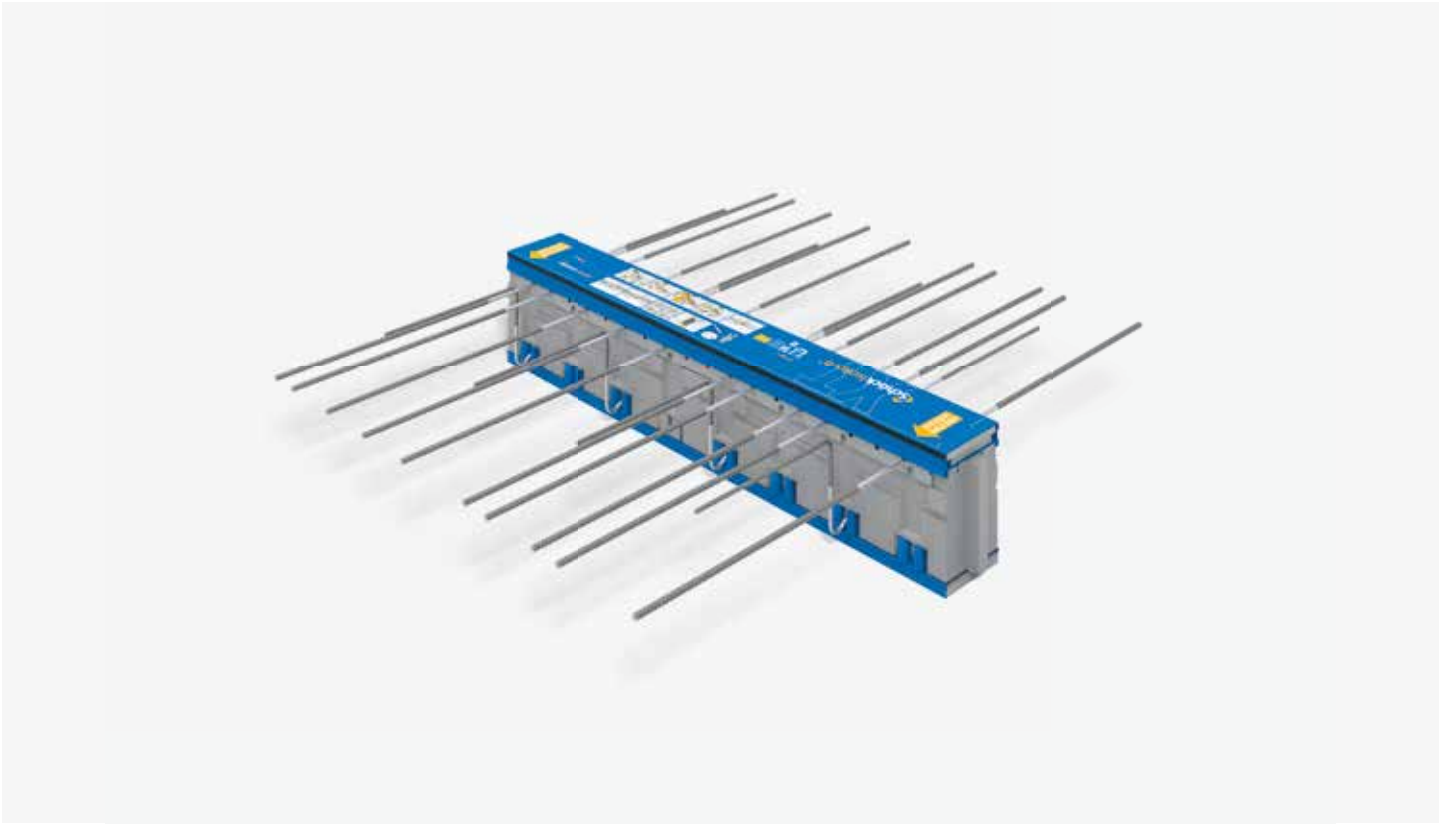
Schöck Isokorb®



Technical Information

Schöck Isokorb® XT for reinforced concrete structures

November 2020

Telephone hotline for design support services
Telephone: 01865 290 890
Fax: 01865 290 899
design@schoeck.co.uk

Planning tools – downloads and requests
Telephone: 01865 290 890
Fax: 01865 290 899
design@schoeck.co.uk
www.schoeck.co.uk

CPD Seminars and on-site consultation
Telephone: 01865 290 890
Fax: 01865 290 899
www.schoeck.co.uk

Planning and consulting service

The engineers of Schöck's application engineering department would be very happy to advise you on static, structural and building-physics questions and will produce for you proposals for your solution with calculations and detailed drawings.
For this please send your planning documentation (general arrangements, sections, static data) with the address of the building project to:

Schöck Ltd
Staniford House
4 Wedgwood Road
Bicester
Oxfordshire
OX26 4UL

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Tel.: 01865 290 890
Fax: 01865 290 899
E-Mail: design@schoeck.co.uk

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Notes | Symbols

Technical Information

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- If the installation takes place in another country then the valid Technical Information of the respective country is to be applied.
- The current Technical Information is to be applied. A current version is available at www.schoeck.co.uk/download

Installation instructions

Current installation instructions can be found online at:
www.schoeck.co.uk/download

Special constructions - bending of reinforcing steel

Some connection situations cannot be realised with those standard product variants presented in this Technical Information. In this case special designs can be requested from the application engineering department (for contact details see page3). This applies, for example, with additional requirements as a result of prefabricated construction (limitations due to technical manufacturing constraints or through transportation width), which can possibly be met using coupler bars. The bending of bars required for special constructions are carried out in the factory in each case on the individual steel bar. With this, it is monitored and ensured that the conditions of the general building supervisory approvals and of BS EN 1992 1-1 (EC2) and BS EN 1992-1-1/NA are observed with regard to bending of reinforcing steel.

Attention: If reinforcing steel in the Schöck Isokorb® is bent or bent and bent back on-site, the observation and the monitoring of the respective conditions lie outside the influence of Schöck Bauteile GmbH. Therefore, in such cases, the warranty is invalidated.

Tags

Hazard note

The yellow triangle with the exclamation mark indicates a hazard note. This means there is a danger to life and limb if compliance is not observed.

Info

The square with "i" indicates important information which must be read in conjunction with the design.

Check list

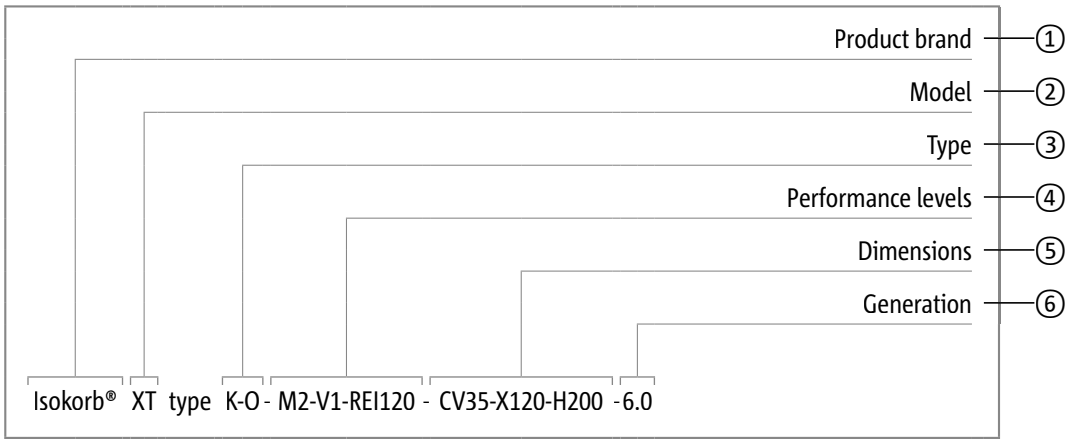
The square with tick indicates the check list. Here the essential points of the design are summarised.

Table of contents

Explanation for the naming of Schöck Isokorb® types

The systematic naming convention for the Schöck Isokorb® product group has changed. This page contains information about the name components for easier conversion.

The type designation has a strict structure. However, the sequence of the name components always remains the same.



① Product brand

Schöck Isokorb®

② Model

In future, the model designation will be a fixed name component of every Isokorb®. It stands for a core characteristic of the product. The corresponding abbreviation will always be positioned before the type word.

Model	Core characteristics of the products	Connection	Components
XT	For extra thermal separation	Reinforced concrete – reinforced concrete, Steel – reinforced concrete	Balcony, access walkway, canopy, floor slab, parapet, balustrade, corbel, beam, wall
CXT	With Combar® for extra thermal separation	Reinforced concrete – Reinforced concrete	Balcony, walkway, canopy
T	For thermal separation	Reinforced concrete – reinforced concrete, Steel – reinforced concrete, Steel – steel	Balcony, access walkway, canopy, floor slab, parapet, balustrade, corbel, beam, wall
RT	For renovation with thermal separation	Reinforced concrete – reinforced concrete, Steel – reinforced concrete	Balcony, walkway, canopy, beam

③ Type

The type is a combination of the following name components:

- Basic type
- static or geometric connection variant

Basic type			
K	Balcony, canopy – cantilevered	**A**	Parapet, balustrade
Q	Balcony, canopy – supported (shear force)	**B**	Beam, downstand beam
C	Corner balcony	**W**	Shear wall
H	Balcony with horizontal loads	**SK**	Steel balcony – cantilevered
Z	Balcony with intermediate insulation	**SQ**	Steel balcony – supported (shear force)
D	Floor slab – continuous (indirectly mounted)	**S**	Steel structure

Static connection variant	
Z	Restraint-free
P	Punctual
V	Shear force
N	Normal force

Geometric connection variant	
L	Arrangement left of viewpoint
R	Arrangement right of viewpoint
U	Balcony with height offset downwards or wall connection
O	Balcony with height offset upwards or wall connection

④ Performance levels

Performance levels include load-bearing levels and fire protection. The various load-bearing levels of an Isokorb® type are numbered consecutively, beginning with 1 for the lowest load-bearing level. Different Isokorb® types with the same load-bearing level do not have the same load-bearing capacity. The load-bearing level must always be determined via the design and calculation tables or the calculation program.

The load-bearing level has the following name components:

- Main load-bearing level: Combination of internal static force and number
- Secondary load-bearing level: Combination of internal static force and number

Internal static force of the main load capacity	
M	Moment
MM	Moment with positive or negative force
V	Shear force
VV	Shear force with positive or negative force
N	Normal force
NN	Normal force with positive or negative force

Internal static force of the secondary load-bearing level	
V	Shear force
VV	Shear force with positive or negative force
N	Normal force
NN	Normal force with positive or negative force

The name component for the fire protection contains the fire resistance class or R0 if no fire protection is required.

Fire resistance class	
REI	R – load bearing capacity, E – integrity, I – insulation under the effects of a fire
RO	No fire protection

⑤ Dimensions

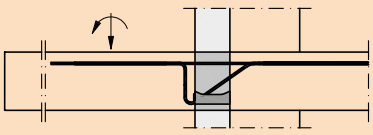
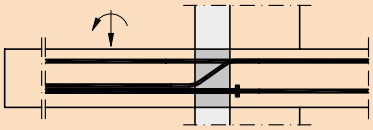
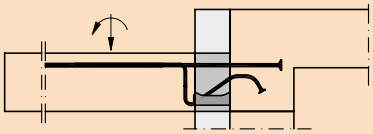
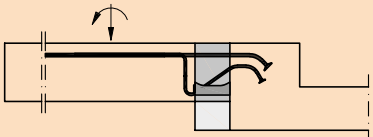
The following name components are part of the dimensions:

- Concrete cover CV
- Bond length LR, bond height HR
- Insulating element thickness X, height H, length L, wIdth W
- Diameter of thread D

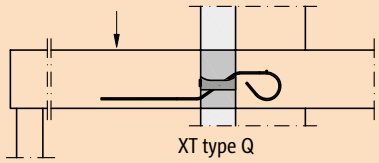
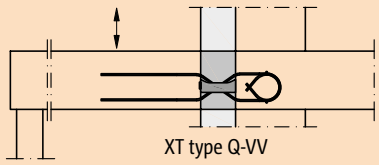
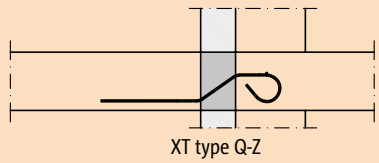
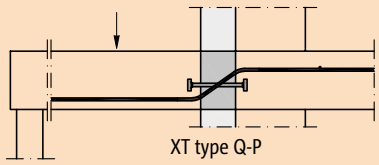
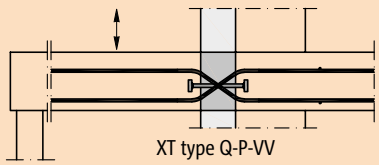
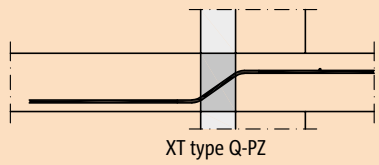
⑥ Generation

Each type designation ends with a generation number.

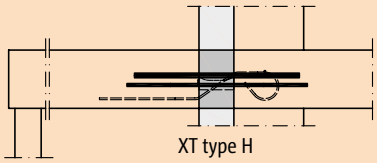
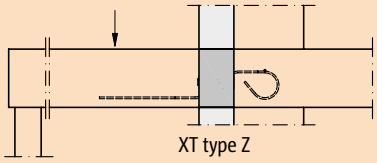
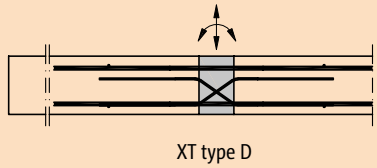
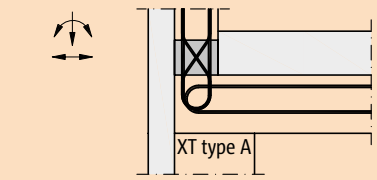
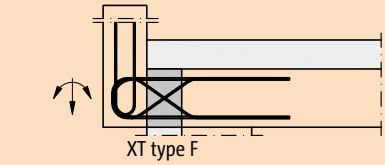
Summary of types

Application	Production type	Schöck Isokorb® type
Free cantilevered balconies  XT type K	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**XT type K** HTE COMPACT Page 25
Free cantilevered balconies  XT type C	**Building site** In-situ concrete balconies **Precast concrete work** Prefabricated component balconies	**XT type C** HTE Page 43
Free cantilevered balconies with height offset downwards  XT type K-U	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies	**XT type K-U** HTE COMPACT Page 61
Free cantilevered balconies with height offset upwards  XT type K-O	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies	**XT type K-O** HTE COMPACT Page 61

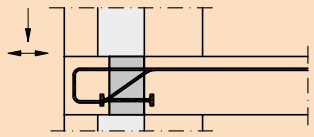
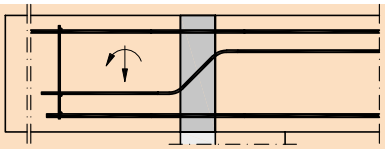
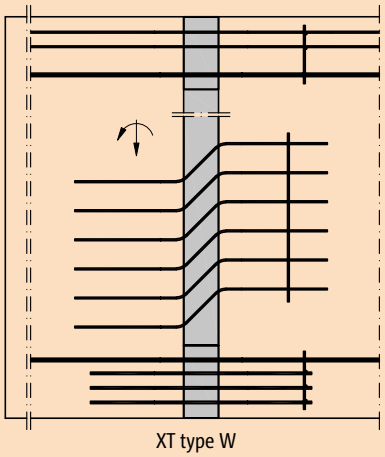
Summary of types

Application	Production type	Schöck Isokorb® type
Supported balconies  XT type Q	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**XT type Q**  Page 93
Supported balconies with positive and negative shear force  XT type Q-VV	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**XT type Q-VV**  Page 93
Zero-stress shear force connection  XT type Q-Z	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**XT type Q-Z** Page 93
Supported balconies with point load peaks  XT type Q-P	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**XT type Q-P** Page 109
Supported balconies with positive and negative shear force with point load peaks  XT type Q-P-VV	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**XT type Q-P-VV** Page 109
Zero-stress shear force connection  XT type Q-PZ	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**XT type Q-PZ** Page 109

Summary of types

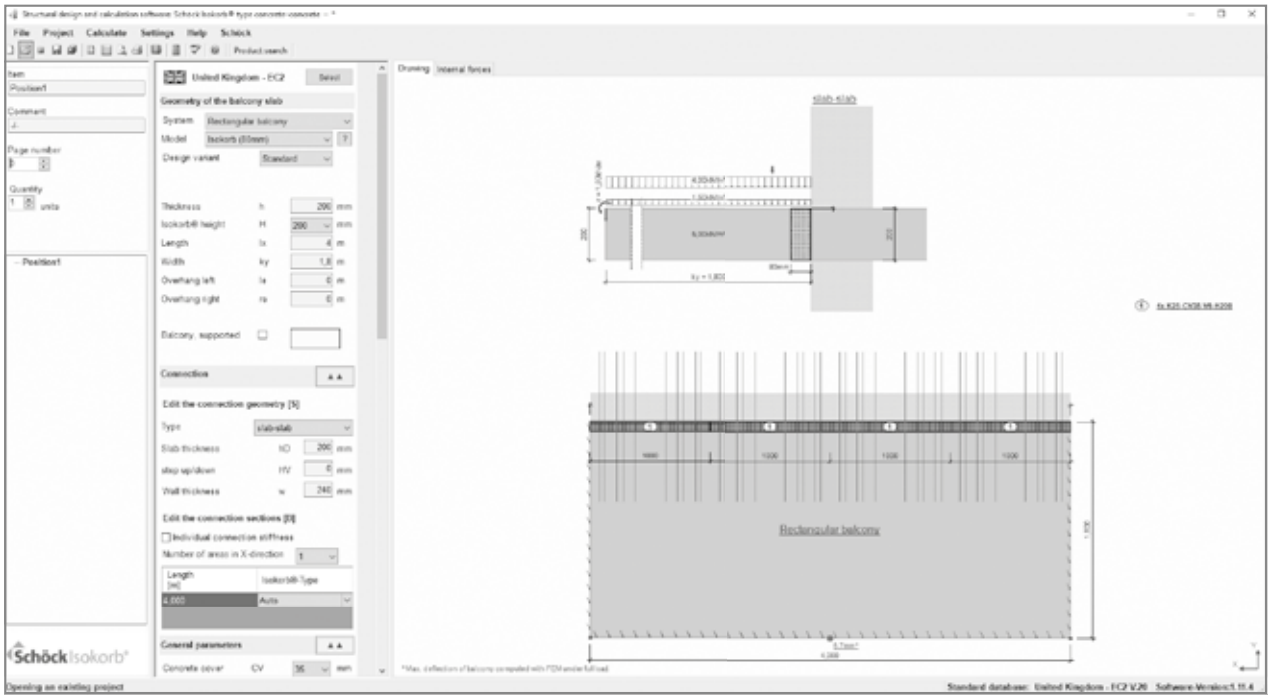
Application	Production type	Schöck Isokorb® type
Addition for horizontal loads  XT type H	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**XT type H** Page 123
Addition as insulating adapter  XT type Z	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**XT type Z** Page 135
Continuous floors with bending momemts and shear forces  XT type D	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**XT type D** Page 141
Balustrades and parapets  XT type A	**Building site** In-situ concrete **Precast concrete work** Completely prefabricated part	**XT type A** Page 151
For attached balustrades  XT type F	**Building site** In-situ concrete **Precast concrete work** Completely prefabricated part	**XT type F** Page 173

Summary of types

Application	Production type	Schöck Isokorb® type
Corbel  XT type O	**Building site** In-situ concrete **Precast concrete work** Completely prefabricated part	**XT type O** Page 187
Free cantilevered downstand beams and reinforced concrete beams  XT type B	**Building site** In-situ concrete **Precast concrete work** Completely prefabricated part	**XT type B** Page 197
Free cantilevered shear walls  XT type W	**Building site** In-situ concrete **Precast concrete work** Completely prefabricated part	**XT type W** Page 205

Design software

The Schöck Isokorb® design software provides the rapid design of thermally separated structures.
The Schöck Isokorb® design software is available as a free download and can also be applied for on DVD. It runs under MS Windows using MS Framework 4.6.1.



Software

- Administrator rights are required for installation of the software.
- Upwards from Windows 7, with an update, the software is to be started using administrator rights (right mouse click on Schöck Icon; selection: carry out using administrator rights).

Fire protection

Reinforced concrete – reinforced concrete

Info

Technical information on the thermal insulation and impact sound insulation can be found under:
www.schoeck.co.uk/download/building-physics

Fire protection configuration

Fire protection configuration Schöck Isokorb® XT

The Schöck Isokorb® XT comes as standard with fire protection configuration (REI120).

- e.g. with fire protection XT type K-M4-V1-REI120-CV35-X120-H200-6.0

For this purpose, fire protection boards are installed on the upper and lower sides of the Schöck Isokorb® (see figure). Prerequisite for the fire protection classification of the balcony connection is that the balcony slab and the ceiling also fulfil the requirements for the necessary fire resistance class according to BS EN 1992-1-1 and -2 (EC 2. If, in addition to the load-bearing capacity (R) intrgrity (E) and insulation (I) are aalso required in case of fire, then the cutouts between the Schöck Isokorb® are to be closed e. g. using the Schöck Isokorb® XT type Z with the fire protection configuration.

The Schöck Isokorb®XT has been checked as enclosing on the basis of floors acc. to BS EN 1365-2. According to BS EN13501-2 only the requirement R (load bearing capacity in cases of fire) is placed on balconies. Basis for this testing is BS EN 1365-5. In addition, for fire protection of the Schöck Isokorb®, testing continues to be carried on the basis of floors acc. to BS EN 1365-2. From this results the classification REI.
(R - load bearing capacity, E - integrity, I - insulation)

The requirements from the fire tests with the Schöck Isokorb® using flush integrated lateral fire protection bands or 10 mm projecting fire protection boards has been implemented. The integrated fire protection bands made from material forming insulation layers or respectively the 10 mm projecting fire protection boards on the upper side of the Schöck Isokorb® , ensure that the joints, which have opened due to the effect of the fire, are closed. Thus the room integrity and the insulation in the case of fire are ensured (see figures below).

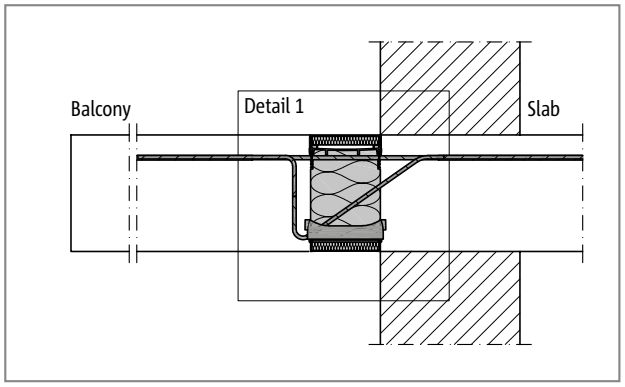


Fig. 1: Schöck Isokorb® XT type K with REI120: Fire protection boards top and bottom; laterally integrated fire protection strips

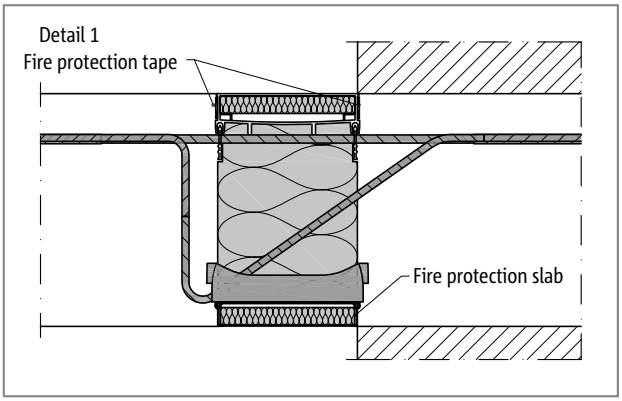


Fig. 2: Schöck Isokorb® XT type K with REI120: Detail 1

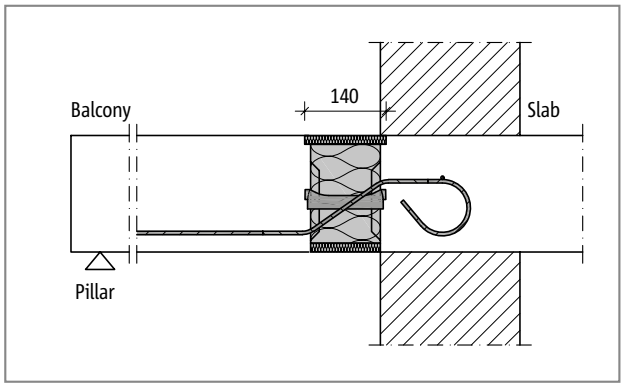


Fig. 3: Schöck Isokorb® XT type Q with REI120: Fire protection board top projecting laterally

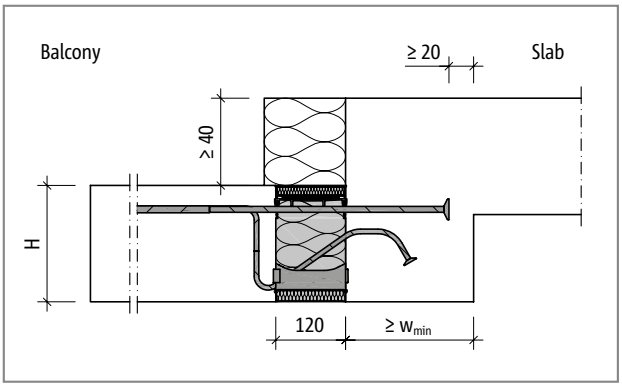


Fig. 4: Schöck Isokorb® XT type K-U with REI120: Fire protection board top and bottom; laterally integrated fire protection strips

Fire protection classes

Fire protection classes REI120, R90, EI120

The reaction to fire of structural components is classified on the basis of the European Standard BS EN 13501-2.

The Schöck Isokorb® XT achieves the following fire protection classes:

Schöck Isokorb® XT type	K, C, Q, H, D ,A, F, O	B, W
Fire protection class	REI120	R 90

Schöck Isokorb® XT type	Z
Fire protection class	EI120

Fire protection

Reinforced concrete – reinforced concrete

Notes

Notes

- The Schöck Isokorb® XT type H is basically to be combined with Schöck Isokorb® types of length 1 m.
- The Schöck Isokorb® XT types Q-P, Q-P-VV, Q-PZ can be employed individually, provided the mode of operation of the load-bearing system is so selected that the load application and the load further transfer into the connection areas provided on both the floor and balcony sides are ensured,. The slab design and the therefrom resultant on-site reinforcement arrangement must be matched to the point load application.
- 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®.
- A static verification is to be provided for the adjacent reinforced concrete structural component on both sides of the Schöck Isokorb®.
- The tight fit between the thrust bearings and the concrete must be ensured, therefore lift joints must be arranged underneath the thrust bearings. With construction joints (BS EN 1992-1-1/NA) between precast concrete members and the Schöck Isokorb® an on-site concreting or grouting strips ≥ 100 mm is carried out.
- The fire protection board of the Schöck Isokorb® may not be penetrated by nails or screws.

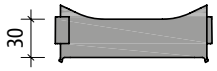
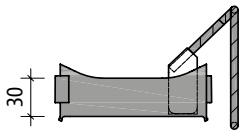
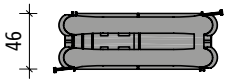
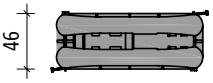
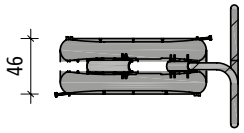
Special constructions - bending of reinforcing steel

Some connection situations cannot be realised with those standard product variants presented in this Technical Information. In this case special designs can be requested from the application engineering department (for contact details see page3). This applies, for example, with additional requirements as a result of prefabricated construction (limitations due to technical manufacturing constraints or through transportation width), which can possibly be met using coupler bars. The bending of bars required for special constructions are carried out in the factory in each case on the individual steel bar. With this, it is monitored and ensured that the conditions of the general building supervisory approvals and of BS EN 1992 1-1 (EC2) and BS EN 1992-1-1/NA are observed with regard to bending of reinforcing steel.

Attention: If reinforcing steel in the Schöck Isokorb® is bent or bent and bent back on-site, the observation and the monitoring of the respective conditions lie outside the influence of Schöck Bauteile GmbH. Therefore, in such cases, the warranty is invalidated.

HTE-Compact®

Summary of the application of the HTE-Compact® pressure bearing in the Schöck Isokorb® types.

HTE-Compact® 20	HTE-Compact® 30	HTE-Compact® 30 with special stirrup
		
		

HTE-Compact® 20

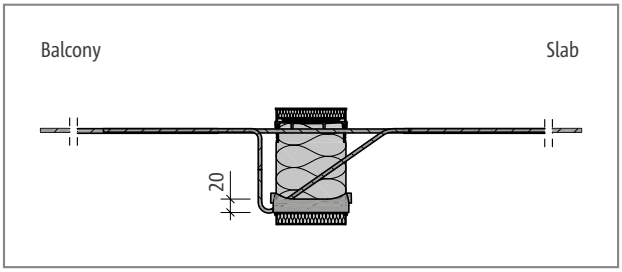


Fig. 5: Schöck Isokorb® XT type K-M1 to M4: Product section

HTE-Compact® 30

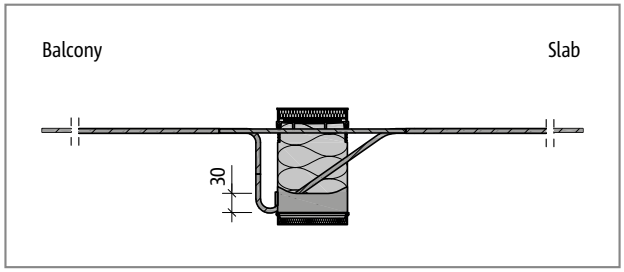


Fig. 6: Schöck Isokorb® XT type K-M5, K-M6: Product section

HTE-Compact® 30 with special stirrup

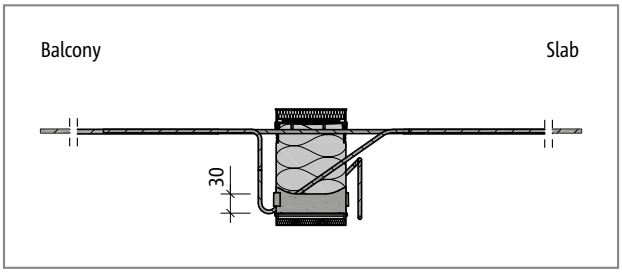


Fig. 7: Schöck Isokorb® XT type K-M7 to M10: Product section

HTE-Compact® 20

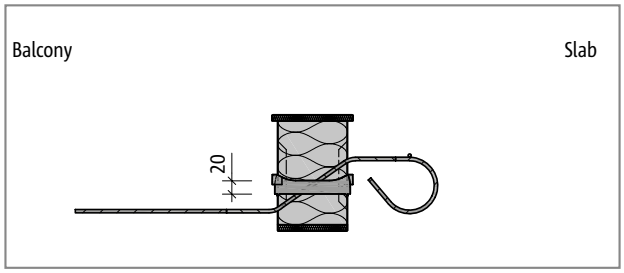


Fig. 8: Schöck Isokorb® XT type Q-V1 to V4: Product section

FEM guidelines

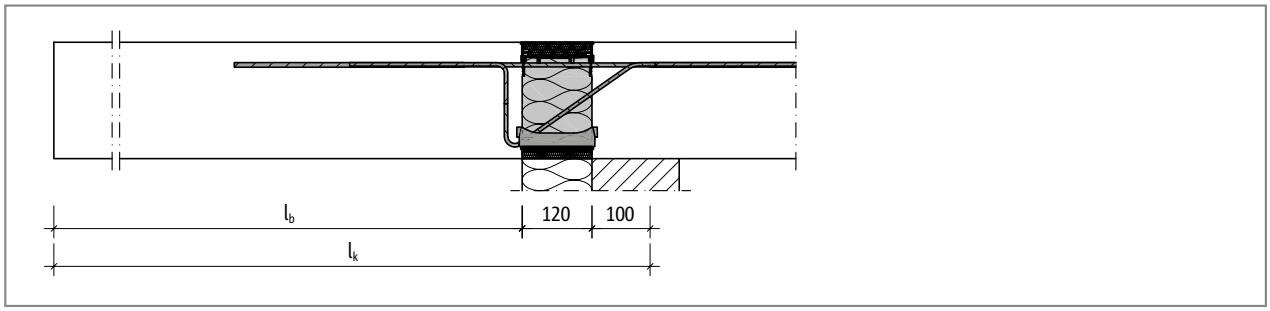


Fig. 9: Schöck Isokorb® XT type K: System cantilever length (l_k) for design and geometric cantilever (l_b)

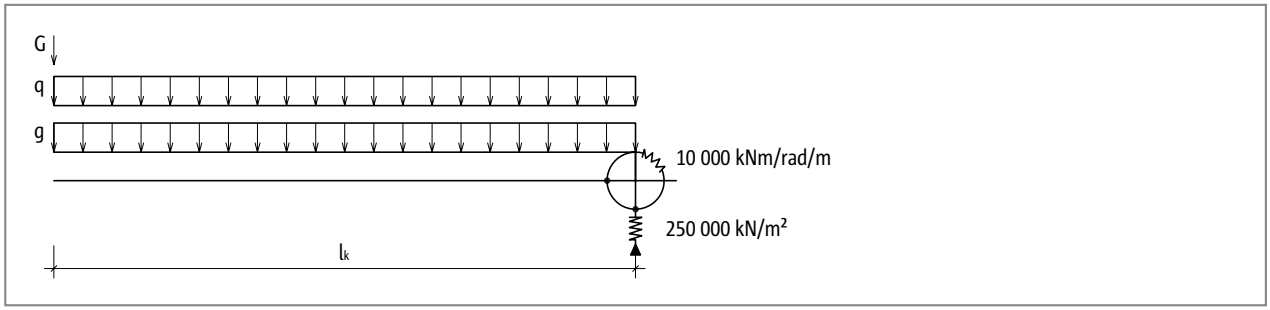


Fig. 10: Schöck Isokorb®: Approximate adoption of the spring stiffness

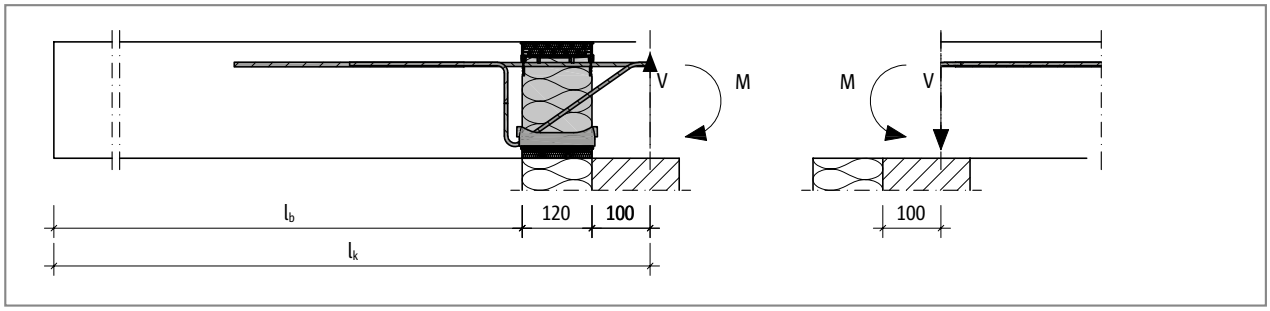


Fig. 11: Schöck Isokorb® XT type K: Determined design stress resultants applied to floor slab

FEM guidelines

Recommended method for the design of Schöck Isokorb® types by means of FEM systems:

- Separate balcony slab from the supporting structure of the building
- Determine internal forces on the balcony slab support taking into account the spring stiffness values (satisfactorily accurate approximation of the Schöck Isokorb® load-bearing behaviour)
  10,000 kNm/rad/m (rotation)
  250,000 kN/m² (vertical)
- Select Schöck Isokorb® type and add the calculated values v_{ed} and m_{ed} as external edge loads to the load-bearing structure of the building.

The stiffnesses in the area of the support of the load-bearing structure (inner slab/wall) are, in the normal case, assumed to be infinitely stiff . Only with very different stiffness relationships of connecting and supporting structural components are the linearly changing moments and shear forces along the edges of the slab to be taken into account.
The achievable internal forces are used for both the design of the Schöck Isokorb® as well as for the design of the inner slab and wall construction of the building.

FEM guidelines

- The Schöck Isokorb® can transmit no twisting moments.

Fatigue/Temperature effect

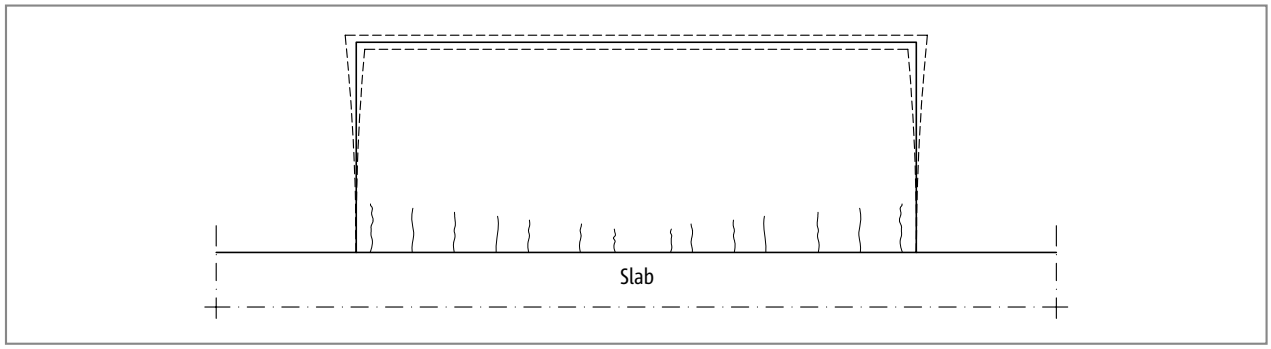


Fig. 12: Balcony slab without Schöck Isokorb®: Crack formation through fatigue possible

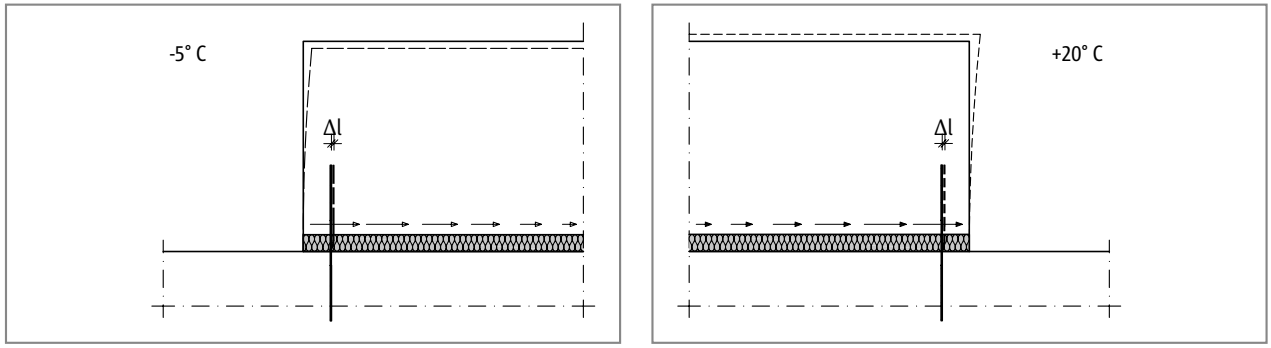


Fig. 13: Schöck Isokorb®: Displacement of the outer bars of a balcony slab by Δl as a result of temperature deformation

Balcony slabs, passageway walks and canopy constructions expand with warming and contract with cooling. With a continuous reinforced concrete slab cracks in the reinforced concrete slab can result at this point through which moisture can penetrate. The Schöck Isokorb® defines a joint which with correct execution prevents cracks in the concrete.

The tension bars, the shear force bars and the HTE-Compact® pressure bearings in the Schöck Isokorb® are consistently deflected transverse to their axis through thermal stressing. Therefore a verification of the fatigue safety is to be carried out for the Schöck Isokorb®. This verification of the fatigue safety is provided through the observation of the respective expansion joint spacings 'e' for the Schöck Isokorb® type (as per approval document). Thus material fatigue and the failure of the structural component over the planned useful life is excluded.

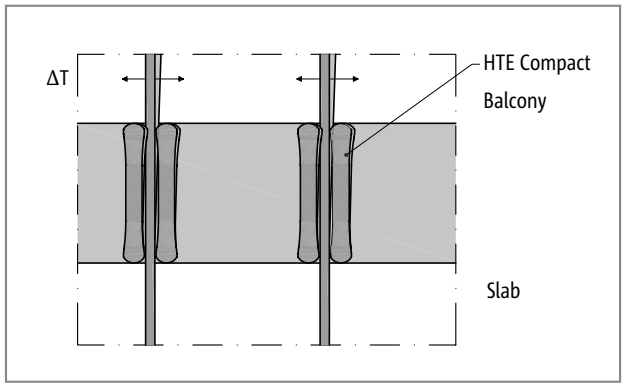


Fig. 14: Schöck Isokorb® detail: deflection of the pressure bearing as a result of temperature difference

The HTE-Compact® pressure bearing compensates the movement of the structural component through individual inclination of each individual compression element. The bars are deflected only in the fatigue safe area.

Fatigue | Expansion joint spacing

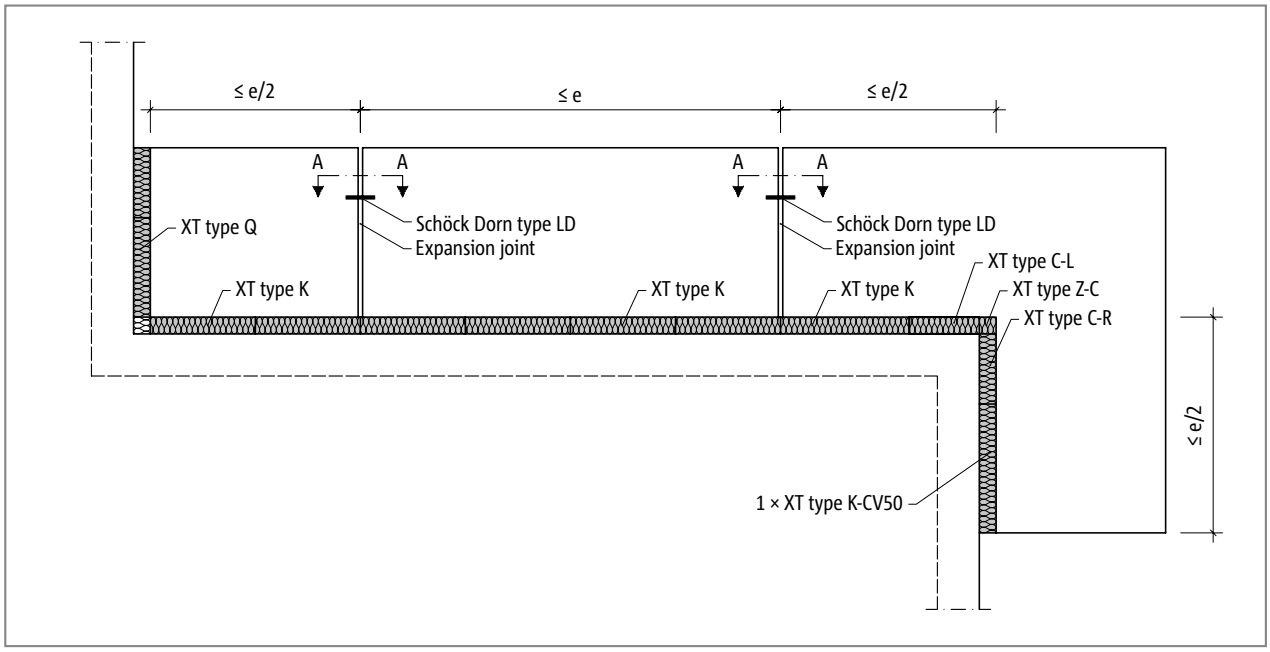


Fig. 15: Schöck Isokorb® XT type K: Expansion joint spacing longitudinally displaceable shear force dowel, e. g. Schöck dowel

The maximum permitted expansion joint spacings e of the Schöck Isokorb® types depend on the bar diameter and type of construction of the chosen Schöck Isokorb® types. For the respective Schöck Isokorb® type, the maximum expansion joint spacings are provided in the Product chapter.
The shear force transmission in the expansion joint can be ensured using a longitudinally displaceable shear force dowel, e.g. Schöck Dorn.

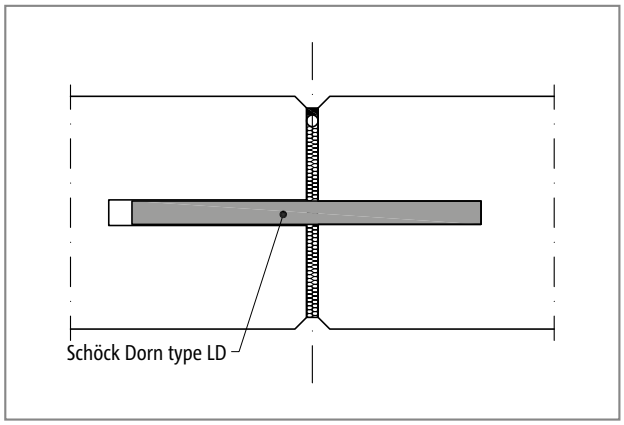


Fig. 16: Schöck Dorn: Expansion joint formation in in-situ concrete

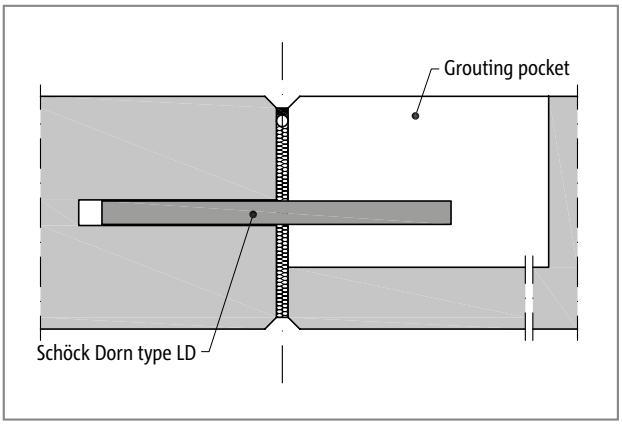


Fig. 17: Schöck Dorn: Expansion joint formation precast concrete balcony

Expansion joints

- Details for the formation of expansion joints see also: Technical Information Schöck Dorn application examples.

Indicative minimum concrete strength classes

In addition, the indicative minimum concrete strength classes of exposure classes XF1, and XF3 are to be noted. The higher minimum concrete strength class is relevant.
In addition, the indicative minimum concrete strength classes of exposure classes XF1, and XF3 are to be noted.

Indicative minimum concrete strength classes (extract from BS EN 1992-1-1 Table 4.1 and BS 8500-1:2006)

Exposure class	Indicative minimum concrete strength classes			Concrete cover CV [mm]
BS EN 1992-1-1 Table 4.1	BS 8500-1:2006	Approval internal component	Approval external component	Schöck Isokorb®
XC1	C20/25	C25/30	C32/40	30
XC3/4	C40/50			35 (Δc = 5 mm)
XC3/4	C30/37			50
XD1	C35/40			50
XS1	C45/55			50 (Δc = 5 mm)
XF1, XF3	acc. to BS EN 206-1			-

Concrete cover

- Due to suitable quality measures with the Schöck Isokorb® manufacture, Δc_{dev} (BS EN 1992-1-1/NA, NDP to 4.4.1.3(3)) may be reduced by 5 mm with the determination of the concrete cover CV.
- XT types K, C: CV35 and CV50 are the concrete cover of the tension bars
- XT type D: CV35 is the concrete cover of the top lying tension bars. The lower tension bars in both cases have 30 mm concrete cover.
  CV50 is the cover of the top and bottom lying tension bars.
- XT types Q, Q-VV, Q-Z: Concrete cover balcony side at the bottom at least 30 mm (as a rule less exposed than the balcony top surface).
- XT types Q-P, Q-P-VV, Q-PZ: Concrete cover balcony side at the bottom at least 40 mm (as a rile less exposed than the balcony top surface).
- With special requirements on the concrete cover further product variants can be requested from Schöck Technical Design Department.

Construction materials

Schöck Isokorb® construction materials

Reinforcing steel	BS4449
Structural steel	S 235 JRG1, S 235 JO, S 235 J2, S 355 JR, S 355 J2, or S 355 JO according to BS EN 10025-2 for the pressure slabs
Stainless steel	Ribbed round steel B500B NR, Material No. 1.4571 or 1.4482 according to Approval document Z-15.7-240 Tension bars Material No. 1.4482 f_{yk} = 600 N/mm^2) Plain steel bars, Material No. 1.4571 or 1.4404 of hardening level S 460
Concrete pressure bearings	HTE-Compact® pressure bearings (pressure bearings made from micro-steel fibre-reinforced high performance fine concrete) HDPE plastic sheathing
Insulating material	Neopor® - this polystyrene hard foam is a registered trademark of BASF, λ = 0.031 W/(m•K), building material classification B1 (flame retardant)
Fire protection material	Light building panels of building material class A1, cement-bonded fire protection panels, mineral wool: ρ ≥ 150 kg/m^3, melting point T ≥ 1000 °C and integrated fire protection tape

Connected components

Reinforced concrete	B500A or B500B according to DIN 488-1, resp. BS EN 1992-1-1 (EC2) and BS EN 1992-1-1/NA
Concrete	Standard concrete according to DIN 1045-2 resp. BS EN 206-1 with a dry density of 2000 kg/m^3 to 2600 kg/m^3 (lightweight concrete is not permitted) **Indicative minimum strength class of the outer structural components :** At least C25/30 and depending on the environmental classes according to BS EN 1992-1-1/NA, Table NA.E.1 **Indicative concrete strength class of the internal structural components:** At least C20/25 and depending on the environmental classes according to BS EN 1992-1-1/NA, Table NA.E.1

Information on the bending of reinforcing steel

With the production of the Schöck Isokorb® in the factory it is ensured through monitoring that the conditions of the general building supervisory approval document and of BS EN 1992-1-1 (EC2) and BS EN 1992-1-1/NA with regard to bending of reinforcing steel are oberved.

Attention: Attention: If reinforcing steel of the Schöck Isokorb® is bent or bent and bent back on-site, the observation and the monitoring of the respective conditions (European Technical Assessment (ETA, BS EN 1992-1-1 (EC2) and BS EN 1992-1-1/NA) lie outside the influence of Schöck Bauteile GmbH. Therefore, in such cases, the warranty is invalidated.

Schöck Isokorb® XT type K

Schöck Isokorb® XT type K
Suitable for cantilever balconies. It transfers negative moments and positive shear forces. The Schöck Isokorb® XT type K with the secondary load-bearing level VV transmits negative moments, positive and negative shear forces.

Element arrangement | Installation cross sections

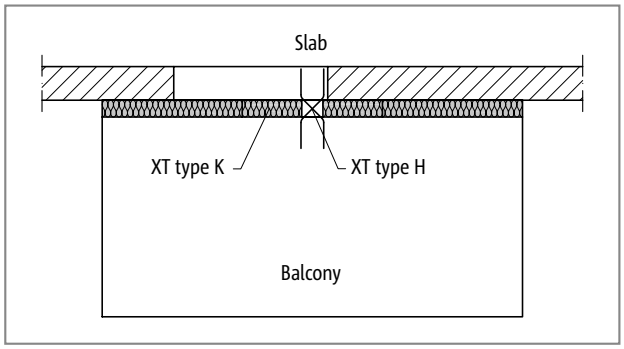


Fig. 18: Schöck Isokorb® XT type K: Balcony freely cantilevered; optional with XT type H (from page 125) with planned horizontal loads (e. g. closed ballustrades)

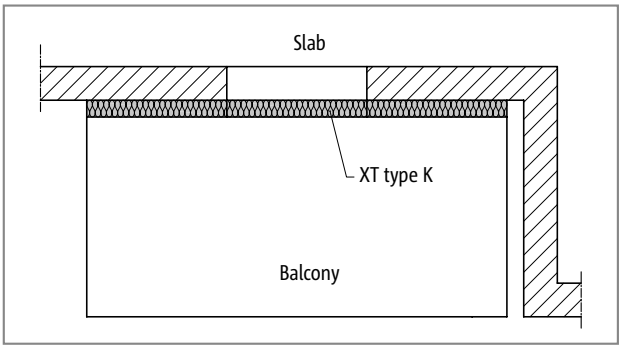


Fig. 19: Schöck Isokorb® XT type K: Balcony with facade offset

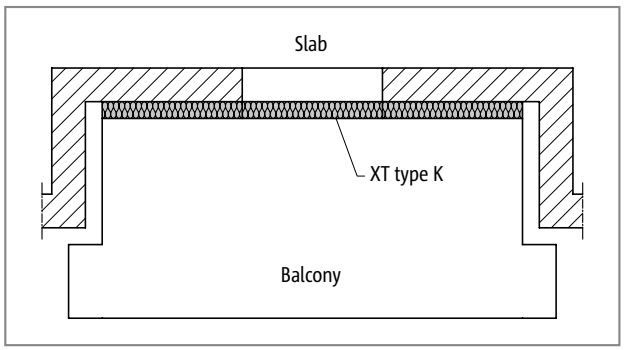


Fig. 20: Schöck Isokorb® XT type K: Balcony with facade recess

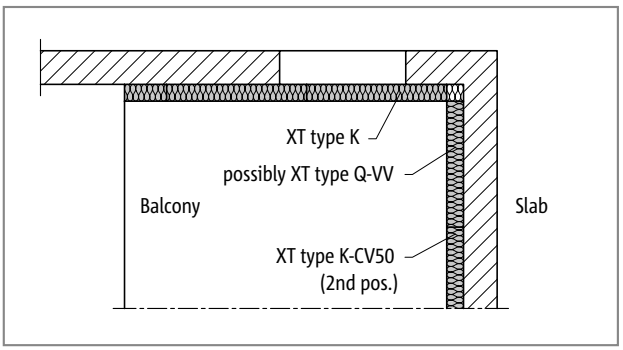


Fig. 21: Schöck Isokorb® XT type K, Q-VV: balcony with inner corner, supported two-sided

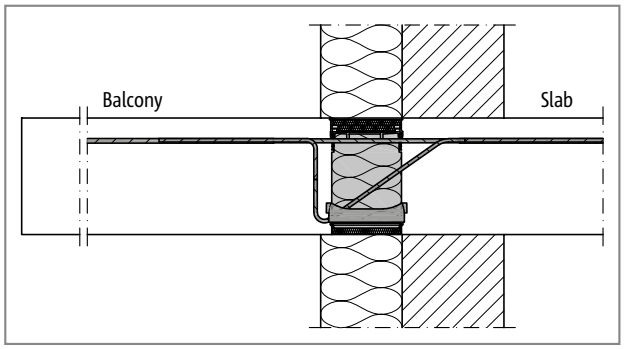


Fig. 22: Schöck Isokorb® XT type K: Connection with thermal insulation composite system (TICS)

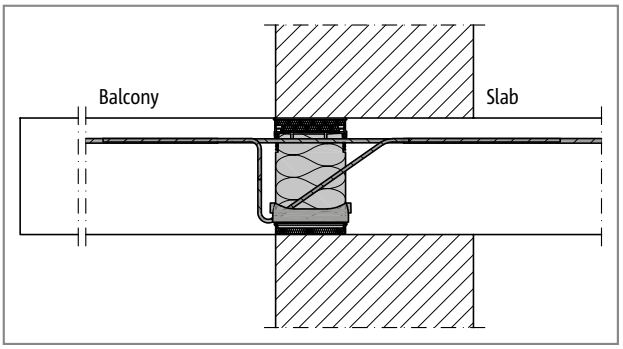


Fig. 23: Schöck Isokorb® XT type K: Connection with single-leaf masonry

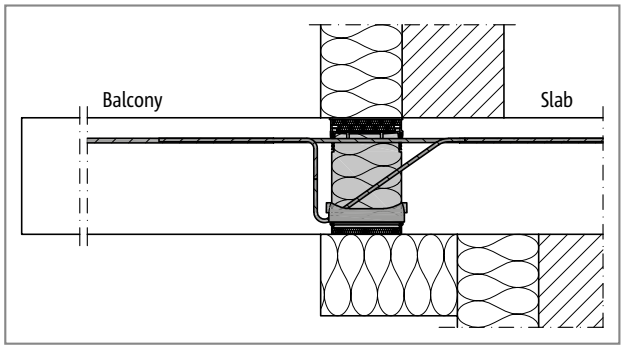


Fig. 24: Schöck Isokorb® XT type K: Connection for indirectlypositioned floor and TICS

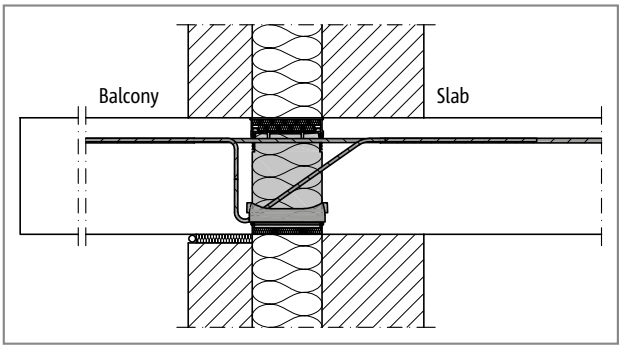


Fig. 25: Schöck Isokorb® XT type K: Cavity wall with a balcony at inner slab level

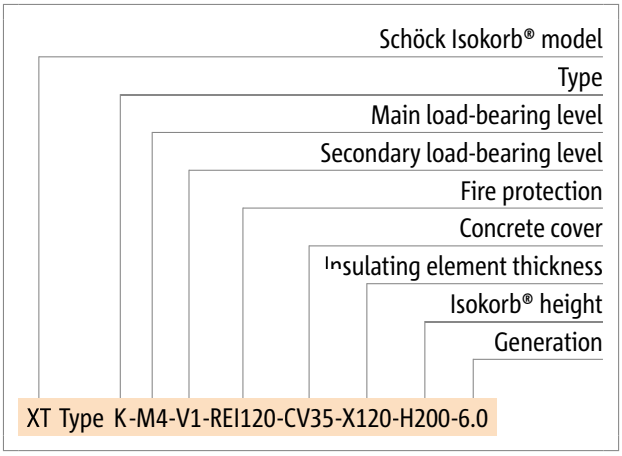
Product selection | Type designations | Special designs

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 M10
- Secondary load-bearing level:
  V1 to V2, 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 - 250 mm for Schöck Isokorb® XT type K and concrete cover CV35
  H = 180 - 250 mm for Schöck Isokorb® XT type K and concrete cover CV50
- 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 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
Secondary load-bearing level			$v_{Rd,z}$ [kN/m]					
	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
	VV1		-	-	±50.1	±50.1	±50.1	±50.1

Schöck Isokorb® XT type K	M1	M2	M3	M4	M5	M6
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 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 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 VV1 (piece)	-	-	8	8	12	13
Special stirrup VV1 (Stk.)	-	-	-	-	-	4

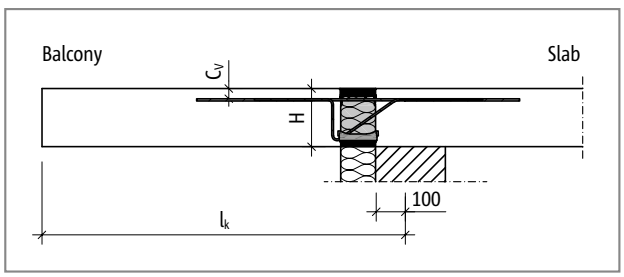


Fig. 26: Schöck Isokorb® XT type K: Static system

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
Secondary load-bearing level			$v_{Rd,z}$ [kN/m]				
	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
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

- 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).
- With CV50, H = 180 mm is the lowest Isokorb® height, this requires a minimum slab thickness of h = 180 mm.
- 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.

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 39

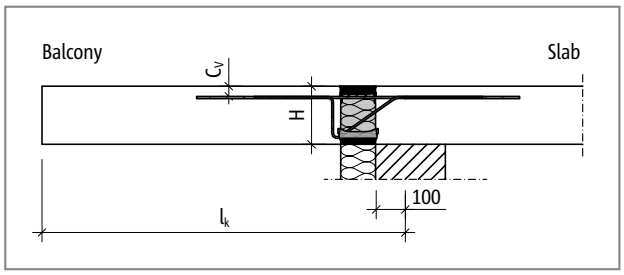


Fig. 27: Schöck Isokorb® XT type K: Static system

Schöck Isokorb® XT type K		M1 - M6		M7 - M10	
Deflection factors when		tan α [%]		tan α [%]	
		CV35	CV50	CV35	CV50
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	1.2
	200	0.8	0.9	0.9	1.0
	210	0.7	0.8	0.9	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

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 - M10	
maximum cantilever length with		$l_{k,max}$ [m]	
		CV35	CV50
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
- Specific weight of concrete γ=25 kN/m³
- Dead weight of the balcony surfacing $g_2 \leq 1.2$ kN/m²
- Balcony rail $g_R \leq 0.75$ kN/m
- Service load q = 4.0 kN/m² with the coefficient $\psi_{2,i}$ = 0.3 for the quasi-permanent combination

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 Dorn.

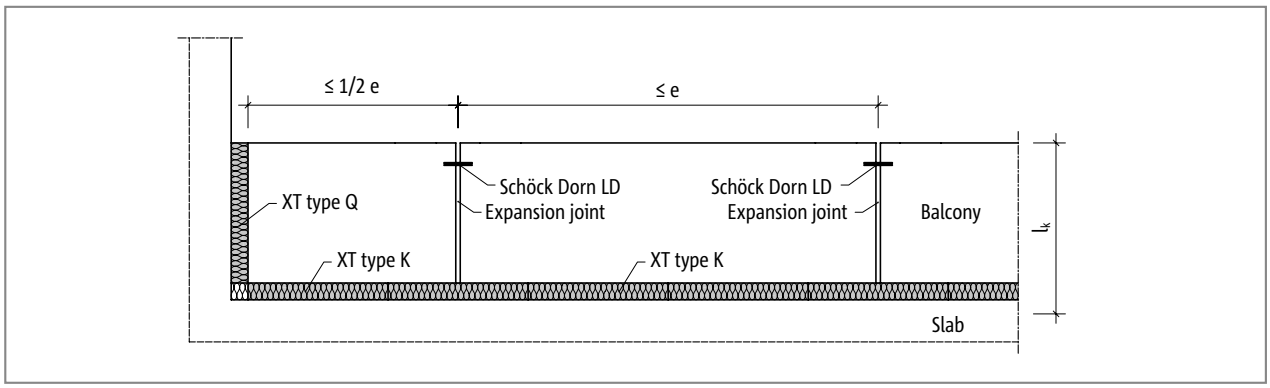


Fig. 28: Schöck Isokorb® XT type K: Expansion joint arrangement

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

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

Product description

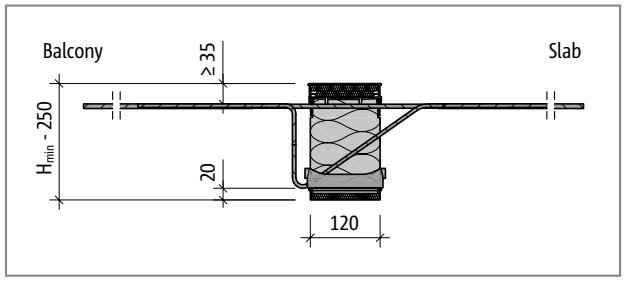


Fig. 29: Schöck Isokorb® XT type K-M1 to M4: Product section

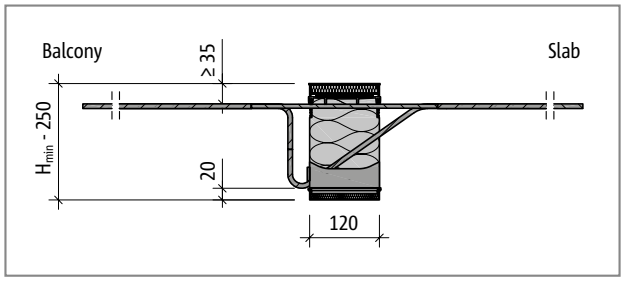


Fig. 30: Schöck Isokorb® XT type K-M5, M6: Product section

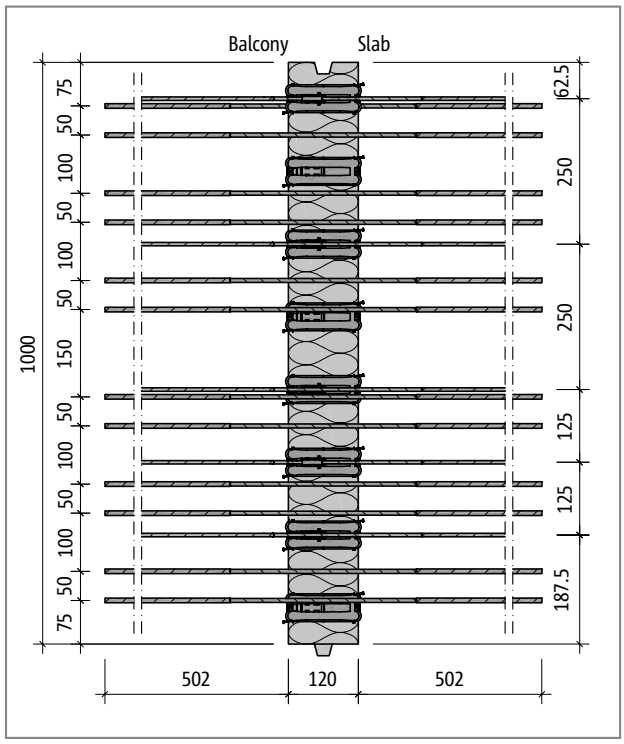


Fig. 31: Schöck Isokorb® XT type K-M4: Product plan view

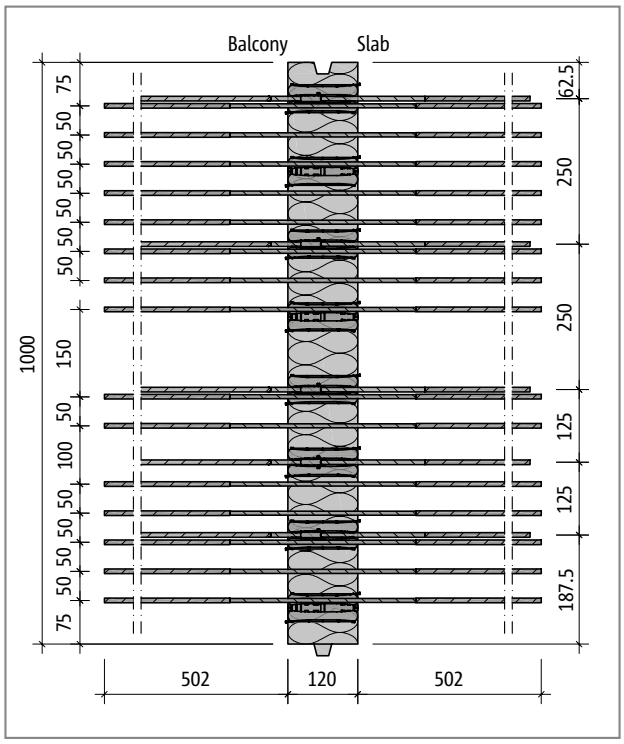


Fig. 32: Schöck Isokorb® XT type K-M6: Product plan view

Product information

- Download further product plan views and cross-sections at www.schoeck.co.uk/download
- 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

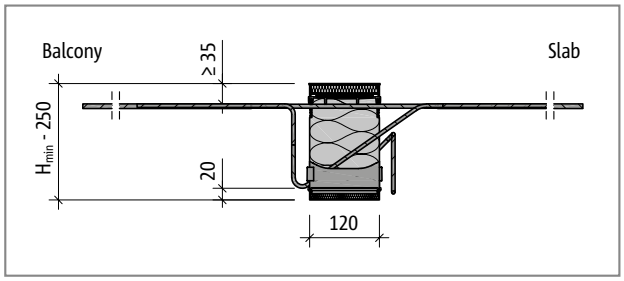


Fig. 33: Schöck Isokorb® XT type K-M7 to M10: Product section

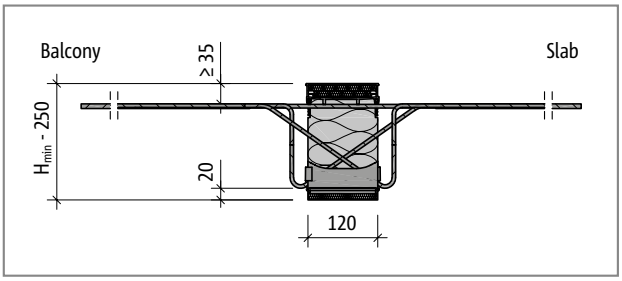


Fig. 34: Schöck Isokorb® XT type K-M5-VV1: Product section

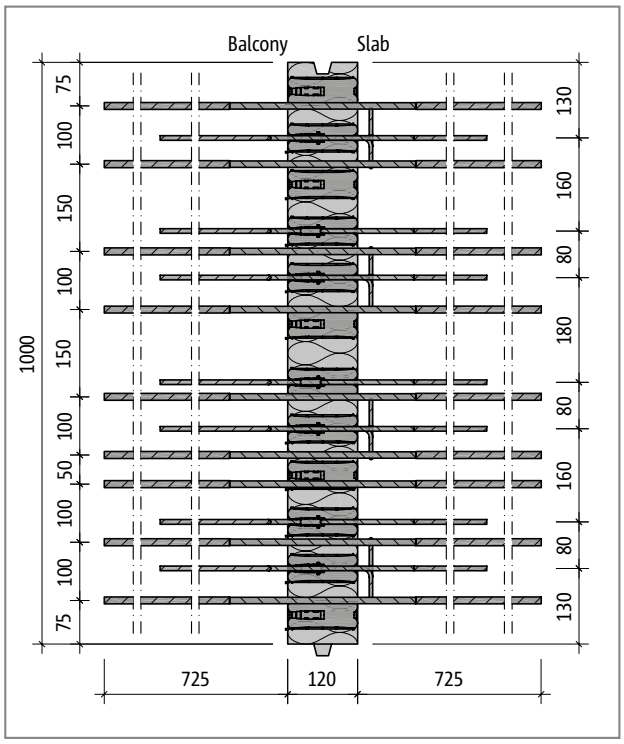


Fig. 35: Schöck Isokorb® XT type K-M8: Product plan view

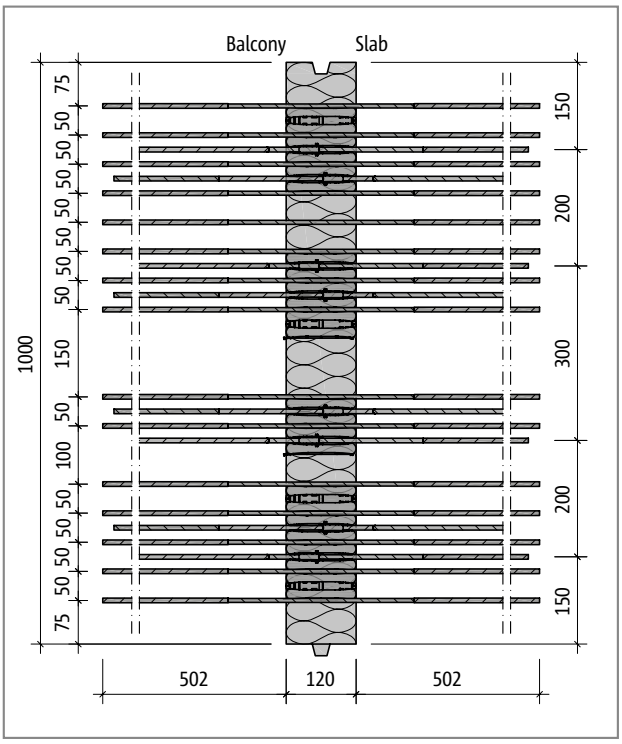


Fig. 36: Schöck Isokorb® XT type K-M5-VV1: Product plan view

Product information

- Download further product plan views and cross-sections at www.schoeck.co.uk/download
- 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

On-site reinforcement

Direct support

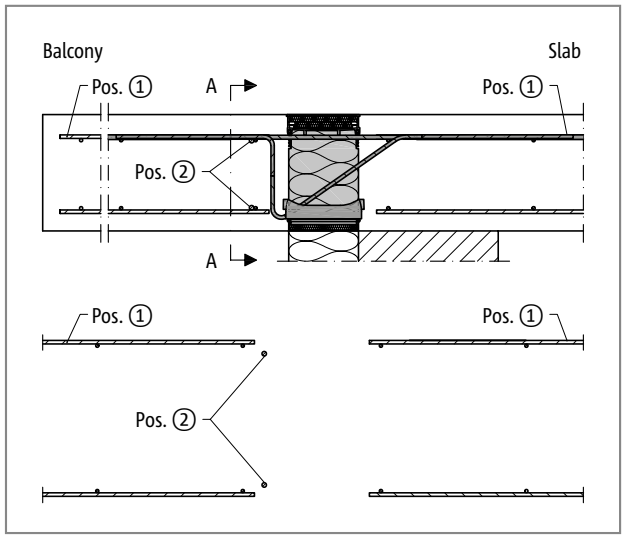


Fig. 37: Schöck Isokorb® XT type K: on-site reinforcement with direct support

Indirect support

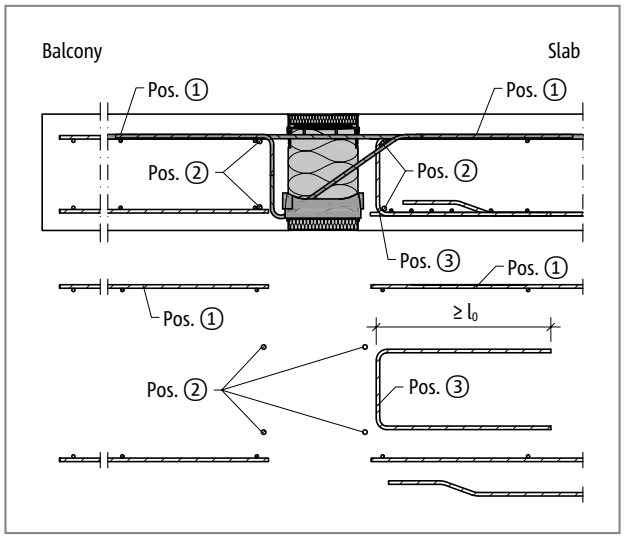


Fig. 38: Schöck Isokorb® XT type K: On-site reinforcement with indirect support

Direct and indirect support

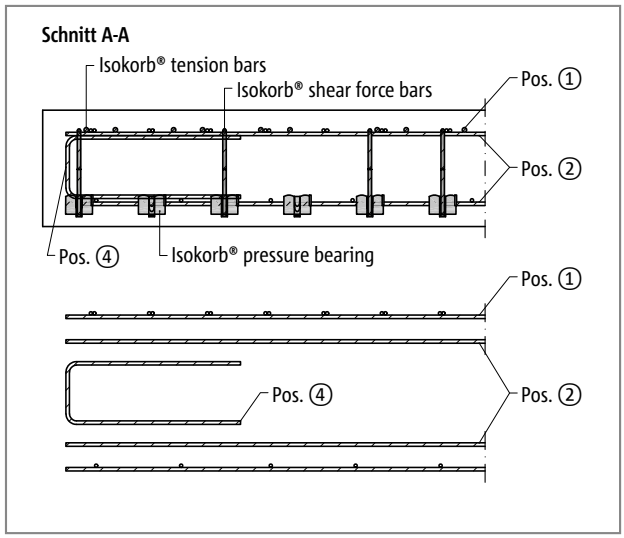


Fig. 39: Schöck Isokorb® XT type K: On-site reinforcement balcony side in section A-A; Pos. 4 = side reinforcement on the free edge perpendicular to the Schock Isokorb

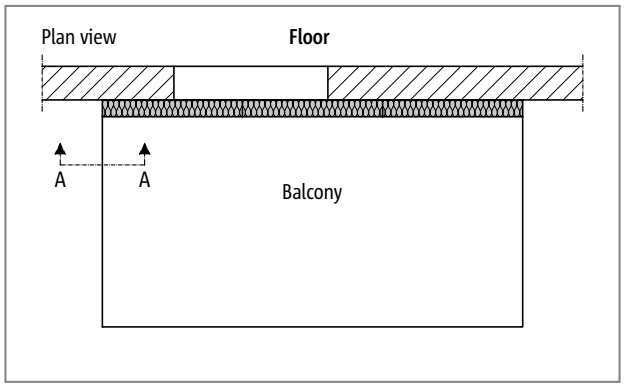


Fig. 40: Schöck Isokorb® XT type K: Diagram of the position of Section A - A

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 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; variants adapted to load-bearing level. The required reinforcement cross-section depends on the bar diameter of the steel bar or wire mesh reinforcement.

Schöck Isokorb® XT type K			M1		M2		M3			M4		
On-site reinforcement	Secondary load-bearing level		V1	V2	V1	V2	V1	V2	VV1	V1	V2	VV1
	Type of bearing	Height [mm]	Floor (XC1) concrete strength class ≥ C25/30 Balcony (XC4) concrete strength class ≥ C25/30									
Pos. 1 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	689
Pos. 1 with ⌀10 [mm²/m]			352	317	553	518	695	662	722	798	755	825
Pos. 1 with ⌀12 [mm²/m]			422	381	664	622	834	794	866	958	906	990
Pos. 2 Steel bars along the insulation joint												
Pos. 2	direct	160 - 250	2 • H8									
	indirect	160 - 250	4 ⌀ 8									
Pos. 3 vertical reinforcement												
Pos. 3 [mm²/m]	indirect	160 - 250	113		113		113		-	113		-
Pos. 4 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		
On-site reinforcement	Secondary load-bearing level		V1	V2	VV1	V1	V2	VV1	V1	V2	VV1
	Type of bearing	Height [mm]	Floor (XC1) concrete strength class ≥ C25/30 Balcony (XC4) concrete strength class ≥ C25/30								
Pos. 1 overlap reinforcement depending on bar diameter											
Pos. 1 with ⌀8 [mm²/m]	direct/indirect	160 - 250	762	724	754	866	827	880	979	979	990
Pos. 1 with ⌀10 [mm²/m]			920	877	902	1044	1001	880	1040	1061	990
Pos. 1 with ⌀12 [mm²/m]			1104	1052	1082	1253	1201	880	1102	1143	990
Pos. 2 Steel bars along the insulation joint											
Pos. 2	direct	160 - 250	2 • H8								
	indirect	160 - 250	4 ⌀ 8								
Pos. 3 vertical reinforcement											
Pos. 3 [mm²/m]	indirect	160 - 250	113		-	125		-	113		-
Pos. 4 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	
On-site reinforcement	Secondary load-bearing level		V1	V2	VV1	V1	V2	V1	V2
	Type of bearing	Height [mm]	Floor (XC1) concrete strength class ≥ C25/30 Balcony (XC4) concrete strength class ≥ C25/30						
Pos. 1 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]			1212	1253	1210	1502	1522	1609	1630
Pos. 2 Steel bars along the insulation joint									
Pos. 2	direct	160 - 250	2 • H8						
	indirect	160 - 250	4 ⌀ 8						
Pos. 3 vertical reinforcement									
Pos. 3 [mm²/m]	indirect	160 - 250	113		-	113		113	
Pos. 4 supplementary edge reinforcement									
Pos. 4	direct/indirect	160 - 250	according to BS EN 1992-1-1 (EC2), 9.3.1.4						

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.

Tight fit/Concreting section | Precast/Compression joints

Tight fit/Concreting section

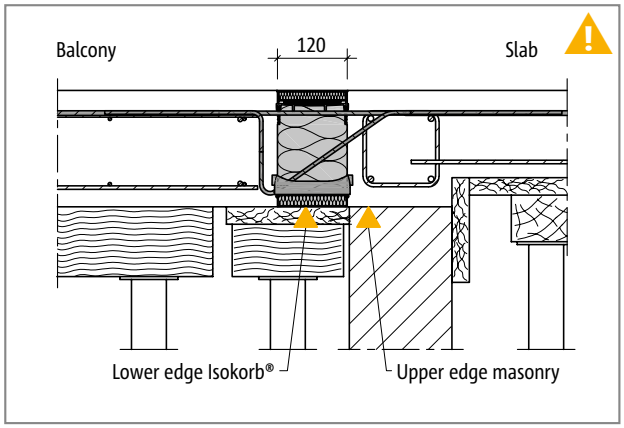


Fig. 41: Schöck Isokorb® XT type K: In-situ concrete balcony with height offset floor on masonry wall

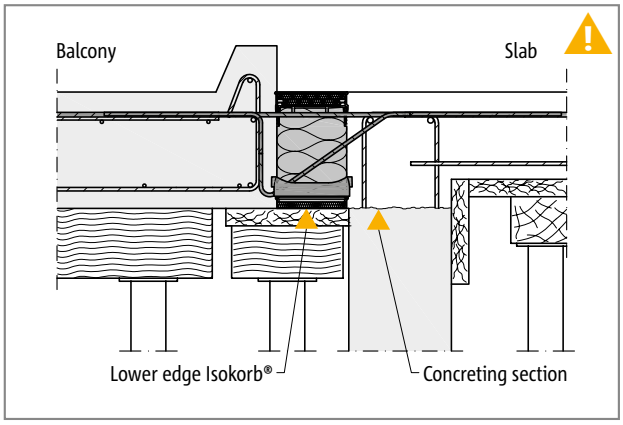


Fig. 42: Schöck Isokorb® XT type K: Fully finished balcony with height offset floor on precast reinforced concrete wall

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

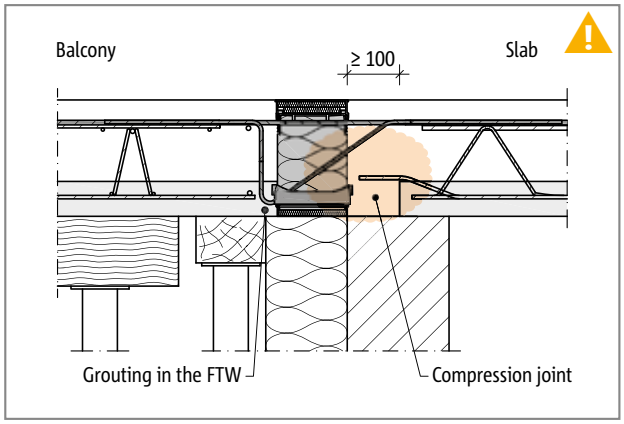


Fig. 43: Schöck Isokorb® XT type K: Direct support, installation in conjunction with element slabs (here: h ≤ 180 mm), compression joint on floor side

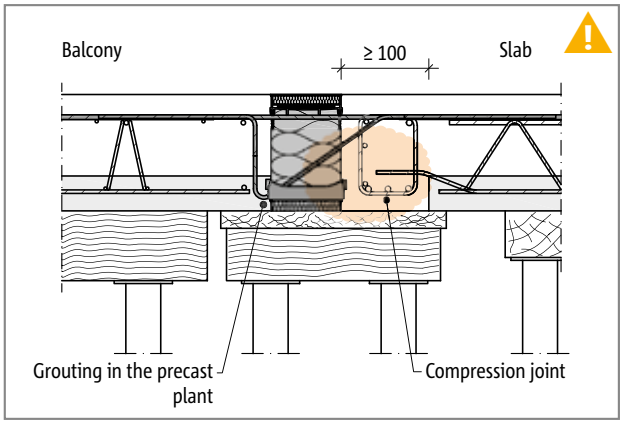


Fig. 44: Schöck Isokorb® XT type K: Indirect support, installation in conjunction with element slabs (here: h ≤ 180 mm), compression joint on floor side

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

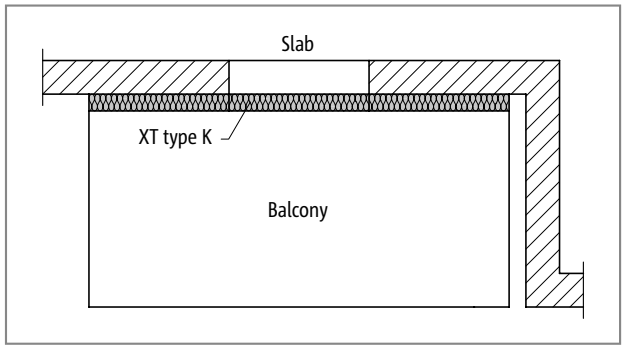


Fig. 45: Schöck Isokorb® XT type K: Plan view

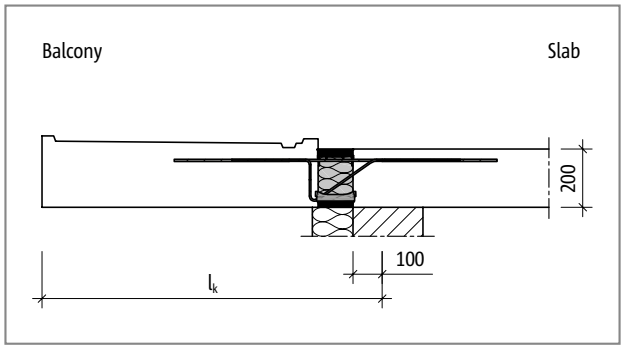


Fig. 46: Schöck Isokorb® XT type K: Static system

Static system and load assumptions

Geometry:	Cantilever length	l_k = 2.12 m
	Balcony slab thickness	h = 200 mm
Design loads:	Balcony slab and coating	g = 6.5 kN/m²
	Live load	q = 4.0 kN/m²
	Edge load (parapet)	g_R = 1.5 kN/m
Exposure classes:	Outer XC 4	
	Inner XC 1	
Selected:	Concrete quality C25/30 for balcony and floor	
	Concrete cover c_{nom} = 35 mm for Isokorb®-tension bars	
	(reduction Δc_{def} by 5mm, in connection with quality measures Isokorb® production)	
Connection geometry:	No height offset, no floor edge downstand beam, no balcony upstand	
Floor supported:	Floor edge directly supported	
Balcony support:	Constraining 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 31) > 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 28) > m_{Ed}

v_{Rd} = +35.3 kN/m (see page 28) > v_{Ed}

Design example

Serviceability limit state (deflection/precamber)

Deformation factor $\tan \alpha$ = 0.8 (from table, see page 30)

selected load combination: g + q/2

(recommendation for the determination of the camber from Schöck Isokorb®)

$m_{üd}$ determine the load-bearing capability in the serviceability 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 the expansion joints balcony length : 4.00 m < 23.00 m

=> no expansion joints required

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 proportionate deflection resulting from 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 inner slab elements been charted in the implementation plans?
- ☐ Have the requirements for on-site reinforcement of connections been defined in each case?
- ☐ With precast balconies are possibly necessary gaps for the front side transportation anchors and downpipes with internal drainage taken into account? Is the maximum centre distance of 300 mm for the Isokorb® bars observed?
- ☐ Is the XT type K-U, K-O (from page 61) or a special design required instead of a Schöck Isokorb® XT type K due to connection with height offset or to a wall?

Schöck Isokorb® XT type C

Schöck Isokorb® XT type C
Suitable for cantilevered corner balconies. It transfers negative moments and positive shear forces.

Element arrangement

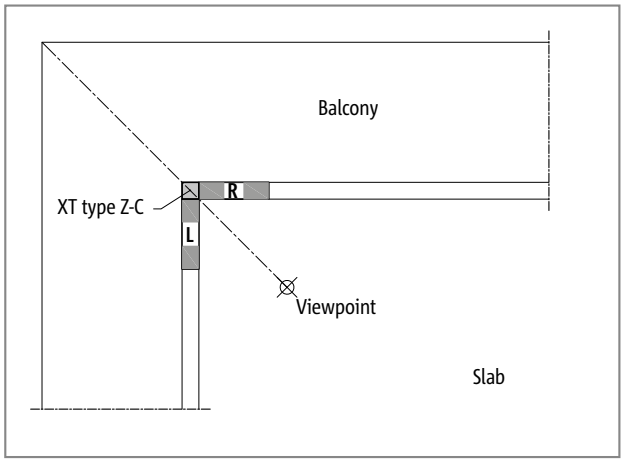


Fig. 47: Schöck Isokorb® XT type C: Arrangement XT type C-L left from viewpoint, arrangement XT type C-R right from viewpoint

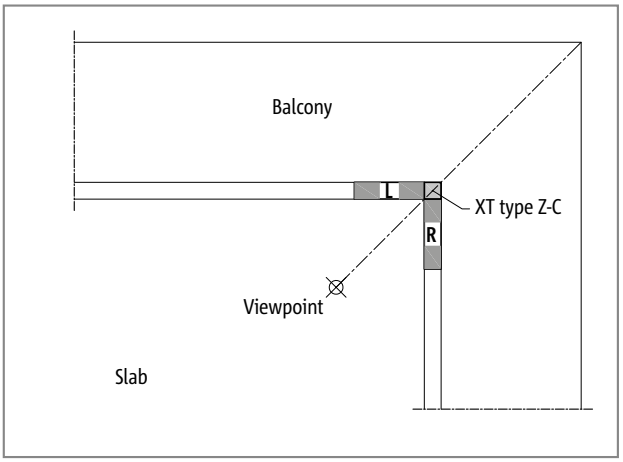


Fig. 48: Schöck Isokorb® XT type C: Arrangement XT type C-L left from viewpoint, arrangement XT type C-R right from viewpoint

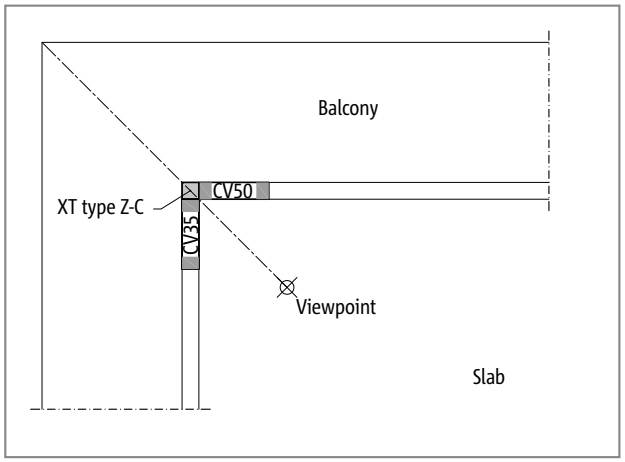


Fig. 49: Schöck Isokorb® XT type C: Concrete cover selectable: Here CV35 left from viewpoint, concrete cover CV50 right from viewpoint

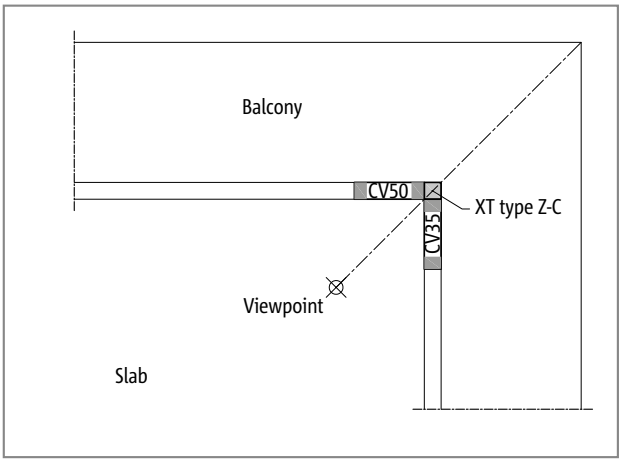


Fig. 50: Schöck Isokorb® XT type C: Concrete cover selectable: Here CV50 left from viewpoint, concrete cover CV35 right from viewpoint

Element arrangement

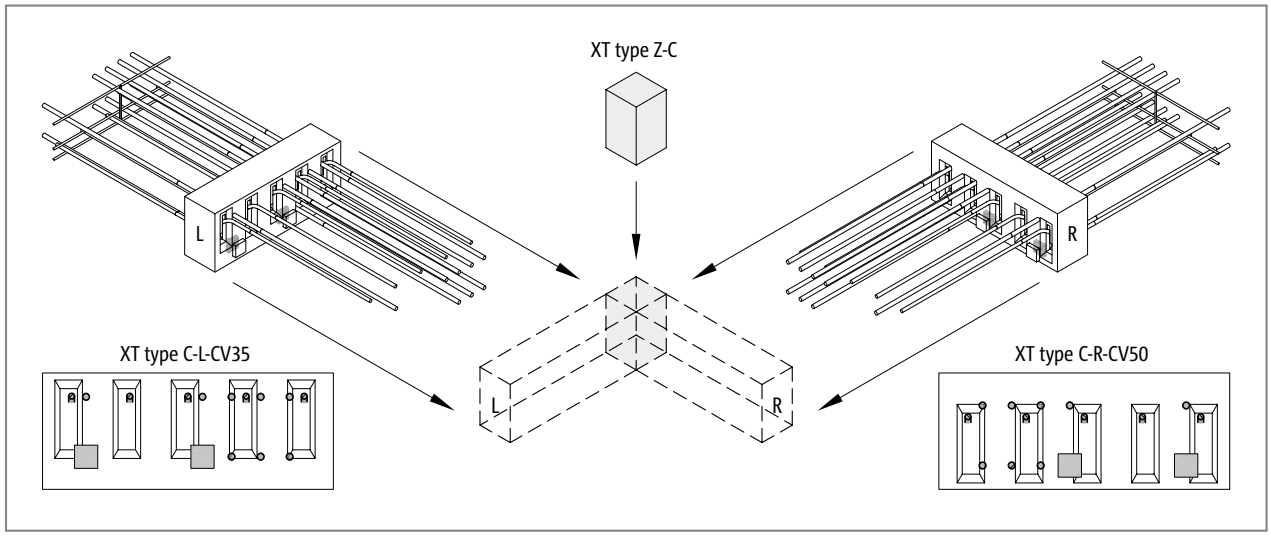


Fig. 51: Schöck Isokorb® XT type C-L-CV35, XT type C-R-CV50: Arrangement at the corner using corner insulating element

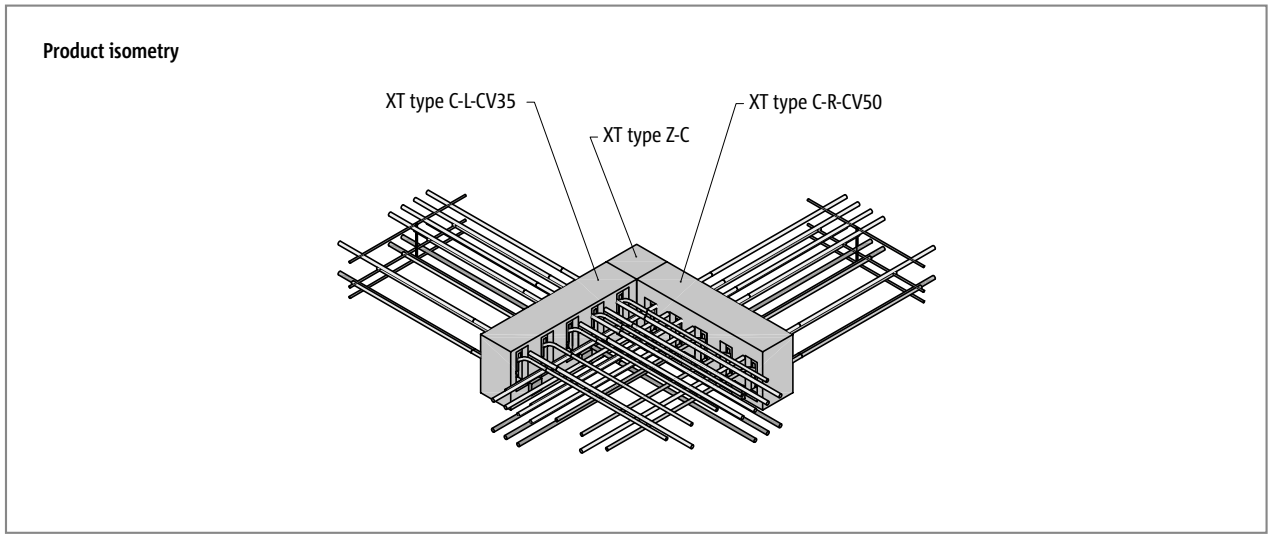


Fig. 52: change representation to illustration Schöck Isokorb® XT type C-L-CV35, XT type C-R-CV50: Isometric representation

Element arrangement

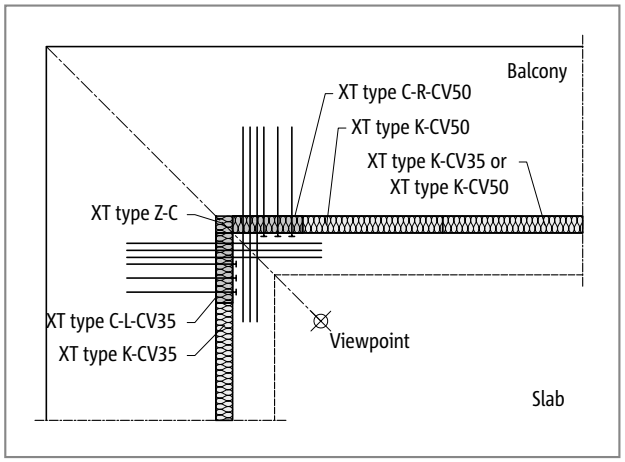


Fig. 53: Schöck Isokorb® XT type C: Balcony with outer corner freely cantilevered (application XT type C-L-CV35, XT type C-R-CV50)

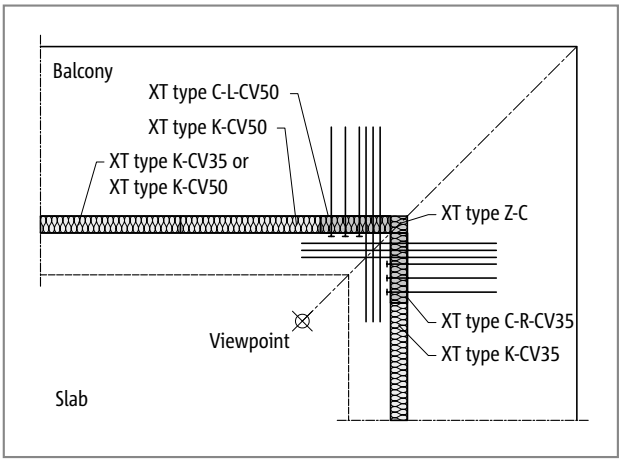


Fig. 54: Schöck Isokorb® XT type C: Balcony with outer corner freely cantilevered (applicationf XT type C-L-CV50, XT type C-R-CV35)

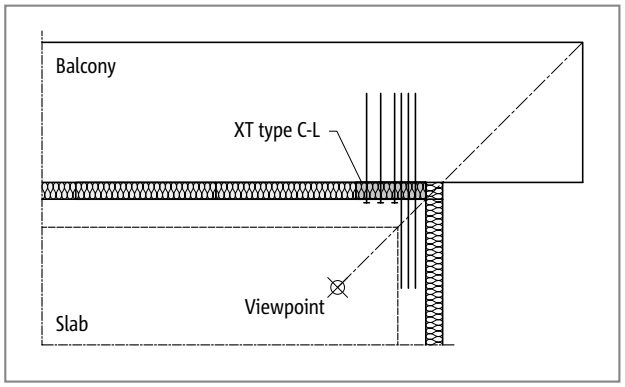


Fig. 55: Schöck Isokorb® XT type C: Balcony projecting over corner of building (application XT type C-L)

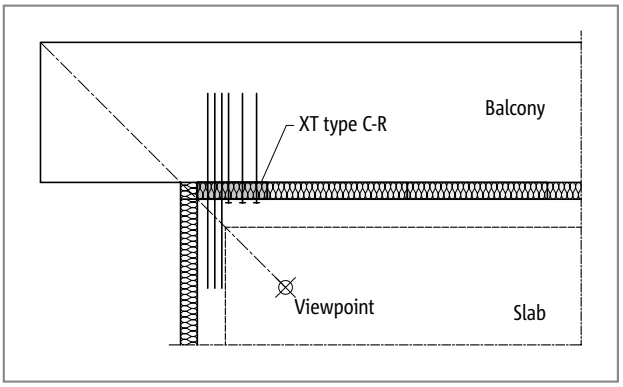


Fig. 56: Schöck Isokorb® XT type C: Balcony projecting over corner of building (application XT type C-R)

Element arrangement

- The Schöck Isokorb® XT type C, with small lengths can also be replaced by Schöck Isokorb® XT type K.
- The corner insulating element (XT type Z-C) is supplied with each Schöck Isokorb® XT type C. The corner insulating element can be ordered separately for use with small cantilever lengths in combination with the Schöck Isokorb® XT type K.
- A Schöck Isokorb® XT type K-CV50 is required in the connection to the Schöck Isokorb® XT type C-CV50 . Accordingly both a Schöck Isokorb® XT type K-CV35 or XT type K-CV50 can be positioned. The reinforcement arrangement of the outer corner balcony can be simplified through the selection of a Schöck Isokorb® XT type K-CV50.

Installation cross sections

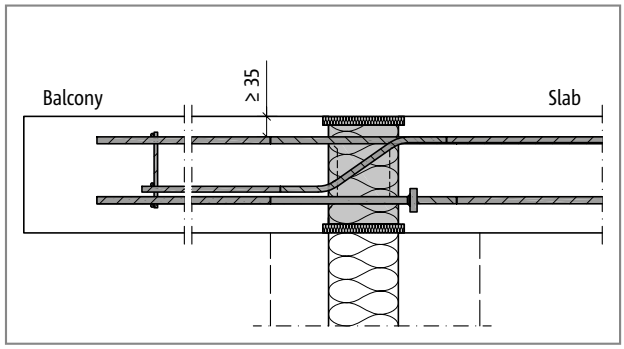


Fig. 57: Schöck Isokorb® XT type C-CV35: Connection with non-load-bearing cavity wall masonry

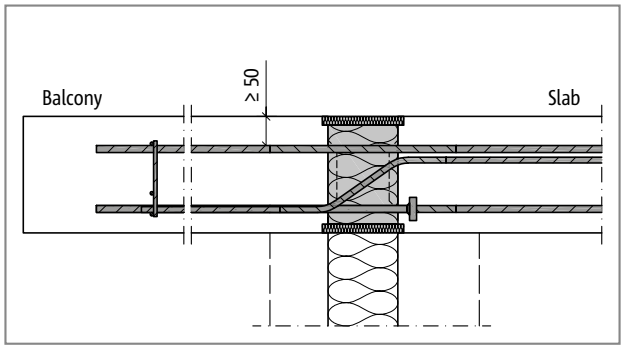


Fig. 58: Schöck Isokorb® XT type C-CV50: Connection with non-load-bearing cavity wall masonry

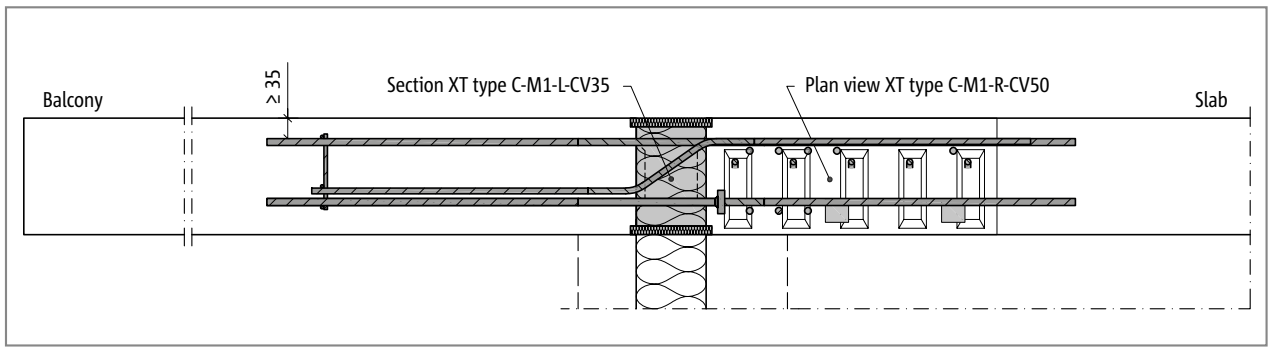


Fig. 59: Schöck Isokorb® XT type C: Outer corner with non-load-bearing cavity wall masonry (section XT type C-L-CV35; view XT type C-R-CV50)

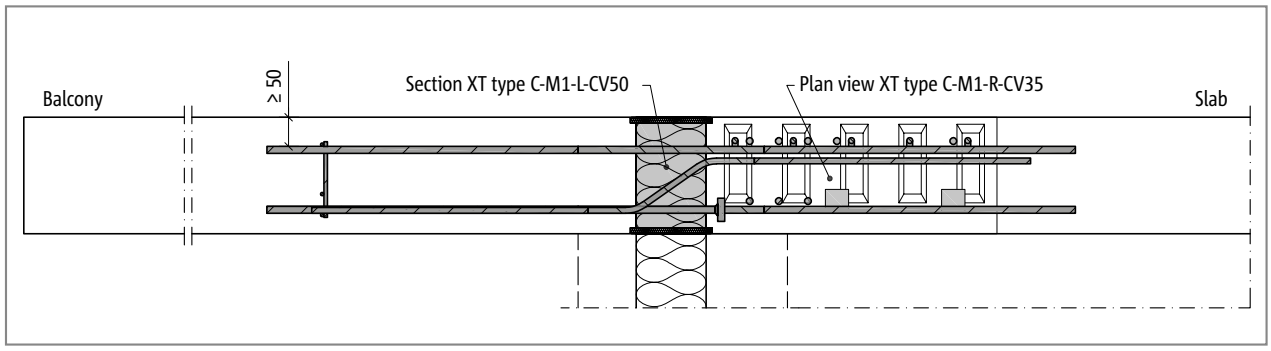


Fig. 60: Schöck Isokorb® XT type C: Outer corner with non-load-bearing cavity wall masonry (view XT type C-L-CV50; section XT type C-R-CV35)

Product selection | Type designations | Special designs

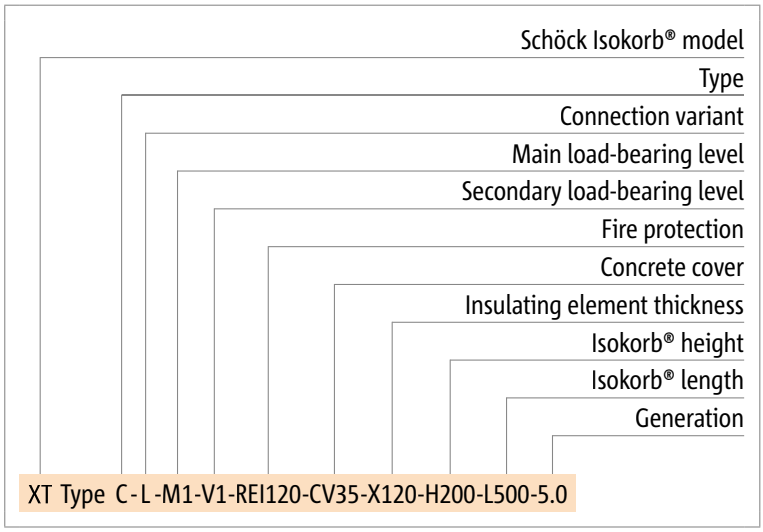
Schöck Isokorb® XT type C variants

An outer corner balcony is made using a Schöck Isokorb® XT type C-L, an XT type C-R and an XT type Z-C. The corner insulating element (XT type Z-C) is supplied with each Schöck Isokorb® XT type C.

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

- Connection variants:
  L: Left from the viewpoint on the floor
  R: Right from the viewpoint on the floor
- Main load-bearing level: M1 and M2
- Secondary load-bearing level: V1 and V2
- Fire resistance class:
  REI120 (Standard): Projection upper + lower fire protection board, 10 mm on both sides
- Concrete cover of the tension bars: CV35 = 35 mm, CV50 = 50 mm
- Insulating element thickness:
  X120 = 120 mm
- Isokorb® height:
  H = 180 - 250 mm for secondary level V1
  H = 200 - 250 mm for secondary level V2
- Isokorb® length: L = 500 mm
- Possible combination of arrangements of the Schöck Isokorb® XT type C and concrete cover of the tension bars CV:
  XT type C-L-CV35 with XT type C-R-CV50 and XT type Z-C
  XT type C-L-CV50 with XT type C-R-CV35 and XT type Z-C
- 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.

C25/30 design

Schöck Isokorb® XT type C		L-M1, R-M1	L-M2, R-M2
Design values with	Concrete cover CV [mm]	Concrete strength class ≥ C25/30	
	CV35/CV50	$M_{Rd,y}$ [kNm/element]	
Isokorb® height H [mm]	180	-18.2	-23.4
	190	-20.4	-26.2
	200	-22.6	-29.0
	210	-24.7	-31.8
	220	-26.9	-34.7
	230	-29.1	-37.5
	240	-31.3	-40.3
	250	-33.5	-43.1
Secondary load-bearing level		$V_{Rd,z}$ [kN/element]	
	V1	97.9	97.9
	V2	141.0	141.0

Schöck Isokorb® XT type C	L-M1, R-M1	L-M2, R-M2
Isokorb® length [mm]	500	500
Tension bars	5 ⌀ 12	5 ⌀ 12
Compression bars	3 ⌀ 12	3 ⌀ 12
Pressure bearing bars	2 ⌀ 12	3 ⌀ 14
Shear force bars V1	5 ⌀ 10	5 ⌀ 10
Shear force bars V2	5 ⌀ 12	5 ⌀ 12
H_{min} with V2 [mm]	200	200

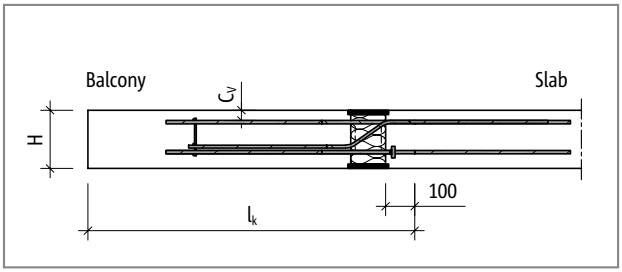


Fig. 61: Schöck Isokorb® XT type C: Static system

Notes on design

- Minimum height Schöck Isokorb® XT type C with V2: H_{min} = 200 mm
- The Schöck Isokorb® XT type C, with small lengths can also be replaced by Schöck Isokorb® XT type K.
- 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.

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 39

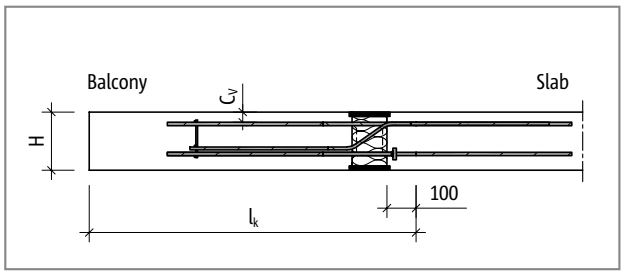


Fig. 62: Schöck Isokorb® XT type C: Static system

Schöck Isokorb® XT type C		L-M1, R-M1, L-M2, R-M2
Deflection factors when		tan α [%]
		CV35/CV50
Isokorb® height H [mm]	180	1.2
	190	1.1
	200	1.0
	210	0.9
	220	0.8
	230	0.8
	240	0.7
	250	0.7

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 C		L-M1, R-M1, L-M2, R-M2
maximum cantilever length with		$l_{k,max}$ [m]
		CV35/CV50
Isokorb® height H [mm]	180	1.89
	190	2.00
	200	2.12
	210	2.23
	220	2.34
	230	2.50
	240	2.65
	250	2.78

Maximum cantilever length

The tabular values are based on the following assumptions:

- Accessible balcony
- Specific weight of concrete 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

Maximum cantilever length

- The maximum cantilever length, depending on the length of flange of the outer corner with the employment of the Schöck Isokorb® XT type C, can be limited by the load-bearing capacity.

Expansion joint spacing

The shear force transmission in the expansion joint can be ensured using a longitudinally displaceable shear force dowel, e.g. Schöck Dorn.

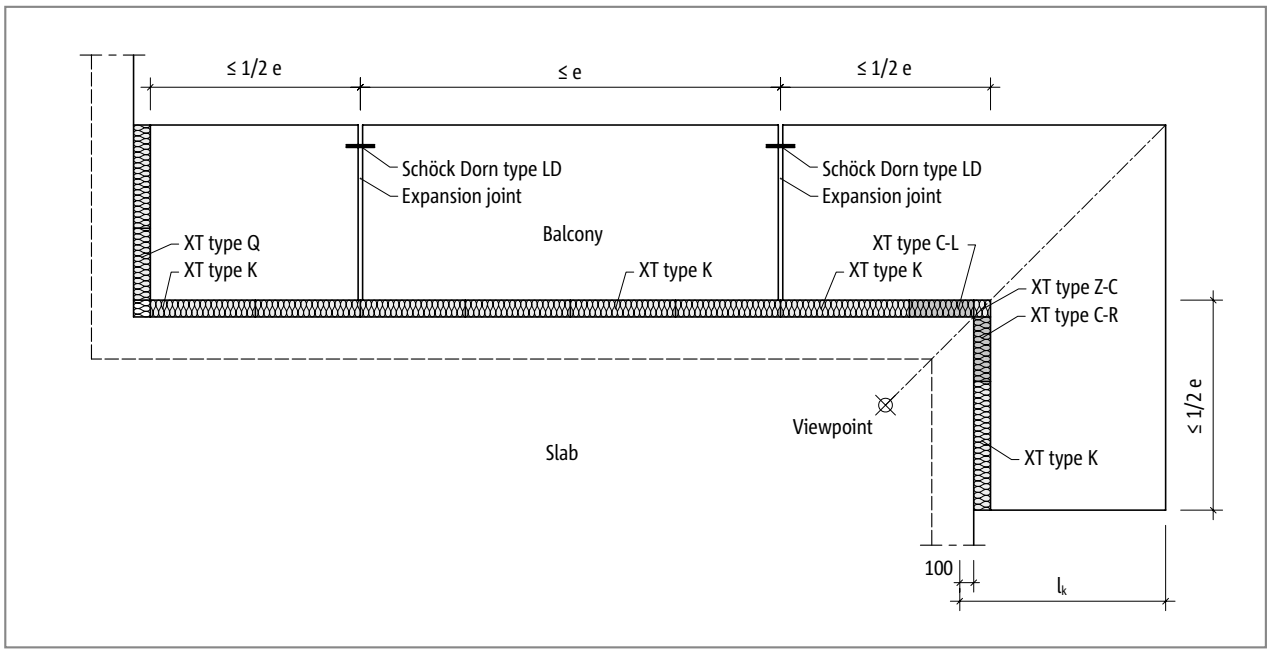


Fig. 63: Schöck Isokorb® XT type C: Expansion joint arrangement

Schöck Isokorb® XT type C		L-M1, R-M1	L-M2, R-M2
Maximum expansion joint spacing		e [m]	
Insulating element thickness [mm]	120	19.8	17.0

Schöck Isokorb® XT type C combined with	XT type K	XT type Q, XT type Q-VV	XT type Q-P, XT type Q-P-VV, XT type Q-PZ	XT type D
maximum expansion joint spacing from fixed point e/2 [m]	≤ e/2 see p. 32	≤ e/2 see p. 101	≤ e/2 see p. 115	≤ e/2 see p. 146

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

Product description

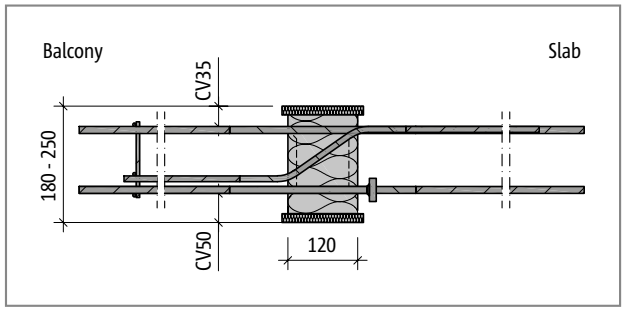


Fig. 64: Schöck Isokorb® XT type C-L-CV35: Product section

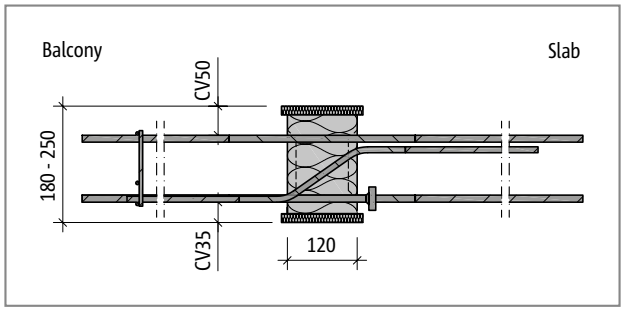


Fig. 65: Schöck Isokorb® XT type C-L-CV50: Product section

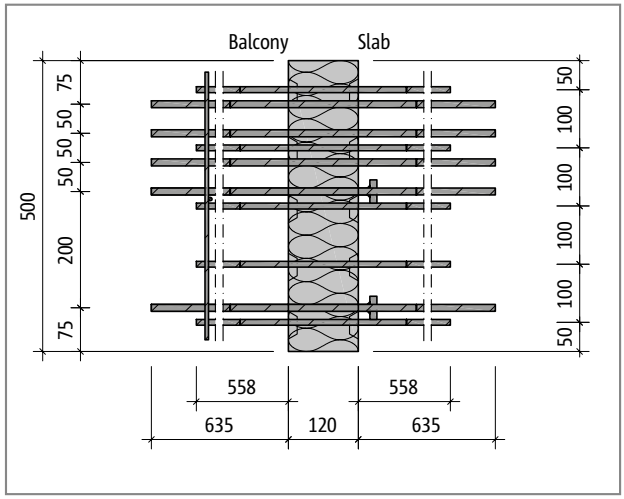


Fig. 66: Schöck Isokorb® XT type C-L-M1-V1: Product plan view

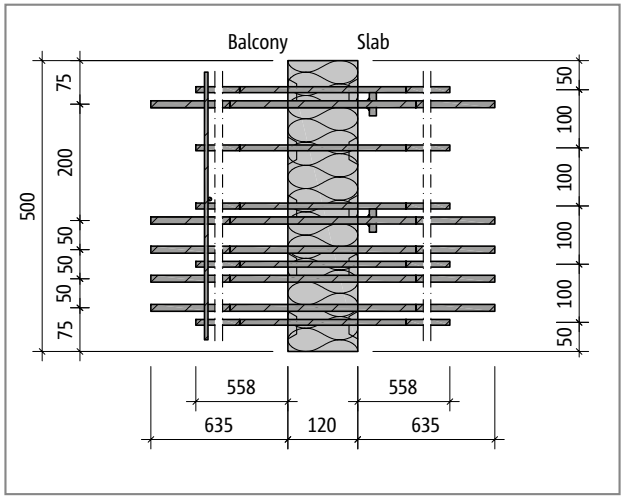


Fig. 67: Schöck Isokorb® XT type C-R-M1-V1: Product plan view

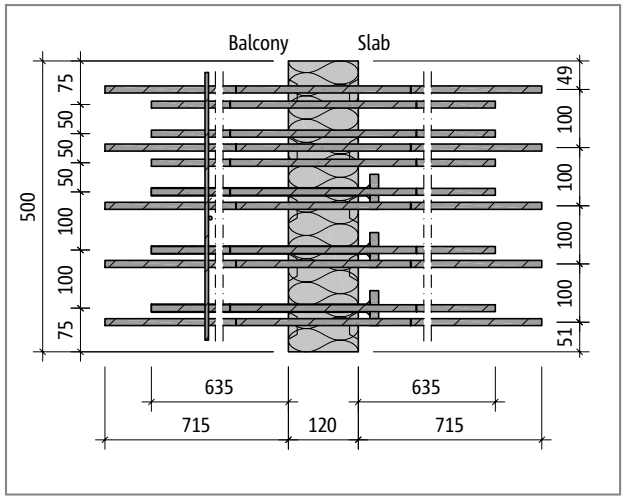


Fig. 68: Schöck Isokorb® XT type C-L-M2-V2: Product plan view

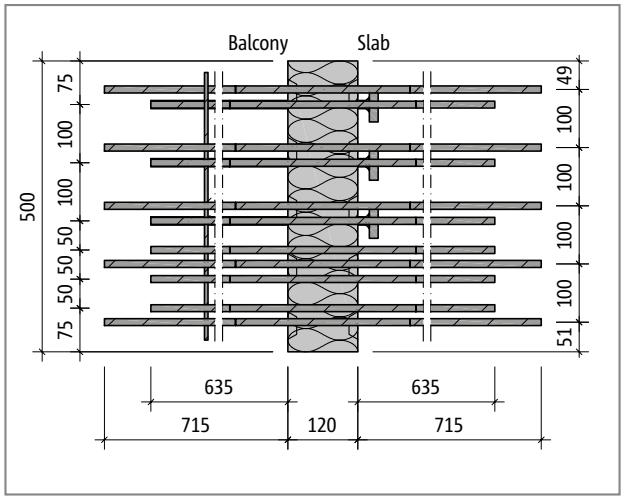


Fig. 69: Schöck Isokorb® XT type C-R-M2-V2: Product plan view

Product information

- Download further product plan views and cross-sections at www.schoeck.co.uk/download
- Minimum height Schöck Isokorb® XT type C with V2: H_{min} = 200 mm
- Concrete cover of the tension bars: CV35 = 35 mm, CV50 = 50 mm
- The Schöck Isokorb® XT type C is also available as variant XT type C-F for use with precast slabs.

On-site reinforcement

Indirect support, outer coner balcony XT type C-L-CV35

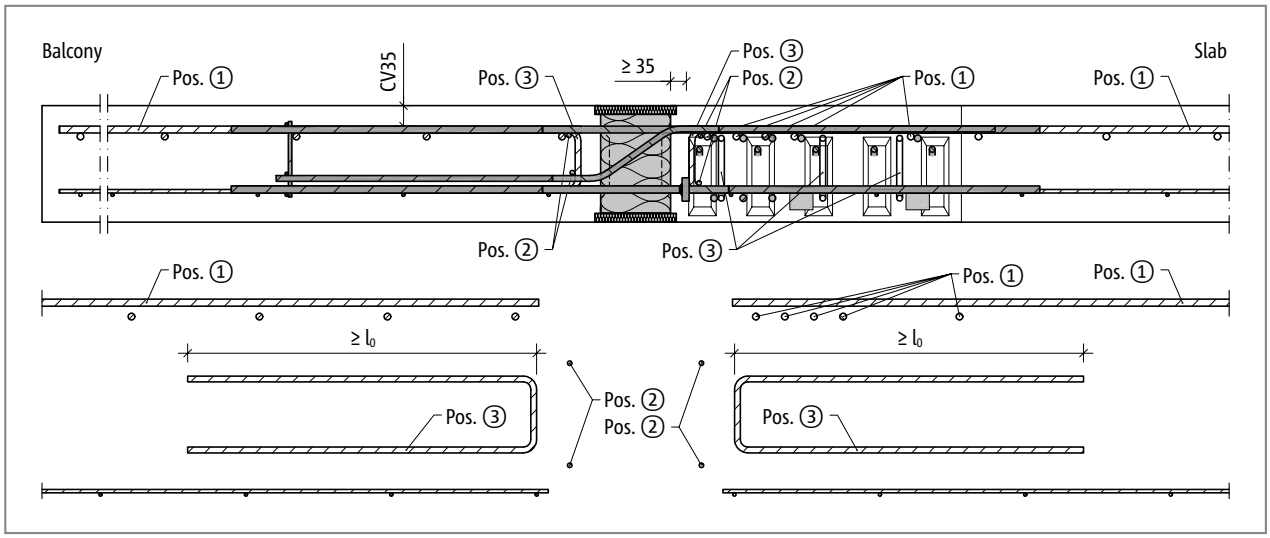
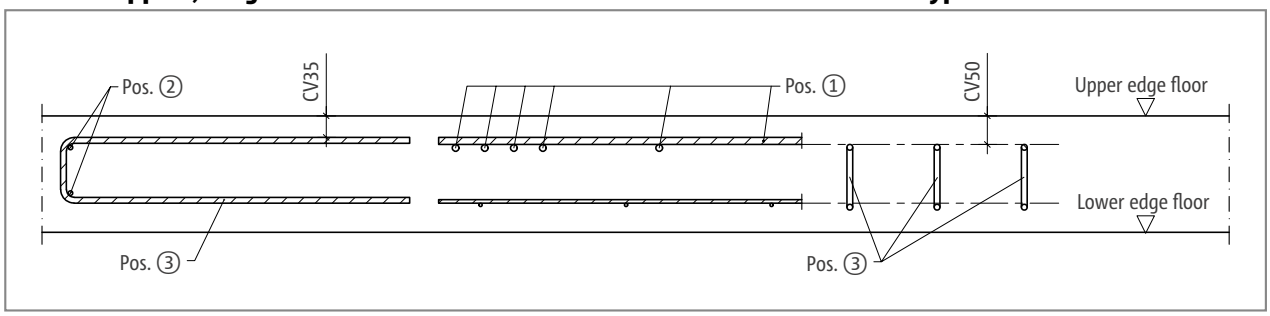


Fig. 70: Schöck Isokorb® XT type C: On-site reinforcement outer corner (section XT type C-L-CV35, view XT type C-R-CV50)

Indirect support, height of the on-site reinforcement with Schöck Isokorb® XT type C-L-CV35



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 C20/25 or C25/30; structurally selected: aa_s lapping reinforcement ≥ aa_s Isokorb® tension bars.

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.

Schöck Isokorb® XT type C	M1-V1	M1-V2	M2-V1	M2-V2
On-site reinforcement	Concrete strength class ≥ C25/30			
Pos. 1 Lapping reinforcement				
Pos. 1 [mm²/Element]	565	565	678	678
Pos. 1 Variant	5 • H12	5 • H12	6 • H12	6 • H12
Pos. 2 Steel bars along the insulation joint				
Pos. 2	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8
Pos. 3 Stirrup				
Pos. 3 [mm²/Element]	225	325	225	325
Pos. 3 Variant	3 • H10	5 • H10	3 • H10	5 • H10
Lap length l_0 [mm]	680	680	680	680

On-site reinforcement

Indirect support, outer corner balcony XT type C-L-CV50

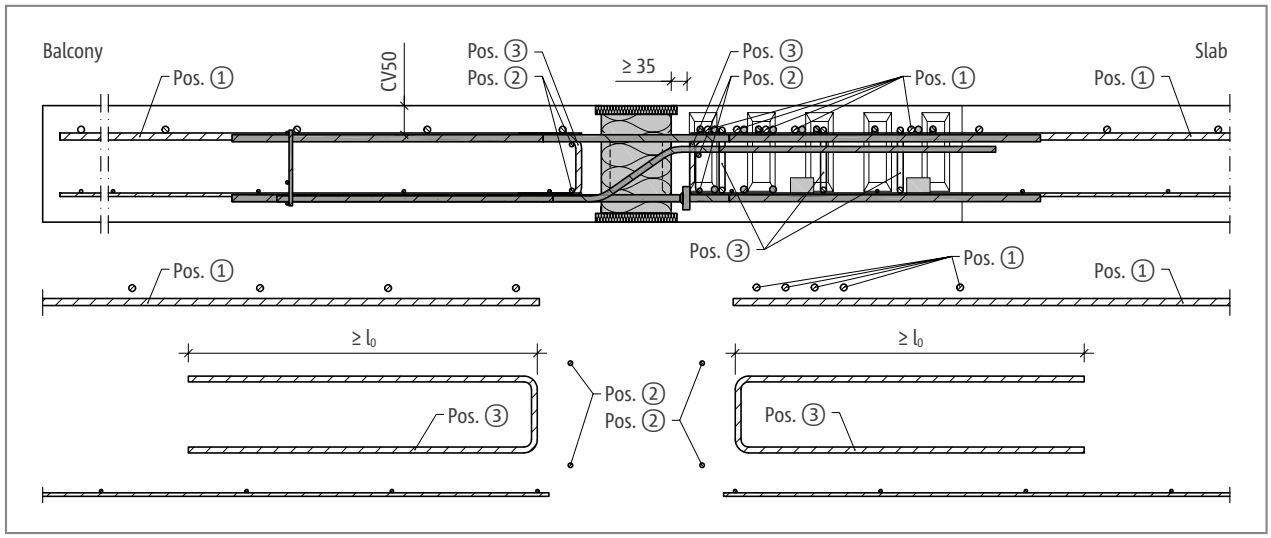
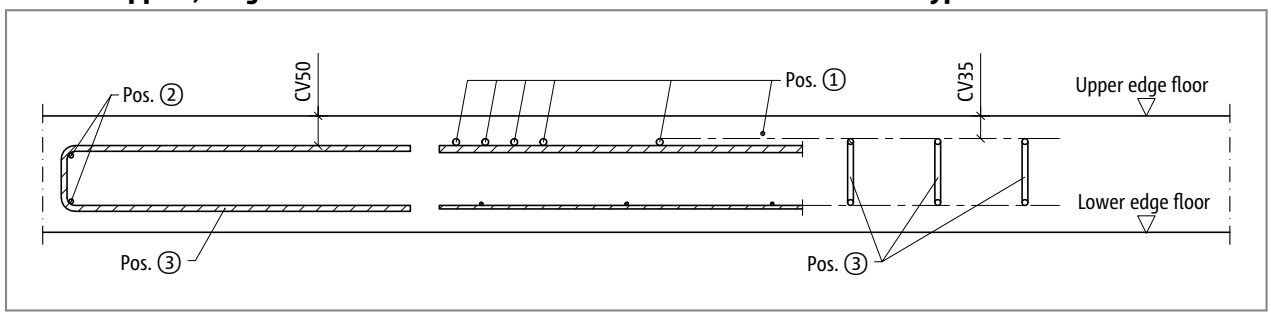


Fig. 71: Schöck Isokorb® XT type C: On-site reinforcement outer corner (section XT type C-L-CV50, view XT type C-R-CV35)

Indirect support, height of the on-site reinforcement with Schöck Isokorb® XT type C-L-CV50



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.

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.
- The indicative minimum concrete strength class of the external structural component is C32/40.

On-site reinforcement

Direct support, outer corner balcony XT type C-L-CV35

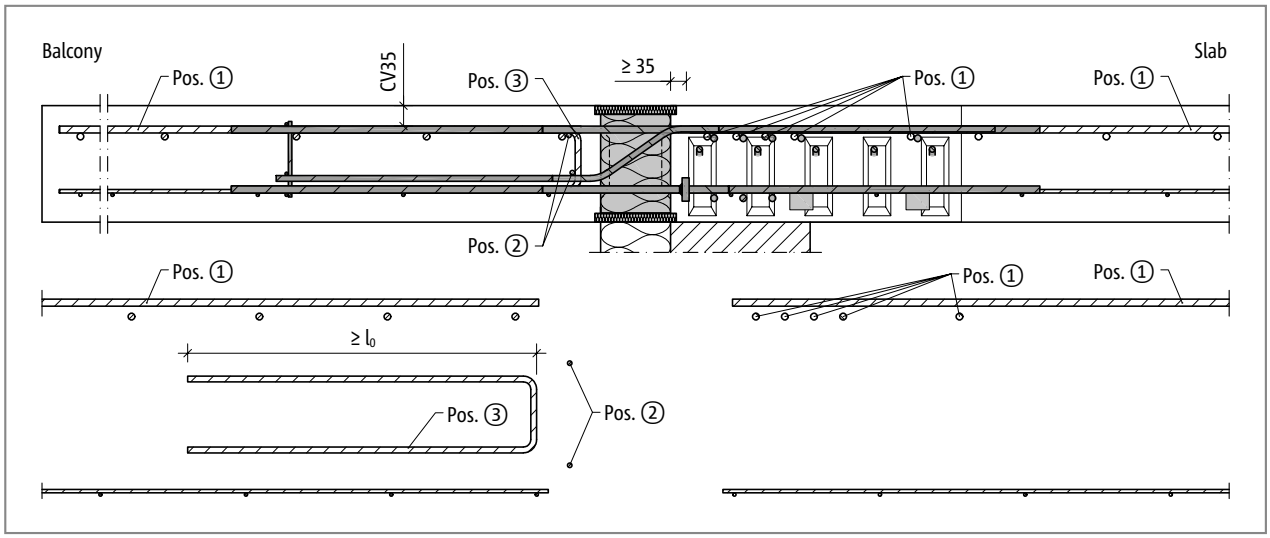
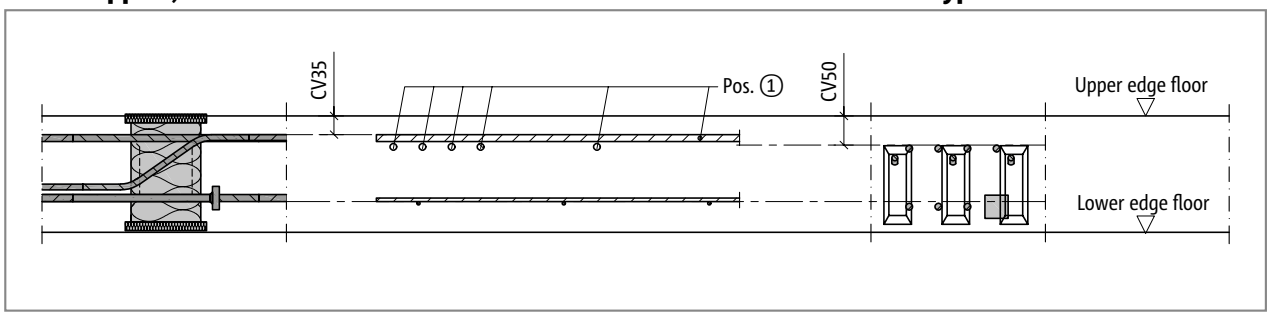


Fig. 72: Schöck Isokorb® XT type C: On-site reinforcement outer corner balcony (section XT type C-L-CV35, view XT type C-R-CV50)

Direct support, elevation of the on-site reinforcement with Schöck Isokorb® XT type C-L-CV35



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 C20/25 or C25/30; structurally selected: aa_s lapping reinforcement ≥ aa_s Isokorb® tension bars.

Schöck Isokorb® XT type C	M1-V1	M1-V2	M2-V1	M2-V2
On-site reinforcement	Concrete strength class ≥ C25/30			
Pos. 1 Lapping reinforcement				
Pos. 1 [mm²/Element]	565	565	678	678
Pos. 1 Variant	5 • H12	5 • H12	6 • H12	6 • H12
Pos. 2 Steel bars along the insulation joint				
Pos. 2	2 • H8	2 • H8	2 • H8	2 • H8
Pos. 3 Stirrup				
Pos. 3 [mm²/Element]	225	325	225	325
Pos. 3 Variant	3 • H10	5 • H10	3 • H10	5 • H10
Lap length l_0 [mm]	680	680	680	680

On-site reinforcement

Direct support, outer corner balcony XT type C-L-CV50

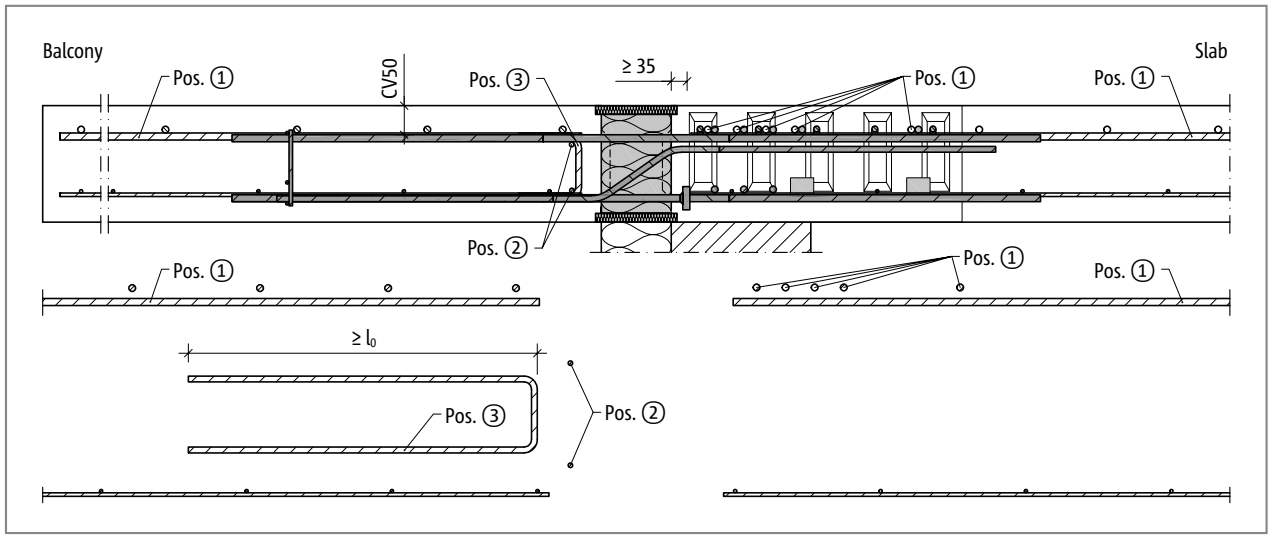
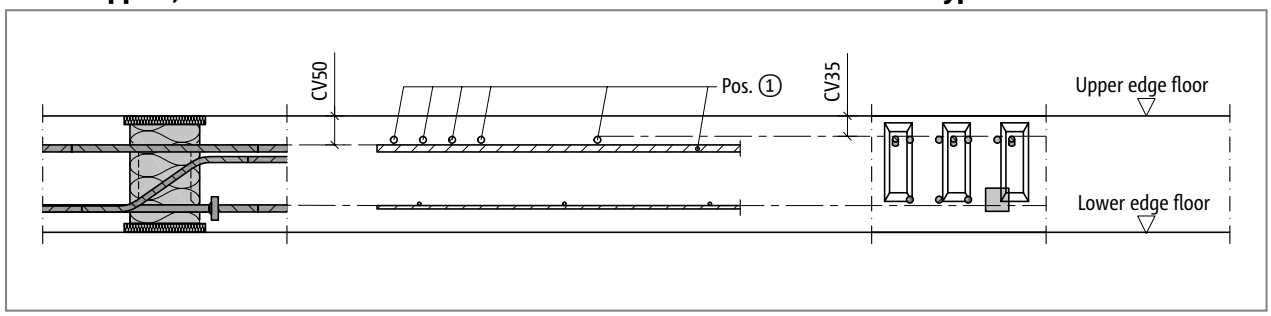


Fig. 73: Schöck Isokorb® XT type C: On-site reinforcement outer corner (section XT type C-L-CV50, view XT type C-R-CV35)

Direct support, elevation of the on-site reinforcement with Schöck Isokorb® XT type C-L-CV50



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.

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.
- The indicative minimum concrete strength class of the external structural component is C32/40.

Precast construction

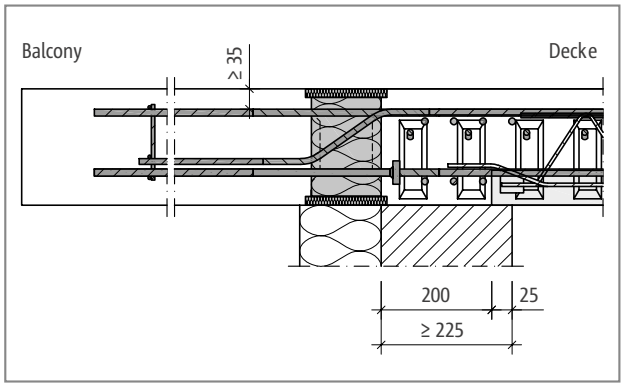


Fig. 74: Schöck Isokorb® XT type C: Prefabricated slab without edge support with TICS (section XT type C-L-CV35, view XT type C-R-CV50)

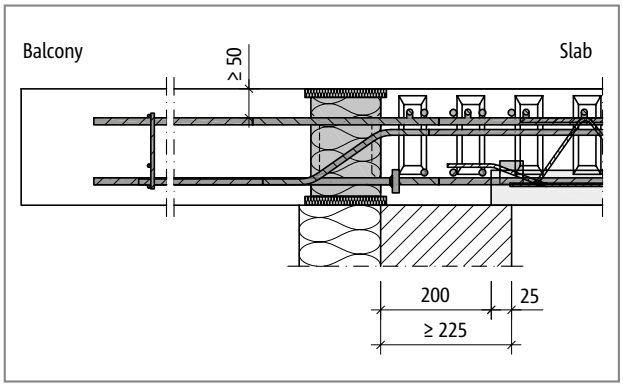


Fig. 75: Schöck Isokorb® XT type C: Prefabricated slab without edge support with TICS (section XT type C-R-CV50, view XT type C-L-CV35)

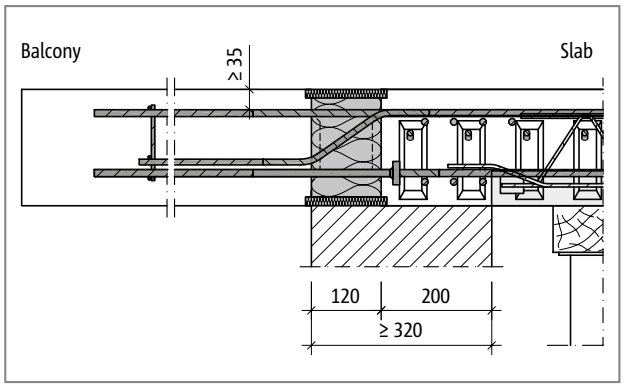


Fig. 76: Schöck Isokorb® XT type C: Prefabricated slab with edge support with thermal insulating masonry (section XT type C-L-CV35, view XT type C-R-CV50)

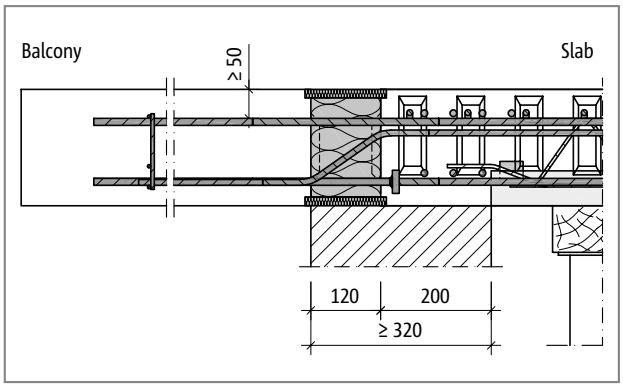


Fig. 77: Schöck Isokorb® XT type C: Prefabricated slab with edge support with thermal insulating masonry (section XT type C-R-CV50, view XT type C-L-CV35)

Precast construction

- The Schöck Isokorb® XT type C requires, in combination with precast slabs, a block-out in the area of the compression rods of at least 190 mm from the insulating element edge.

Check list

- ☐ Is the combination possibility (XT type C-R-CV35 and XT type C-L-CV50 or vice versa) taken into account with the corner balcony?
  Is a Schöck Isokorb® XT type K-CV50 planned in connection to the Schöck Isokorb®XT type C-L-CV50 or XT type C-R-CV50?
- ☐ Is the minimum slab thickness (H_{min} = 180 mm, or with V2 H_{min} = 200 mm) of the Schöck Isokorb® XT type C taken into account
- ☐ Are the recommendations for the limitation of the slenderness observed?
- ☐ Are the maximum allowable expansion joint spacings taken into account?
- ☐ Are the requirements with regard to fire protection explained and is the appropriate addendum entered in the Isokorb® type description in the implementation plans?
- ☐ Is the in-situ concrete strip (width ≥ 190 mm from insulating element of the Schöck Isokorb® XT type C) required in connection with prefabricated floors indicated in the implementation plans?
- ☐ 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?
- ☐ Have the loads on the Schöck Isokorb® connection been specified at design level?
- ☐ With the selection of the design table is the relevant concrete cover taken into account?
- ☐ Has the additional proportionate deflection resulting from 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?
- ☐ 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?
- ☐ Have the requirements for on-site reinforcement of connections been defined in each case?
- ☐ With precast balconies are possibly necessary gaps for the front side transportation anchors and downpipes with internal drainage taken into account? Is the maximum centre distance of 300 mm for the Isokorb® bars observed?
- ☐ Is the XT type K-U, K-O (from page 61) or a special design required instead of a Schöck Isokorb® XT type K due to connection with height offset or to a wall?

Schöck Isokorb® XT type K-U, K-O

Schöck Isokorb® XT type K-U
Suitable for cantilevered balconies with height offset downwards. The balcony lies lower than the floor slab. Suitable for cantilevered balconies, which are connected to a reinforced concrete wall above. It transfers negative moments and positive shear forces.

Schöck Isokorb® XT type K-O
Suitable for cantilevered balconies with height offset upwards. The balcony lies higher than the floor slab. Suitable for cantilevered balconies, which are connected to a reinforced concrete wall below. It transfers negative moments and positive shear forces.

Product change

Old

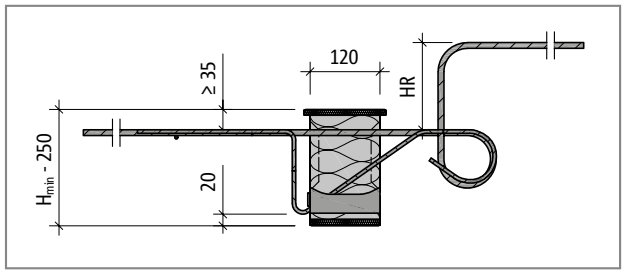


Fig. 78: Schöck Isokorb® XT type K-HV: Product section

New

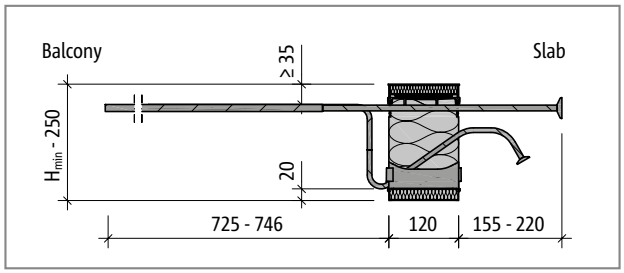


Fig. 79: Schöck Isokorb® XT type K-U: Product section

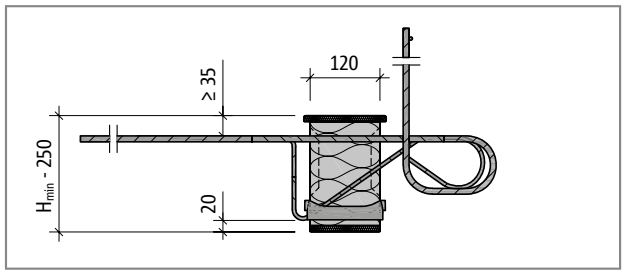


Fig. 80: Schöck Isokorb® XT type K-WO: Product section

Old

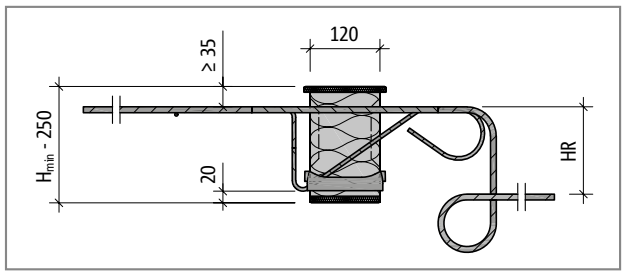


Fig. 81: Schöck Isokorb® XT type K-BH: Product section

New

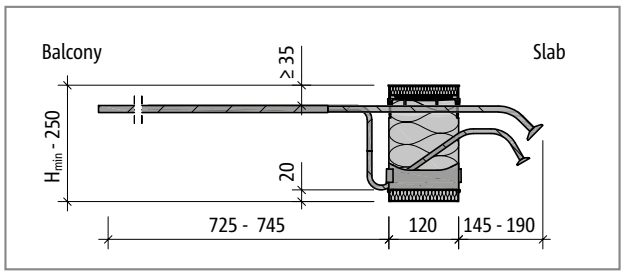


Fig. 82: Schöck Isokorb® XT type K-O: Product section

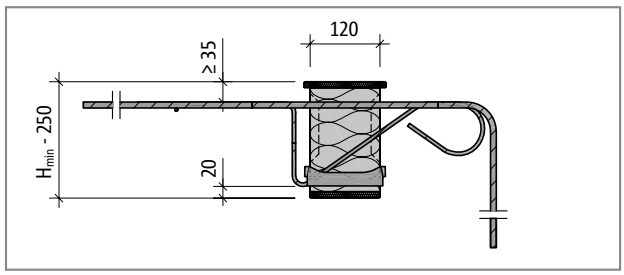


Fig. 83: Schöck Isokorb® XT type K-WU: Product section

Product change

- The Schöck Isokorb® XT type K-HV and the Schöck Isokorb® XT type K-WO are replaced by the Schöck Isokorb® XT type K-U.
- The Schöck Isokorb® XT type K-BH and the Schöck Isokorb® XT type K-WU are replaced by the Schöck Isokorb® XT type K-O.

Balcony with height offset downwards using Schöck Isokorb® XT type K

Height offset $h_V \leq h_D - c_a - d_s - c_i$

If $h_V \leq h_D - c_a - d_s - c_i$ then the Schöck Isokorb® XT type K with straight tension bars can be selected.

Height offset $h_V > h_D - c_a - d_s - c_i$

If the condition $h_V \leq h_D - c_a - d_s - c_i$ is not met, the connection can be implemented using the Schöck Isokorb® XT type K-U.

Recommendation: Downstand beam width at least 220 mm

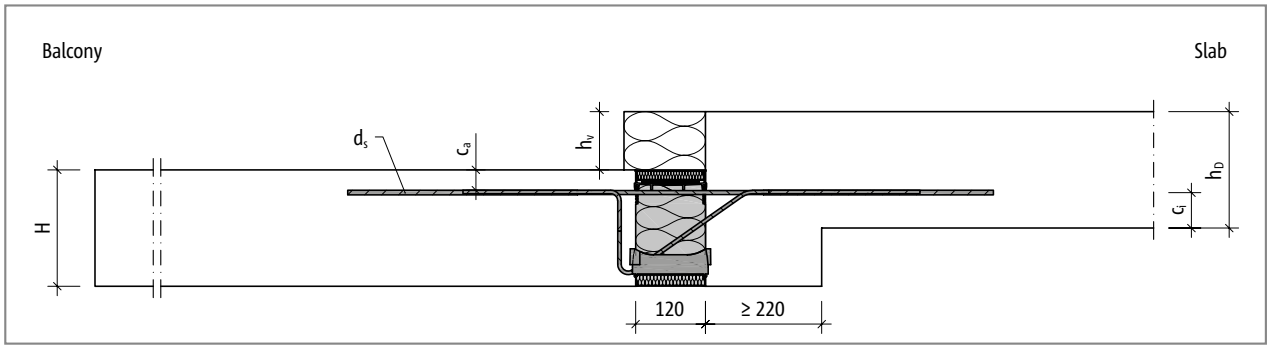


Fig. 84: Schöck Isokorb® XT type K: Small height offset downwards (balcony subjacent)

Height offset $h_V > h_D - c_a - d_s - c_i$

If the condition $h_V \leq h_D - c_a - d_s - c_i$ is not met, the connection can be implemented using Schöck Isokorb® XT type K-U.

Element arrangement | Installation cross sections

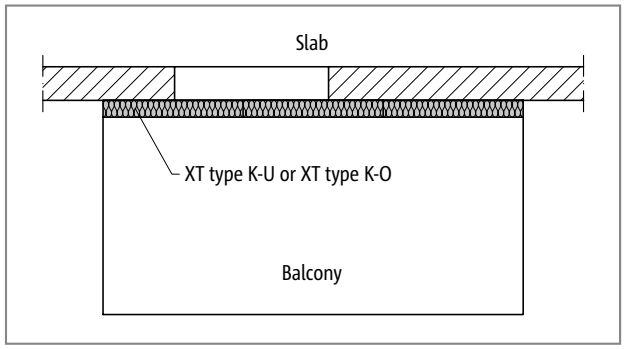


Fig. 85: Schöck Isokorb® XT type K-U/K-O: Cantilevered balcony

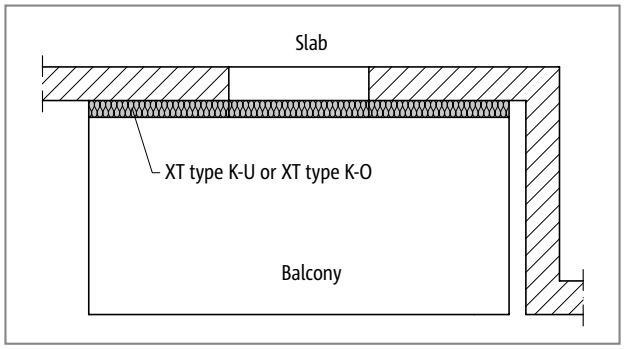


Fig. 86: Schöck Isokorb® XT type K-U/K-O: Balcony with facade offset

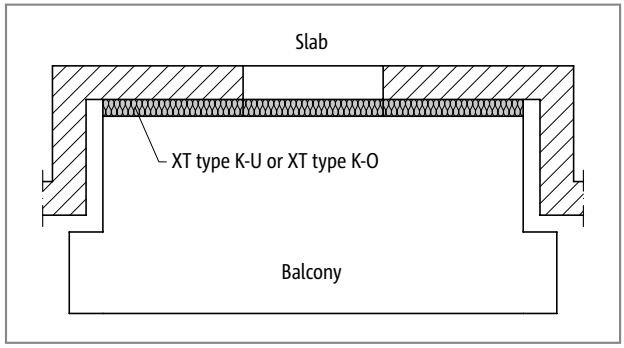


Fig. 87: Schöck Isokorb® XT type K-U/K-O: Balcony with facade offset

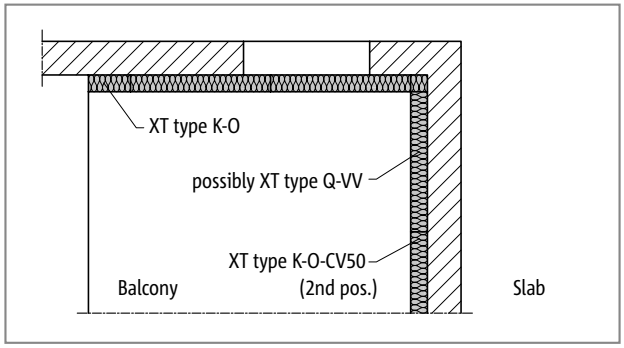


Fig. 88: Schöck Isokorb® XT type K-U/K-O, XT type Q-VV: Balcony with inner corner, supported two-sided

Balcony with height offset upwards

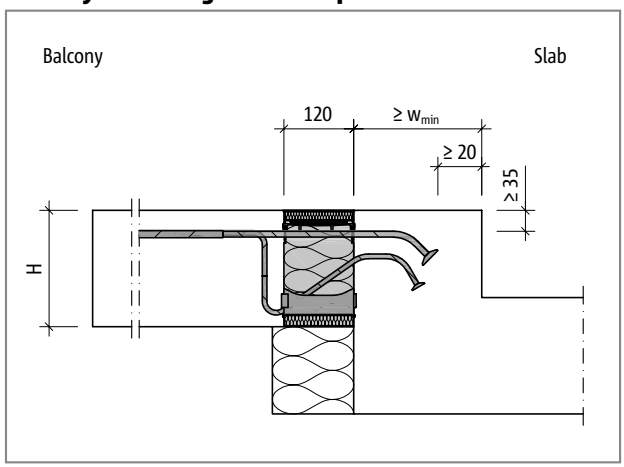


Fig. 89: Schöck Isokorb® XT type K-O: Balcony with height offset upwards and external insulation

Balcony with height offset downwards

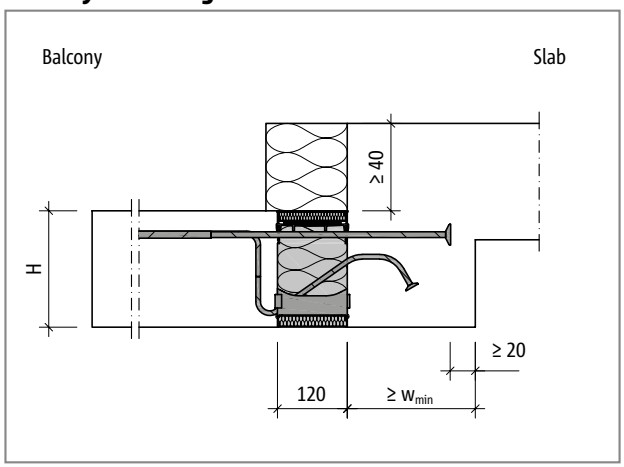


Fig. 90: Schöck Isokorb® XT type K-U: Balcony with height offset downwards and external insulation

Installation cross sections

Wall connection upwards

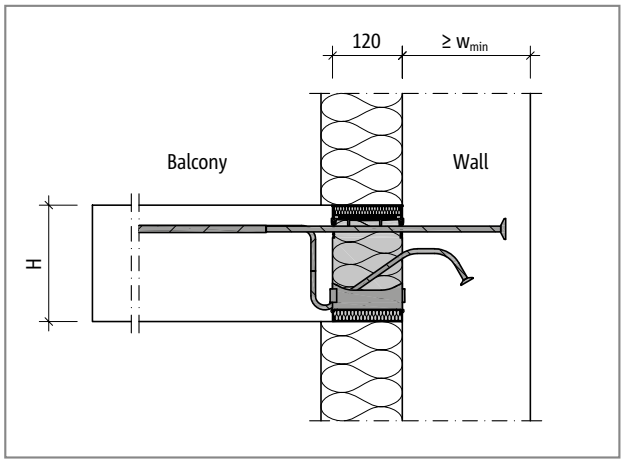


Fig. 91: Schöck Isokorb® XT type K-U: Wall connection upwards with external insulation

Wall connection downwards

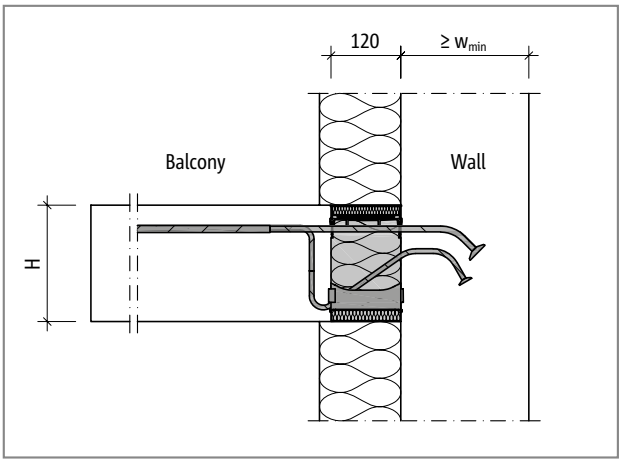


Fig. 92: Schöck Isokorb® XT type K-O: Wall connection downwards with external insulation

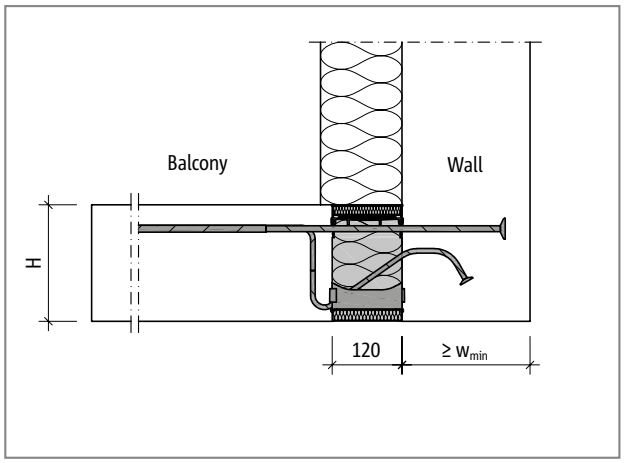


Fig. 93: Schöck Isokorb® XT type K-U: Wall connection upwards with external insulation

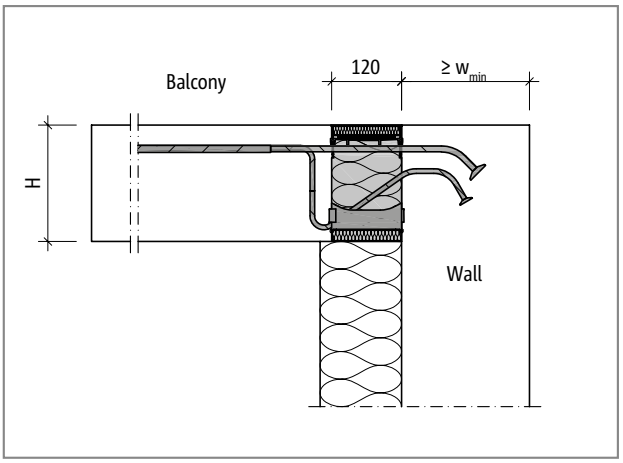


Fig. 94: Schöck Isokorb® XT type K-O: Wall connection downwards with external insulation

Geometry

- Use of the Schöck Isokorb® XT types K-U and K-O requires a minimum wall thickness and a minimum downstand beam width of 175 mm.
- Depending on the selected Schöck Isokorb® type and on the selected Isokorb® height a minimum structural component size w_{min} is required (see page 69)
- A minimum concrete cover of 60 mm above the anchor head must be complied with.

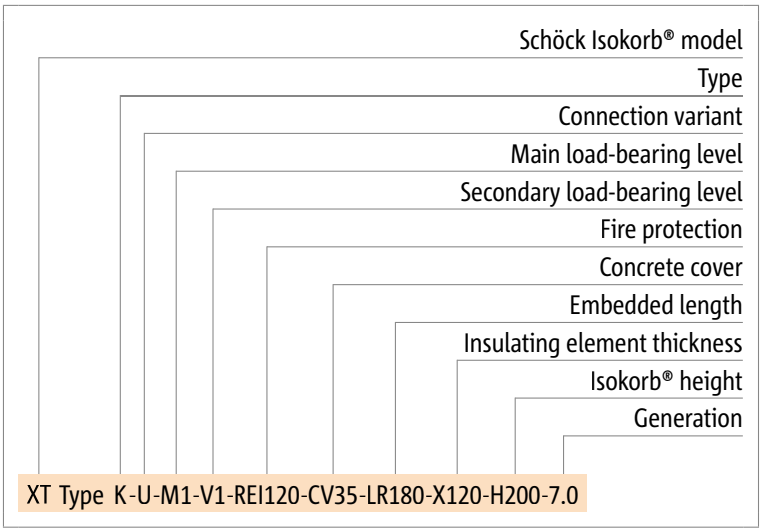
Product selection | Type designations | Special designs

Schöck Isokorb® XT type K-U variants

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

- Main load-nearing level: M1 to M4
- Secondary load-bearing level: V1
- Fire resistance class:
  REI120 (standard)
- Concrete cover of the tension bars: CV35 = 35 mm, CV50 = 50 mm
- Bond length: LR = 155 mm to 220 mm; depends on the Isokorb® height, see page 69.
- Insulating element thickness: X120 = 120 mm
- Isokorb® height: H = H_{min} to 250 mm
- Generation: 7.0

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).

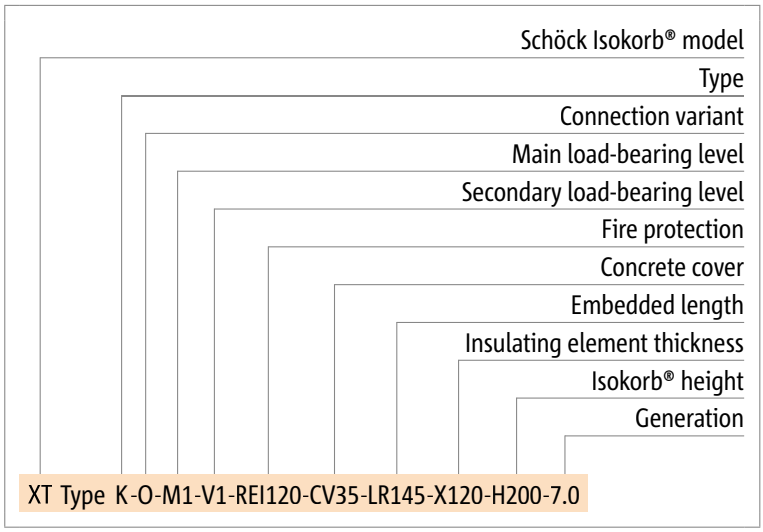
Product selection | Type designations | Special designs

Schöck Isokorb® XT type K-O Variants

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

- Main load-bearing level: M1 to M4
- Secondary load-bearing level: V1
- Fire resistance class:
  REI120 (standard)
- Concrete cover of the tension bars: CV35 = 35 mm, CV50 = 50 mm
- Bond length: LR = 145 mm to 190 mm; depends on the Isokorb® height, see page 69.
- Insulating element thickness: X120 = 120 mm
- Isokorb® height: H = H_{min} to 250 mm
- Generation: 7.0

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).

Minimum component dimensions

Schöck Isokorb® XT type K-U		M1 - M4			
minimum component dimension for		CV35		CV50	
		w_{min} [mm]	LR [mm]	w_{min} [mm]	LR [mm]
Isokorb® height H [mm]	160	175	155	-	-
	170	175	155	-	-
	180	175	155	175	155
	190	175	155	175	155
	200	200	180	175	155
	210	200	180	175	155
	220	220	200	200	180
	230	220	200	200	180
	240	240	220	220	200
	250	240	220	220	200

Schöck Isokorb® XT type K-O		M1 - M4			
minimum component dimension for		CV35		CV50	
		w_{min} [mm]	LR [mm]	w_{min} [mm]	LR [mm]
Isokorb® height H [mm]	160	175	145	-	-
	170	175	145	-	-
	180	175	145	175	145
	190	175	145	175	145
	200	175	145	175	145
	210	175	145	175	145
	220	190	170	175	145
	230	190	170	175	145
	240	210	190	190	170
	250	210	190	190	170

Design

Notes on design

- With CV50, H = 180 mm is the lowest Isokorb® height, this requires a minimum slab thickness of h = 180 mm.
- Use of the Schöck Isokorb® XT types K-U and K-O requires a minimum wall thickness and a minimum downstand beam width of 175 mm.
- The employment of Schöck Isokorb® XT type K-U and K-O is possible with other connection situations (175 mm ≤ w_{vorh} < w_{min}) taking into account reduced load-bearing capacity. For this please make contact with the Schöck Design Department (see page 3).
- Depending on the selected Schöck Isokorb® type and on the selected Isokorb® height a minimum structural component size w_{min} is required (see page 69)
- The design values for the Schöck Isokorb® XT type K-U depend on the available downstand beam width and wall thickness (w_{vorh}).
- A minimum concrete cover of 60 mm above the anchor head must be complied with.
- Direction of the load application in the neighbouring structural element determines the Isokorb® connection variant.

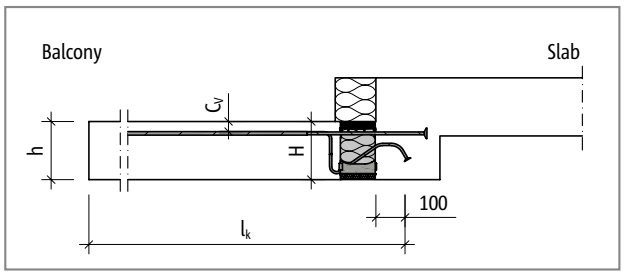


Fig. 95: Schöck Isokorb® XT type K-U: Static system

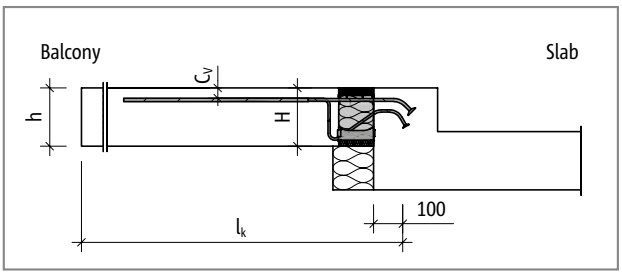


Fig. 96: Schöck Isokorb® XT type K-O: Static system

C25/30 design

Schöck Isokorb® XT type K-U			M1	M2	M3	M4
Design values with	Concrete cover CV [mm]		Concrete strength class ≥ C25/30			
			200 mm > downstand beam width ≥ 175 mm 200 mm >wall thickness ≥ 175 mm			
	CV35	CV50	$m_{Rd,y}$ [kNm/m]			
Isokorb® height H [mm]	160		-11.5	-15.4	-19.2	-26.1
		180	-12.2	-16.3	-20.4	-27.7
	170		-12.9	-17.3	-21.6	-29.3
		190	-13.7	-18.2	-22.8	-30.9
	180		-14.4	-19.2	-23.9	-32.5
		200	-15.1	-20.1	-25.1	-34.1
	190		-15.8	-21.1	-26.3	-35.7
		210	-16.5	-22.0	-27.5	-37.4
Secondary load-bearing level			$v_{Rd,z}$ [kN/m]			
	V1		50.0	75.0	75.0	75.0

Schöck Isokorb® XT type K-U			M1	M2	M3	M4
Design values with	Concrete cover CV [mm]		Concrete strength class ≥ C25/30			
			220 mm > downstand beam width ≥ 200 mm 220 mm > wall thickness ≥ 200 mm			
	CV35	CV50	$m_{Rd,y}$ [kNm/m]			
Isokorb® height H [mm]	160		-15.1	-20.1	-25.1	-34.1
		180	-16.0	-21.3	-26.6	-36.2
	170		-16.9	-22.5	-28.2	-38.3
		190	-17.8	-23.8	-29.7	-40.4
	180		-18.8	-25.0	-31.3	-42.5
		200	-19.7	-26.3	-32.8	-44.6
	190		-20.6	-27.5	-34.4	-46.7
		210	-21.6	-28.7	-35.9	-48.8
	200		-22.5	-30.0	-37.5	-50.9
		220	-23.4	-31.2	-39.0	-53.0
	210		-24.3	-32.5	-40.6	-55.1
		230	-25.3	-33.7	-42.1	-57.2
Secondary load-bearing level			$v_{Rd,z}$ [kN/m]			
	V1		50.0	75.0	75.0	75.0

Notes on design

Static system and information on the design see page 70.

C25/30 design

Schöck Isokorb® XT type K-U			M1	M2	M3	M4
Design values with	Concrete cover CV [mm]		Concrete strength class ≥ C25/30			
			Downstand beam width ≥ 220 mm wall thickness ≥ 220 mm			
	CV35	CV50	$m_{Rd,y}$ [kNm/m]			
Isokorb® height H [mm]	160		-17.0	-24.3	-30.4	-41.1
		180	-18.2	-25.8	-32.2	-43.8
	170		-19.3	-27.3	-34.1	-46.3
		190	-20.5	-28.8	-36.0	-48.8
	180		-21.6	-30.3	-37.8	-51.4
		200	-22.9	-31.8	-39.7	-53.9
	190		-23.9	-33.3	-41.6	-56.5
		210	-25.2	-34.8	-43.5	-59.0
	200		-26.3	-36.3	-45.3	-61.6
		220	-27.6	-37.8	-47.2	-64.1
	210		-28.7	-39.3	-49.1	-66.7
		230	-30.1	-40.8	-51.0	-69.2
	220		-31.1	-42.3	-52.8	-71.7
		240	-32.5	-43.8	-54.7	-74.3
	230		-33.6	-45.3	-56.6	-76.8
		250	-35.0	-46.8	-58.4	-79.4
	Concrete cover CV [mm]		Downstand beam width ≥ 240 mm wall thickness ≥ 240 mm			
	CV35	CV50	$m_{Rd,y}$ [kNm/m]			
	240		-36.1	-48.3	-60.3	-81.9
	250		-38.4	-51.3	-64.1	-87.0
Secondary load-bearing level			$v_{Rd,z}$ [kN/m]			
	V1		50.0	75.0	75.0	75.0

Schöck Isokorb® XT type K-U	M1	M2	M3	M4
Isokorb® length [mm]	1000	1000	1000	1000
Tension bars	4 ⌀ 12	6 ⌀ 12	8 ⌀ 12	10 ⌀ 12
Anchor bars	4 ⌀ 10	6 ⌀ 10	8 ⌀ 10	10 ⌀ 10
Shear force bars V1	4 ⌀ 8	6 ⌀ 8	6 ⌀ 8	6 ⌀ 8
Pressure bearing (piece)	6	8	10	16
Special stirrup (piece)	-	-	-	4

Notes on design

Static system and information on the design see page 70.

C25/30 design

Schöck Isokorb® XT type K-O			M1	M2	M3	M4
Design values with	Concrete cover CV [mm]		Concrete strength class ≥ C25/30			
			Downstand beam width ≥ 175 mm wall thickness ≥ 175 mm			
	CV35	CV50	$m_{Rd,y}$ [kNm/m]			
Isokorb® height H [mm]	160		-17.0	-24.3	-30.4	-41.1
		180	-18.2	-25.8	-32.2	-43.8
	170		-19.3	-27.3	-34.1	-46.3
		190	-20.5	-28.8	-36.0	-48.8
	180		-21.6	-30.3	-37.8	-51.4
		200	-22.9	-31.8	-39.7	-53.9
	190		-23.9	-33.3	-41.6	-56.5
		210	-25.2	-34.8	-43.5	-59.0
	200		-26.3	-36.3	-45.3	-61.6
		220	-27.6	-37.8	-47.2	-64.1
	210		-28.7	-39.3	-49.1	-66.7
		230	-30.1	-40.8	-51.0	-69.2
	Concrete cover CV [mm]		Downstand beam width ≥ 190 mm wall thickness ≥ 190 mm			
	CV35	CV50	$m_{Rd,y}$ [kNm/m]			
	220		-31.1	-42.3	-52.8	-71.7
		240	-32.5	-43.8	-54.7	-74.3
	230		-33.6	-45.3	-56.6	-76.8
		250	-35.0	-46.8	-58.4	-79.4
	Concrete cover CV [mm]		Downstand beam width ≥ 210 mm wall thickness ≥ 210 mm			
	CV35	CV50	$m_{Rd,y}$ [kNm/m]			
	240		-36.1	-48.3	-60.3	-81.9
	250		-38.4	-51.3	-64.1	-87.0
Secondary load-bearing level			$v_{Rd,z}$ [kN/m]			
	V1		50.0	75.0	75.0	75.0

Schöck Isokorb® XT type K-O	M1	M2	M3	M4
Isokorb® length [mm]	1000	1000	1000	1000
Tension bars	4 ⌀ 12	6 ⌀ 12	8 ⌀ 12	10 ⌀ 12
Anchor bars	4 ⌀ 10	6 ⌀ 10	8 ⌀ 10	10 ⌀ 10
Shear force bars V1	4 ⌀ 8	6 ⌀ 8	6 ⌀ 8	6 ⌀ 8
Pressure bearing (piece)	6	8	10	16
Special stirrup (piece)	-	-	-	4

Notes on design

Static system and information on the design see page 70.

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 such that the scheduled drainage direction is met (round up: With drainage towards 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 table value

l_k = cantilever length [m]

m_{pd} = relevant bending moment [kNm/m] in the ultimate limit state for the determination of the deflection p [mm] from Schöck Isokorb®.
The load combination to be applied for the deformation is laid down by the structural engineer.
(Recommendation: Determine load combination for the determination of the camber $w_ü$: g+q/2, $m_{üd}$ in the ultimate limit state)

m_{Rd} = Maximum design moment [kNm/m] of the Schöck Isokorb®

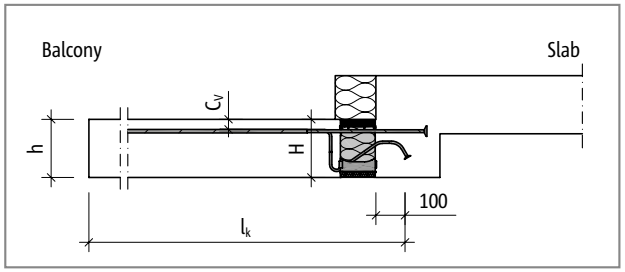


Fig. 97: Schöck Isokorb® XT type K-U: Static system

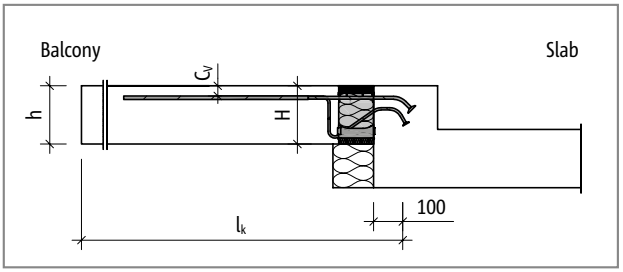


Fig. 98: Schöck Isokorb® XT type K-O: Static system

Deflection/Camber

Schöck Isokorb® XT type		K-U	
Deflection factors when		tan α [%]	
		200 mm > w_{exist} ≥ 175 mm	
		CV35	CV50
Isokorb® height H [mm]	160	1.0	-
	170	0.8	-
	180	0.8	0.9
	190	0.7	0.8
	200	-	0.7
	210	-	0.7

Schöck Isokorb® XT type		K-U	
Deflection factors when		tan α [%]	
		220 mm > w_{exist} ≥ 200 mm	
		CV35	CV50
Isokorb® height H [mm]	160	1.1	-
	170	1.0	-
	180	0.9	1.1
	190	0.8	1.0
	200	0.8	0.9
	210	0.7	0.8
	220	-	0.7
	230	-	0.7

Schöck Isokorb® XT type		K-U	
Deflection factors when		tan α [%]	
		w_{exist} ≥ 220 mm	
		CV35	CV50
Isokorb® height H [mm]	160	1.3	-
	170	1.1	-
	180	1.0	1.2
	190	0.9	1.1
	200	0.8	1.0
	210	0.8	0.9
	220	0.7	0.8
	230	0.7	0.7
	240	0.6	0.7
	250	0.6	0.7

Notes on deformation

- The deflection values for Schöck Isokorb® XT type K-U depend upon the available downstand beam width and wall thickness (w_{vorh}).
- The minimum structural element dimension wmin = 240 mm for CV 35 is to be observed for H ≥ 240 mm.

Deflection/Camber | Slenderness

Deflection factors XT type K-O

Schöck Isokorb® XT type		K-O	
Deflection factors when		tan α [%]	
		w_{exist} ≥ 175 mm	
		CV35	CV50
Isokorb® height H [mm]	160	1.3	-
	170	1.1	-
	180	1.0	1.2
	190	0.9	1.1
	200	0.8	1.0
	210	0.8	0.9
	220	0.7	0.8
	230	0.7	0.7
	240	0.6	0.7
	250	0.6	0.7

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-U K-O	
maximum cantilever length with		$l_{k,max}$ [m]	
		CV35	CV50
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
- Specific weight of concrete γ=25 kN/m³
- Dead weight of the balcony surfacing $g_2 \leq 1.2$ kN/m²
- Balcony rail $g_R \leq 0.75$ kN/m
- Service load q = 4.0 kN/m² with the coefficient $\psi_{2,i} = 0.3$ for the quasi-permanent combination

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 Dorn.

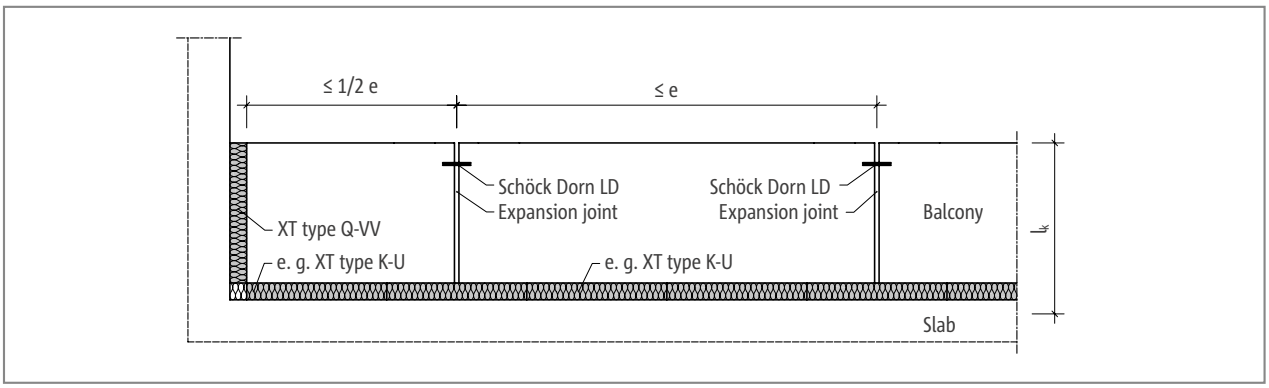


Fig. 99: Schöck Isokorb® XT type K-U: Expansion joint configuration

Schöck Isokorb® XT type		K-U K-O
Maximum expansion joint spacing e		e [m]
Insulating element thickness [mm]	120	21.7

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

Product description

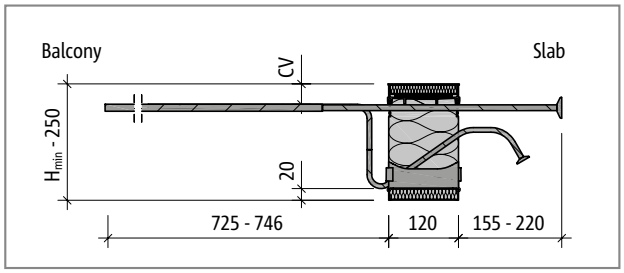


Fig. 100: Schöck Isokorb® XT type K-U-M2: Product section

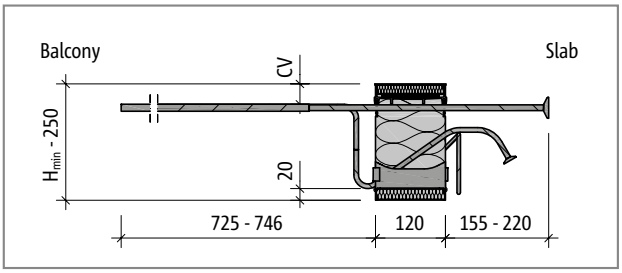


Fig. 101: Schöck Isokorb® XT type K-U-M4: Product section

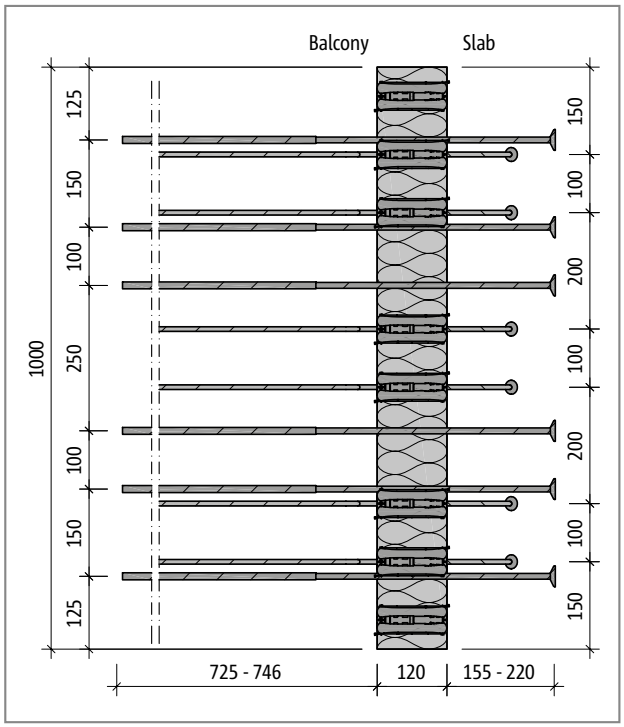


Fig. 102: Schöck Isokorb® XT type K-U-M2: Product plan view

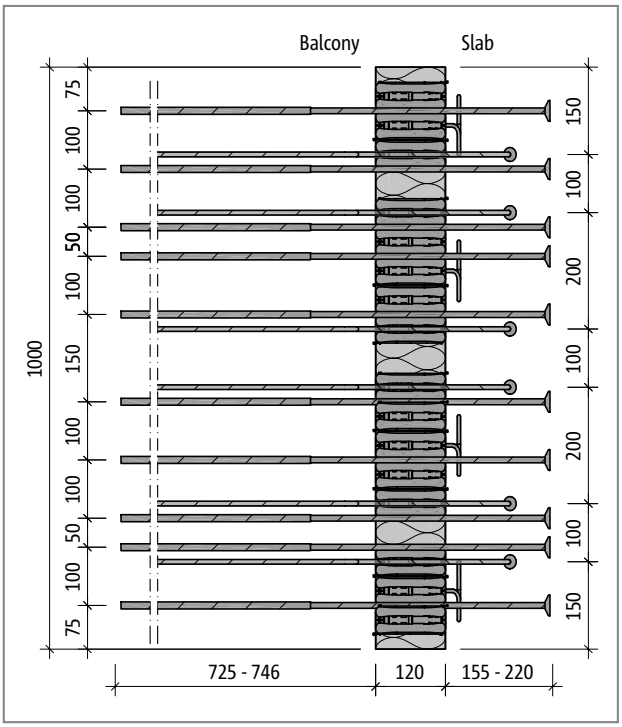


Fig. 103: Schöck Isokorb® XT type K-U-M4: Product plan view

Product information

- Download further product plan views and cross-sections at www.schoeck.co.uk/download
- Minimum height Schöck Isokorb® XT type K-U: H_{min} = 160 mm
- On-site spacing of the Schöck Isokorb® XT type K-U to the unreinforced points possible; take into account the reduced load-bearing force due to spacing; take into account required edge separations
- Concrete cover of the tension bars: CV35 = 35 mm, CV50 = 50 mm

Product description

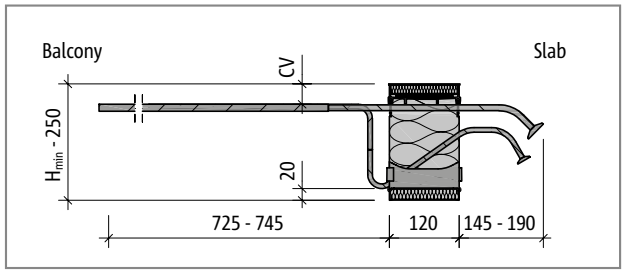


Fig. 104: Schöck Isokorb® XT type K-O-M2: Product section

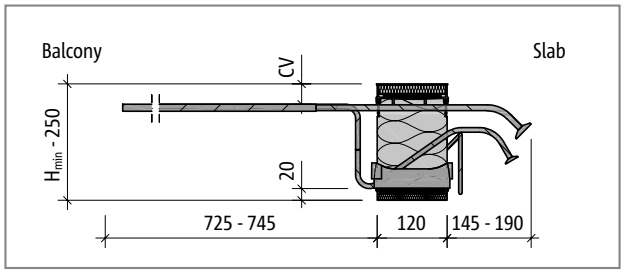


Fig. 105: Schöck Isokorb® XT type K-O-M4: Product section

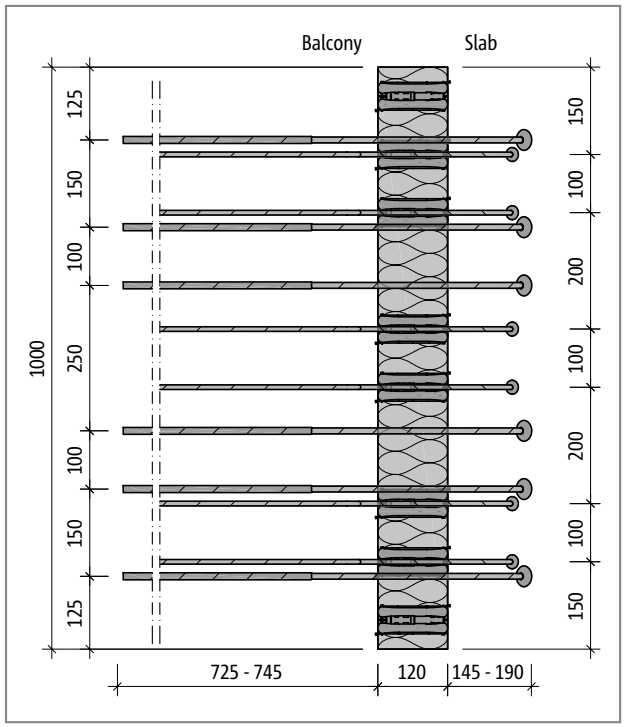


Fig. 106: Schöck Isokorb® XT type K-O-M2: Product plan view

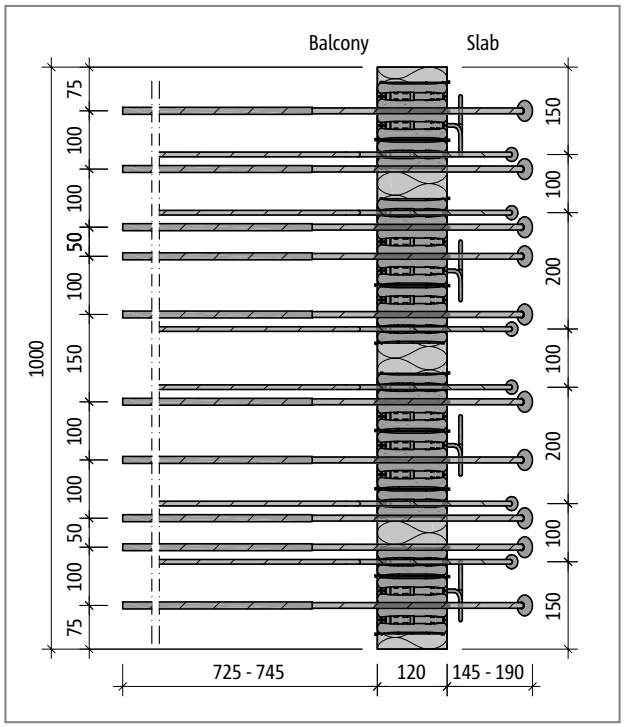


Fig. 107: Schöck Isokorb® XT type K-O-M4: Product plan view

Product information

- Download further product plan views and cross-sections at www.schoeck.co.uk/download
- Minimum height Schöck Isokorb® XT type K-O: H_{min} = 160 mm
- On-site spacingof the Schöck Isokorb® XT type K-O to the unreinforced points possible; take into account the reduced load-bearing force due to spacing; take into account required edge separations
- Concrete cover of the tension bars: CV35 = 35 mm, CV50 = 50 mm

On-site reinforcement - Schöck Isokorb® XT type K

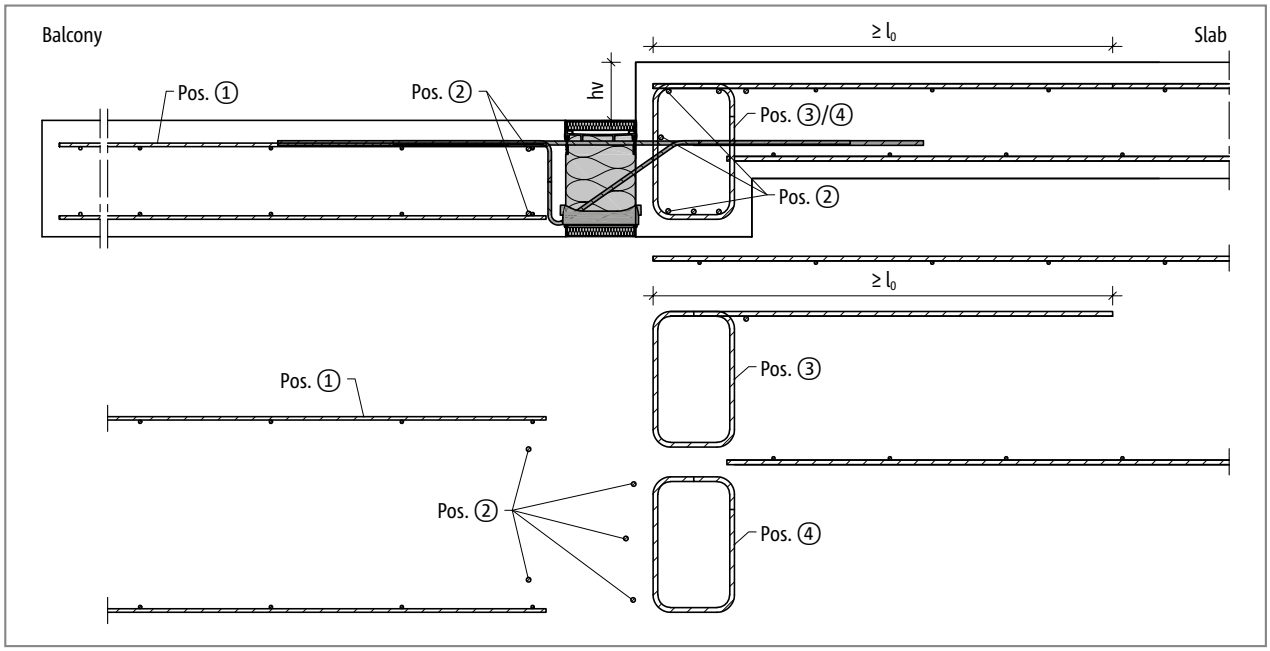


Fig. 108: Schöck Isokorb® XT type K: On-site reinforcement for small height offset

Information about on-site reinforcement

- Due to the reinforcement density in the downstand beam the use up to XT type K-M7 only is recommended.
- 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.
- For the redirection of the tension force on the floor-side, a stirrup reinforcement Pos. 3 is required in the floor edge beam (upper side length $l_{0,bü}$). This stirrup reinforcement Pos.3 safeguards the load transmission from the Schöck Isokorb®.
- The shear force reinforcement Pos. 4 conforms to the loading of balcony, floor and the supporting width of the downstand/upstand beam. Therefore the shear force reinforcement in individual cases is to be verified by the structural engineer.
- The required lateral reinforcement in the overlap area is to be verified according to BS EN 1992-1-1 (EC2), 8.7 to 8.8 and BS EN 1992-1-1/NA, NDPs nd NCIs to 8.7 and 8.8.
- The Schöck Isokorb® XT type K is if necessary to be laid before the installation of the downstand or upstand beam reinforcement.
- Pos. 3: Value for Isokorb® heights between 160 mm and 250 mm may be interpolated.
- Pos. 3: For larger downstand beam widths a reduction of the required reinforcement acc. to the structural engineer's details is possible.

On-site reinforcement - Schöck Isokorb® XT type K

Recommendation for 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; variants adapted to load-bearing level. The required reinforcement cross-section depends on the bar diameter of the steel bar or wire mesh reinforcement.

Schöck Isokorb® XT type K			M1		M2		M3			M4		
On-site reinforcement	Secondary load-bearing level		V1	V2	V1	V2	V1	V2	VV1	V1	V2	VV1
	Location	Height [mm]	Floor (XC1) concrete strength class ≥ C25/30 Balcony (XC4) concrete strength class ≥ C25/30									
Pos. 1 overlap reinforcement depending on bar diameter												
Pos. 1 with ⌀8 [mm²/m]	Balcony side	160 - 250	289	258	457	426	575	544	603	661	622	689
Pos. 1 with ⌀10 [mm²/m]			352	317	553	518	695	662	722	798	755	825
Pos. 1 with ⌀12 [mm²/m]			422	381	664	622	834	794	866	958	906	990
Pos. 2 Steel bars along the insulation joint												
Pos. 2	Balcony side	160 - 250	2 • H8									
	Floor side	160 - 250	3 • H8									
Pos. 3 stirrup reinforcement for redirection of the tension force (single-shear chargeable)												
Pos. 3 [mm²/m]	Floor side	160	233	258	372	398	475	514	351	552	584	429
Pos. 3 [mm²/m]	Floor side	250	384	409	628	653	808	848	725	938	970	863
Pos. 4 Stirrup reinforcement acc. to shear force design												
Pos. 4	Floor side	160 - 250	Stirrup reinforcement according to BS EN 1992-1-1 (EC2), 6.2.3, 9.2.2									

Schöck Isokorb® XT type K			M5			M6			M7		
On-site reinforcement	Secondary load-bearing level		V1	V2	VV1	V1	V2	VV1	V1	V2	VV1
	Location	Height [mm]	Floor (XC1) concrete strength class ≥ C25/30 Balcony (XC4) concrete strength class ≥ C25/30								
Pos. 1 overlap reinforcement depending on bar diameter											
Pos. 1 with ⌀8 [mm²/m]	Balcony side	160 - 250	762	724	754	866	827	880	979	979	990
Pos. 1 with ⌀10 [mm²/m]			920	877	902	1044	1001	880	1040	1061	990
Pos. 1 with ⌀12 [mm²/m]			1104	1052	1082	1253	1201	880	1102	1143	990
Pos. 2 Steel bars along the insulation joint											
Pos. 2	Balcony side	160 - 250	2 • H8								
	Floor side	160 - 250	3 • H8								
Pos. 3 stirrup reinforcement for redirection of the tension force (single-shear chargeable)											
Pos. 3 [mm²/m]	Floor side	160	645	677	489	742	774	609	936	965	746
Pos. 3 [mm²/m]	Floor side	250	1104	1135	970	1278	1310	1185	1592	1621	1412
Pos. 4 Stirrup reinforcement acc. to shear force design											
Pos. 4	Floor side	160 - 250	Stirrup reinforcement according to BS EN 1992-1-1 (EC2), 6.2.3, 9.2.2								

On-site reinforcement - Schöck Isokorb® XT type K-U

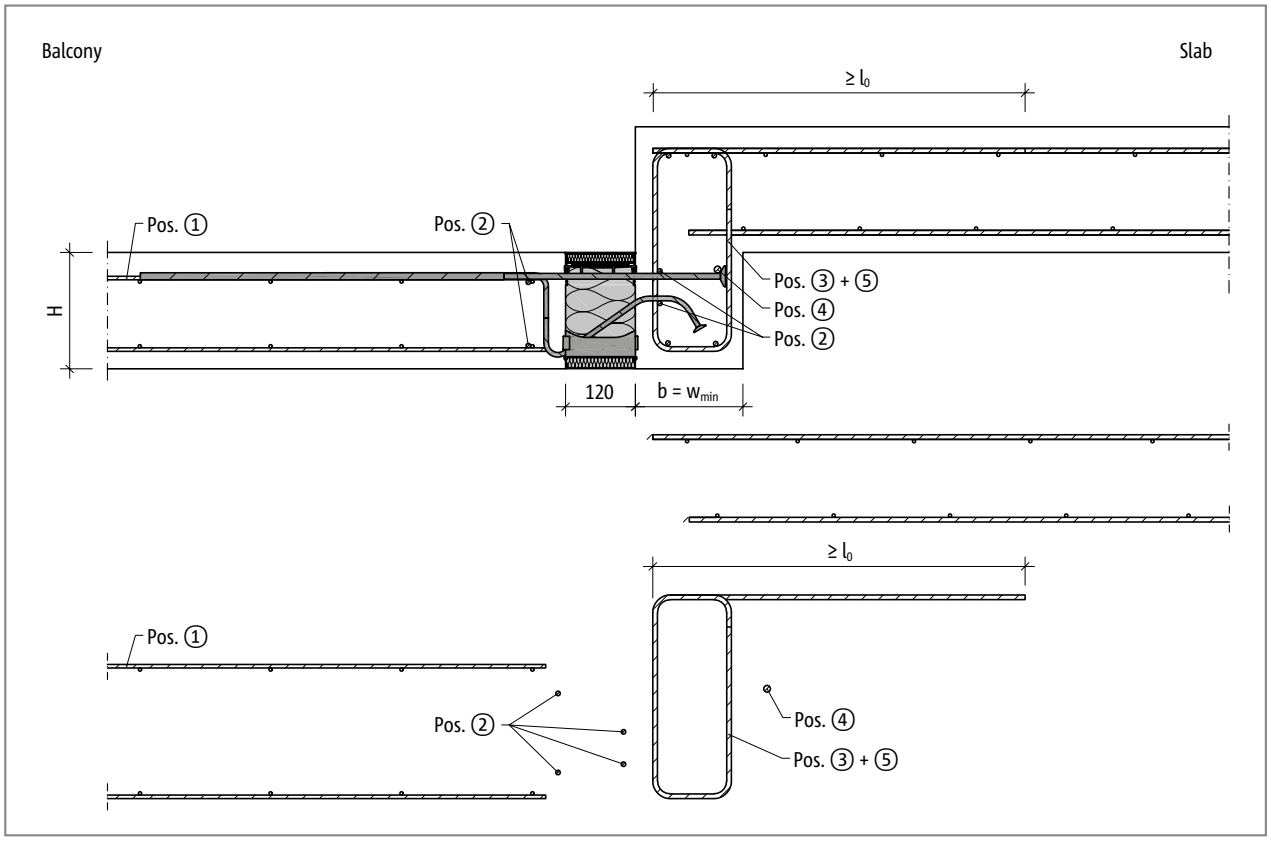


Fig. 109: Schöck Isokorb® XT type K-U: On-site reinforcement for balcony with height offset downwards with minimum structural element dimension (w_{vorh} = w_{min})

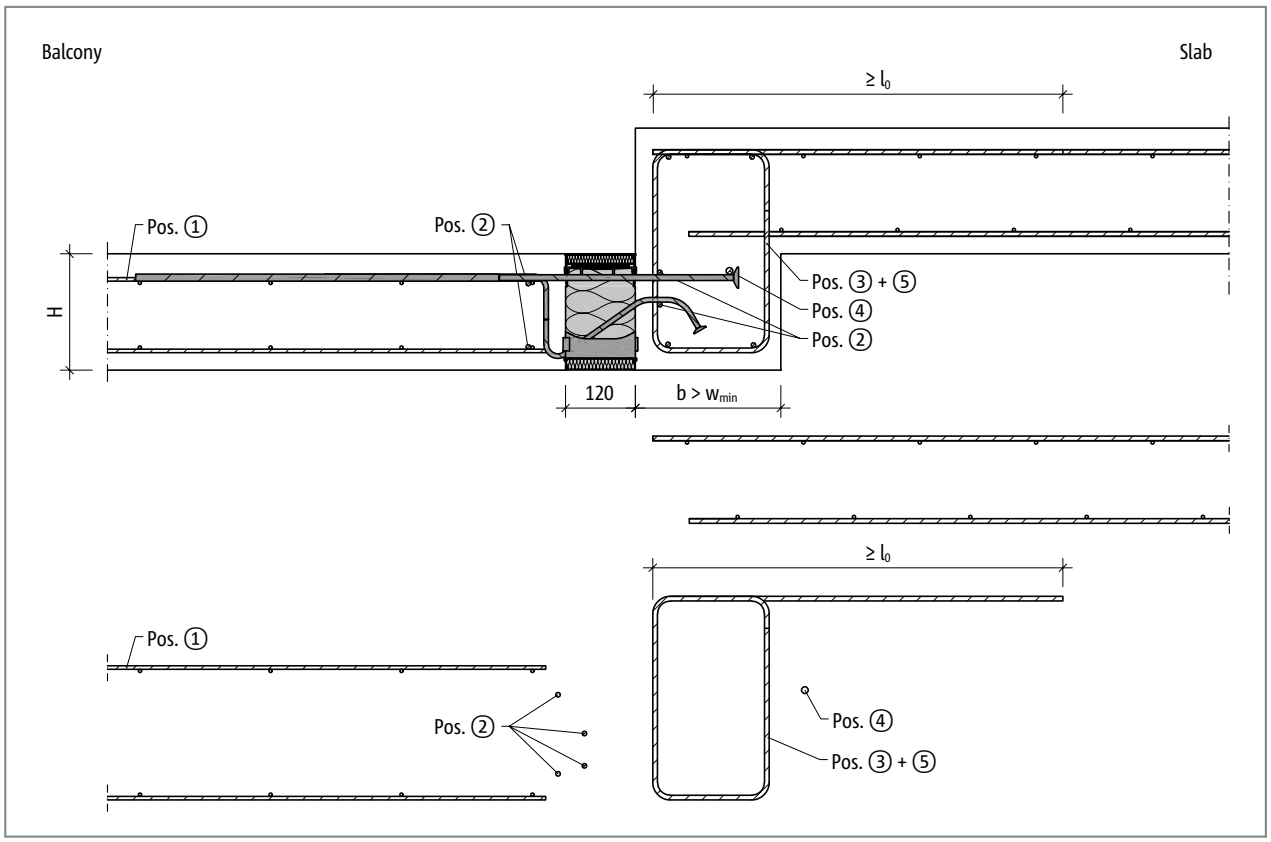


Fig. 110: Schöck Isokorb® XT type K-U: On-site reinforcement for balcony with height offset downwards with larger structural element dimension (w_{vorh} > w_{min})

On-site reinforcement - Schöck Isokorb® XT type K-U

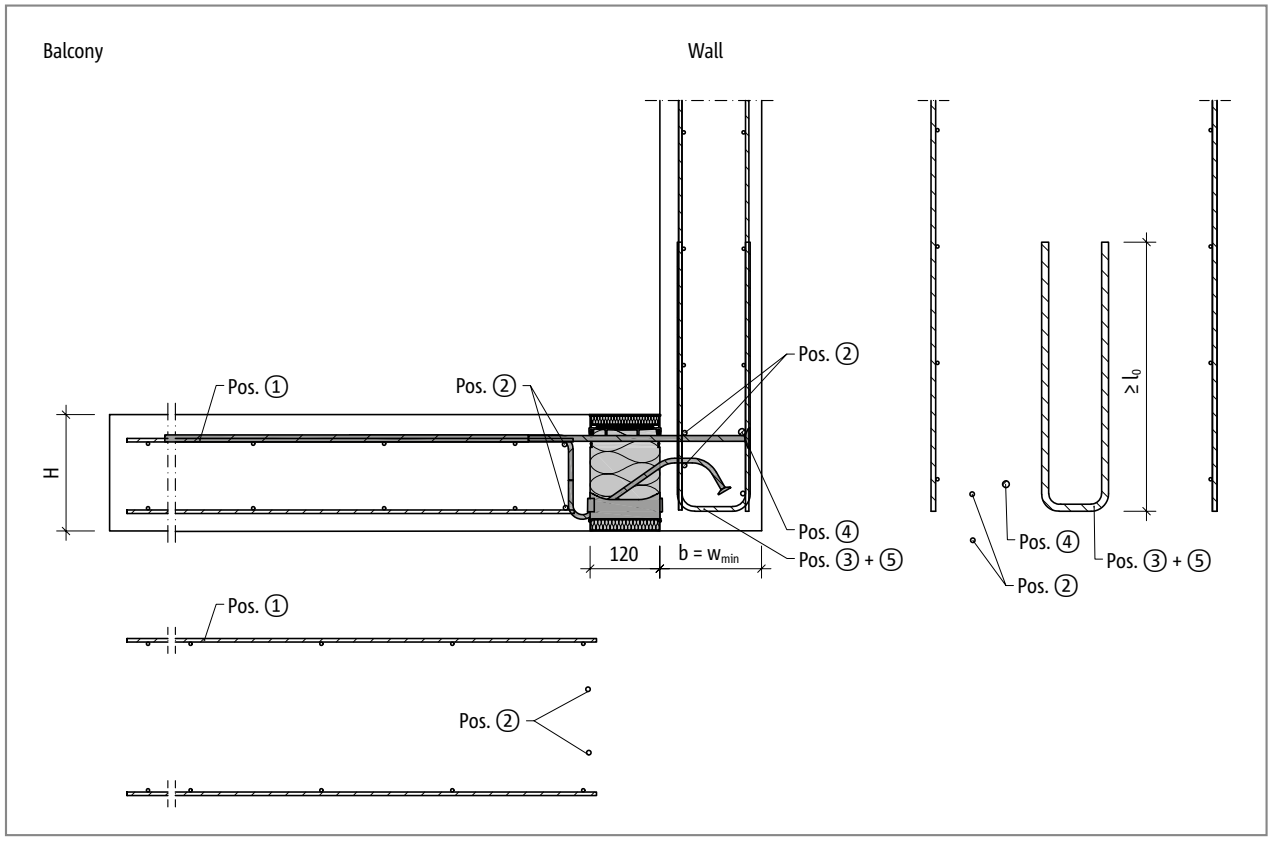


Fig. 111: Schöck Isokorb® XT type K-U: On-site reinforcement for wall connection upwards with minimum structural element dimension ($w_{vorh} = w_{min}$)

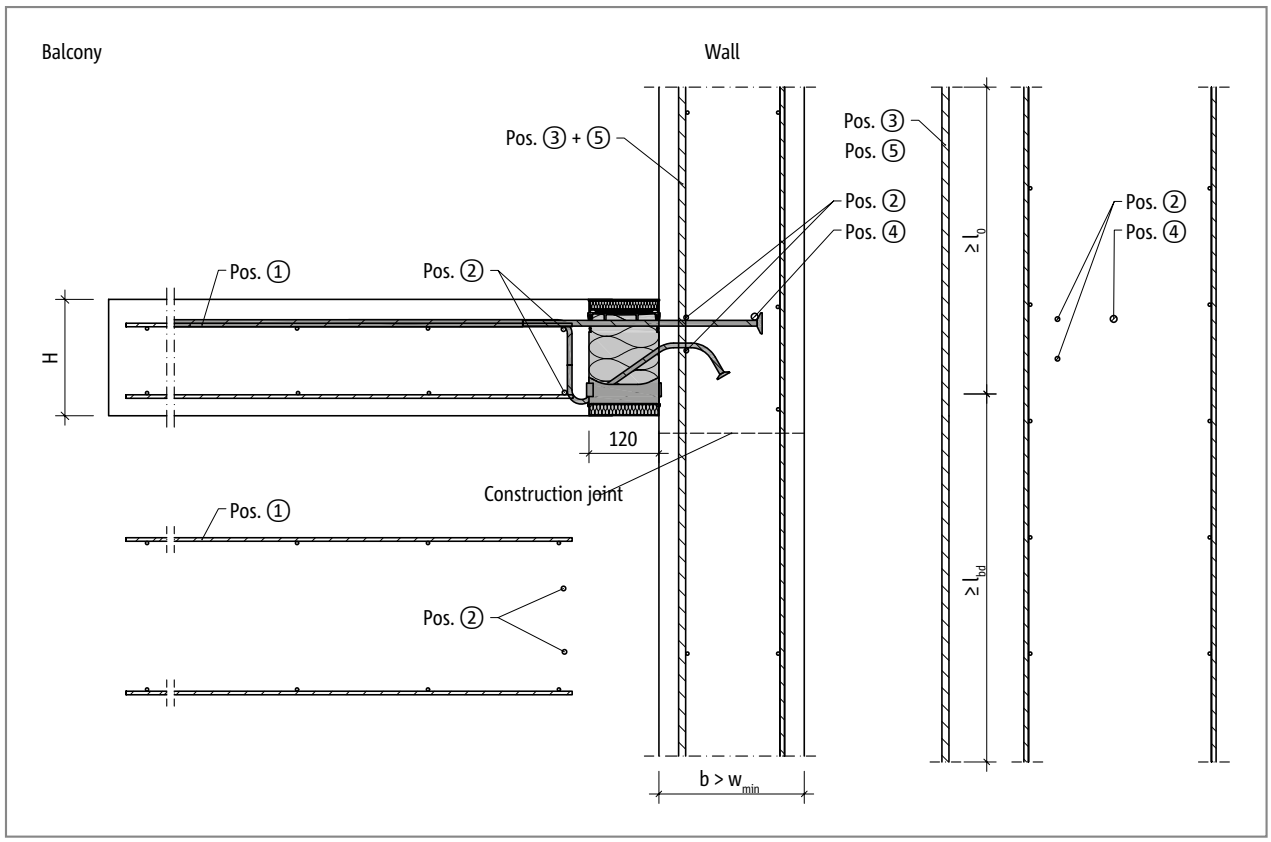


Fig. 112: Schöck Isokorb® XT type K-U: On-site reinforcement for wall connection upwards with larger structural element dimension ($w_{vorh} > w_{min}$)

On-site reinforcement - Schöck Isokorb® XT type K-U

Recommendation for 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; variants adapted to load-bearing level. The required reinforcement cross-section depends on the bar diameter of the steel bar or wire mesh reinforcement.

Schöck Isokorb® XT type K-U			M1	M2	M3	M4
On-site reinforcement	Location	Height [mm]	Concrete strength class ≥ C25/30 200 mm > downstand beam width ≥ 175 mm 200 mm >wall thickness ≥ 175 mm			
Pos. 1 overlap reinforcement depending on bar diameter						
Pos. 1 with ⌀8 [mm²/m]	Balcony side	160 - 210	327	436	545	740
Pos. 1 with ⌀10 [mm²/m]			368	498	607	802
Pos. 1 with ⌀12 [mm²/m]			409	559	668	864
Pos. 2 Steel bars along the insulation joint						
Pos. 2	balcony side/ downstand beam, wall	160 - 210	2 • 2 • H8			
Pos. 3 Vertical reinforcement						
Pos. 3 [mm²/m] minimum reinforcement	downstand beam, wall	160 - 210	≥ 528	≥ 737	≥ 846	≥ 1041
Pos. 3 structural element design	downstand beam, wall	160 - 210	Taking into account the moments and shear forces provided by the structural engineer			
Pos. 4 Steel bars along the insulation joint						
Pos. 4	downstand beam, wall	160 - 210	≥ 1 ⌀ 12			
Pos. 5 splitting tension reinforcement						
Pos. 5 [mm²/m]	downstand beam, wall	160 - 210	130			

Schöck Isokorb® XT type K-U			M1	M2	M3	M4
On-site reinforcement	Location	Height [mm]	Concrete strength class ≥ C25/30 220 mm > downstand beam width ≥ 200 mm 220 mm >wall thickness ≥ 200 mm			
Pos. 1 overlap reinforcement depending on bar diameter						
Pos. 1 with ⌀8 [mm²/m]	Balcony side	160 - 230	427	570	712	967
Pos. 1 with ⌀10 [mm²/m]			468	631	774	1029
Pos. 1 with ⌀12 [mm²/m]			509	693	835	1090
Pos. 2 Steel bars along the insulation joint						
Pos. 2	balcony side/ downstand beam, wall	160 - 230	2 • 2 • H8			
Pos. 3 Vertical reinforcement						
Pos. 3 [mm²/m] minimum reinforcement	downstand beam, wall	160 - 230	≥ 628	≥ 871	≥ 1013	≥ 1268
Pos. 3 structural element design	downstand beam, wall	160 - 230	Taking into account the moments and shear forces provided by the structural engineer			
Pos. 4 Steel bars along the insulation joint						
Pos. 4	downstand beam, wall	160 - 230	≥ 1 ⌀ 12			
Pos. 5 splitting tension reinforcement						
Pos. 5 [mm²/m]	downstand beam, wall	160 - 230	130			

On-site reinforcement - Schöck Isokorb® XT type K-U

Schöck Isokorb® XT type K-U			M1	M2	M3	M4
On-site reinforcement	Location	Height [mm]	Concrete strength class ≥ C25/30 Downstand beam width ≥ 220 mm wall thickness ≥ 220 mm			
Pos. 1 overlap reinforcement depending on bar diameter						
Pos. 1 with ⌀8 [mm²/m]	Balcony side	160 - 250	517	689	862	1170
Pos. 1 with ⌀10 [mm²/m]			558	751	923	1232
Pos. 1 with ⌀12 [mm²/m]			599	813	985	1293
Pos. 2 Steel bars along the insulation joint						
Pos. 2	balcony side/ downstand beam, wall	160 - 250	2 • 2 • H8			
Pos. 3 Vertical reinforcement						
Pos. 3 [mm²/m] minimum reinforcement	downstand beam, wall	160 - 250	≥ 640	≥ 960	≥ 1163	≥ 1400
Pos. 3 structural element design	downstand beam, wall	160 - 250	Taking into account the moments and shear forces provided by the structural engineer			
Pos. 4 Steel bars along the insulation joint						
Pos. 4	downstand beam, wall	160 - 250	≥ 1 ⌀ 12			
Pos. 5 splitting tension reinforcement						
Pos. 5 [mm²/m]	downstand beam, wall	160 - 250	130			

Information about on-site reinforcement

- 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.
- When reinforcing with different diameters the reinforcement specification for the largest diameter is relevant.
- The minimum reinforcement of Pos. 3 serves for the transfer of the active bar axial forces from the Isokorb®. This minimum reinforcement must be complied with.
  The required reinforcement from the structural element design as a result of the loading of the balcony, floors, walls and the supporting width of the downstand/upstand beam is to be verified by the structural engineer. The reinforcement determined from this must be compared with the minimum reinforcement of Pos, 3.
  The greater of the two values is relevant.
- Isokorb® height for CV35: H = 160 - 190 mm for downstand beam width w_{min} < 200 mm
  H = 160 - 210 mm for downstand beam width w_{min} < 220 mm
  H = 160 - 230 mm for downstand beam width w_{min} < 240 mm
- The required lateral reinforcement in the overlap area is to be verified according to BS EN 1992-1-1 (EC2), 8.7 to 8.8 and BS EN 1992-1-1/NA, NDPs nd NCIs to 8.7 and 8.8.
- l_0 for l_0 (⌀10) ≥ 570 mm, l_0 for l_0 (⌀12) ≥ 680 mm, l_0 (⌀14) ≥ 790 mm nd l_0 (⌀16) ≥ 910 mm.
- With the selection of the Isokorb® type channels and inclinations must be taken into account, in order to maintain the required concrete cover.
- For safe application of force the information with regard to the lift joint is to be complied with, see page 91.

Hazard warning - missing connection bar

- For the given load-bearing capacity, the transverse reinforcement bar is absolutely necessary. This transverse reinforcement bar must be fitted directly to the anchor head.

On-site reinforcement - Schöck Isokorb® XT type K-U

Design example

Numerical example for stirrup design (Pos. 3 + 5):

Geometry: Isokorb® height H = 200 mm
downstand beam width w_{vorh} = 220 mm
concrete cover CV30

Concrete strength: C25/30

Internal forces from balcony: m_{Ed} = -45.3 kNm/m
v_{Ed} = 35.0 kN/m

Selected: XT type K-U-M3-V1-REI120-CV35-LR180-X120-H200-7.0

Minimum reinforcement for Pos. 3: $a_{s,min}$ = 11.63 cm²/m
Required reinforcement from structural element design: $a_{s,req}$ = 5.67 cm²/m < 11.63 cm²/m = $a_{s,min}$

⇒ The minimum reinforcement $a_{s,min}$ = 11.63 cm²/m is decisive!

Required splitting tensile reinforcement Pos. 5: $a_{s,req}$ = 1.30 cm²/m

⇒ Required stirrup cross-section: $a_{s,req}$ = 11.63 cm²/m + 1.30 cm²/m = 12.93 cm²/m

On-site reinforcement - Schöck Isokorb® XT type K-O

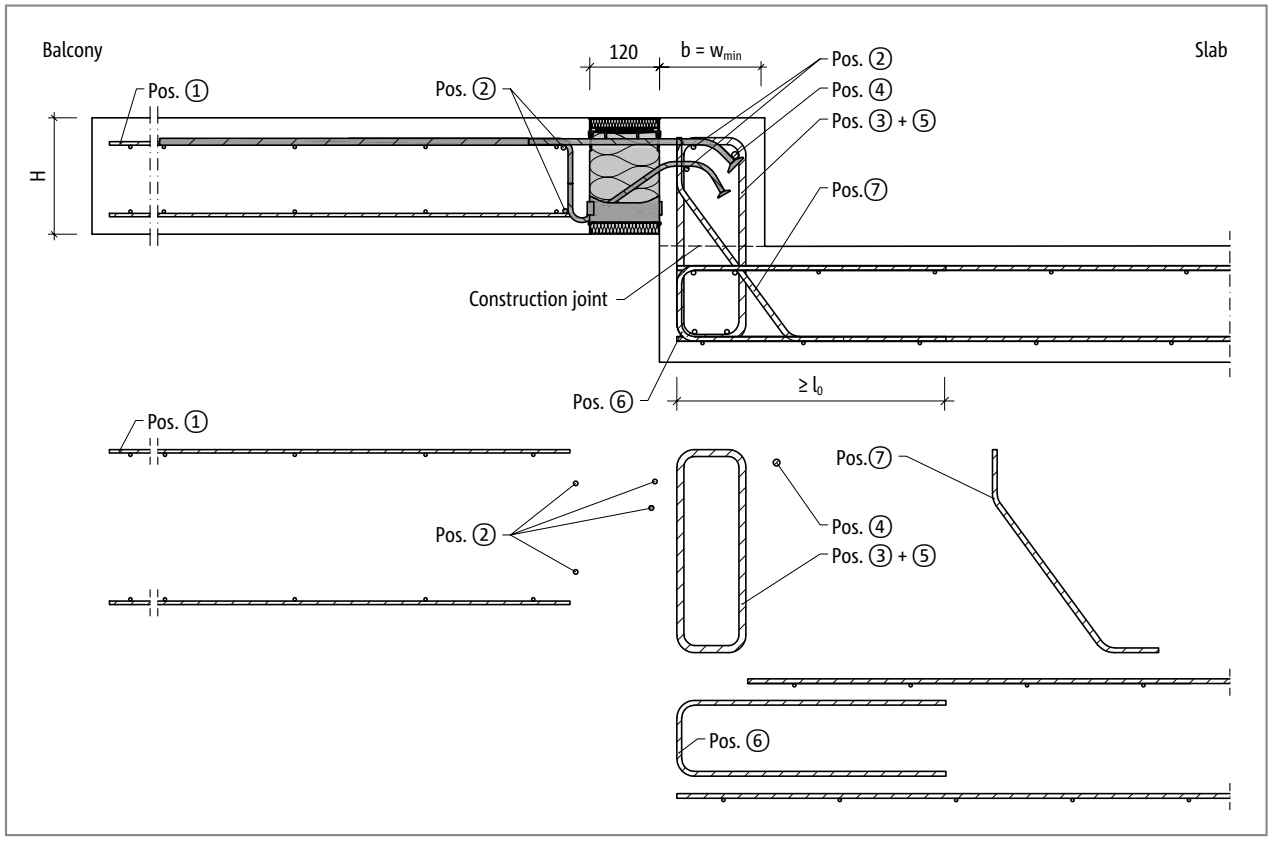


Fig. 113: Schöck Isokorb® XT type K-O: On-site reinforcement for balcony with height offset upwards with minimum structural element dimension (w_{vorh} = w_{min})

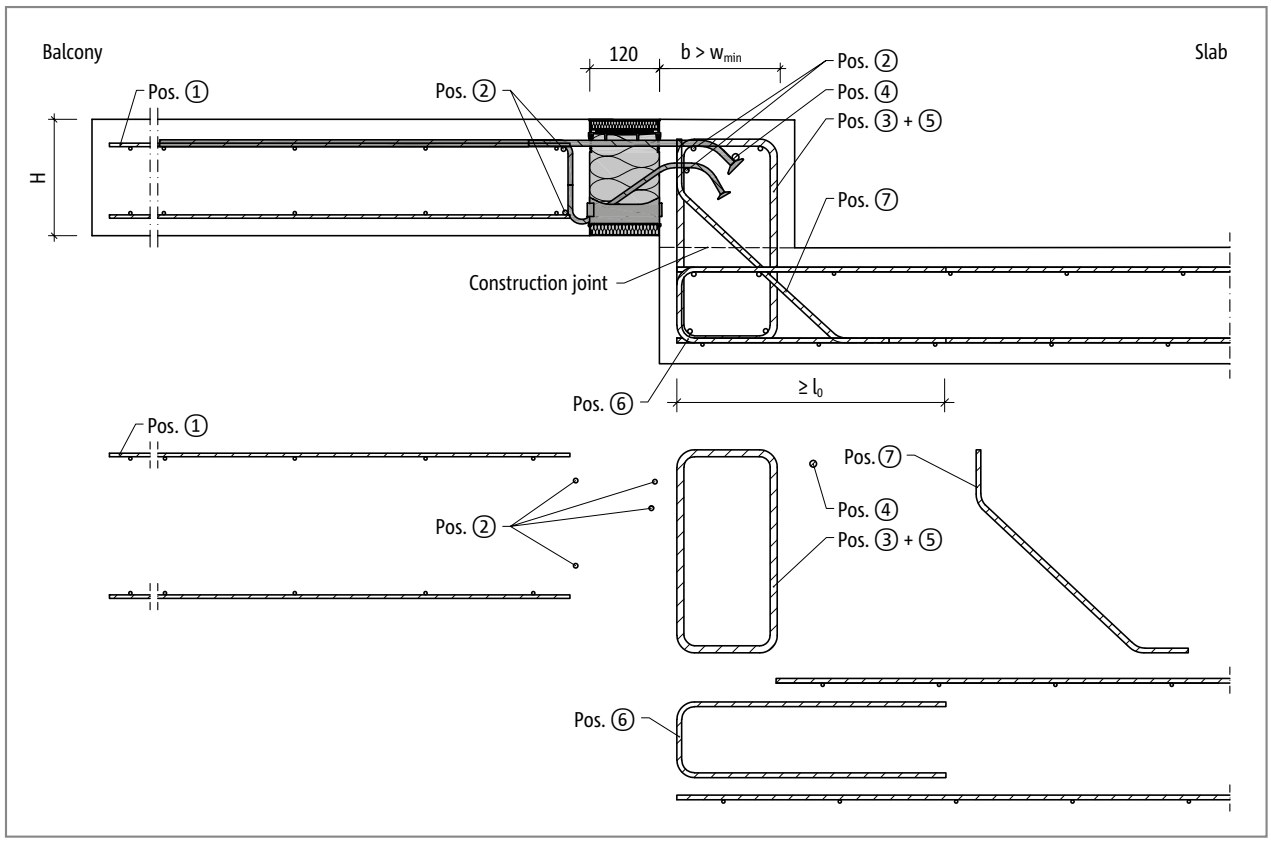


Fig. 114: Schöck Isokorb® XT type K-O: On-site reinforcement for balcony with height offset upwards with larger structural element dimension (w_{vorh} > w_{min})

On-site reinforcement - Schöck Isokorb® XT type K-O

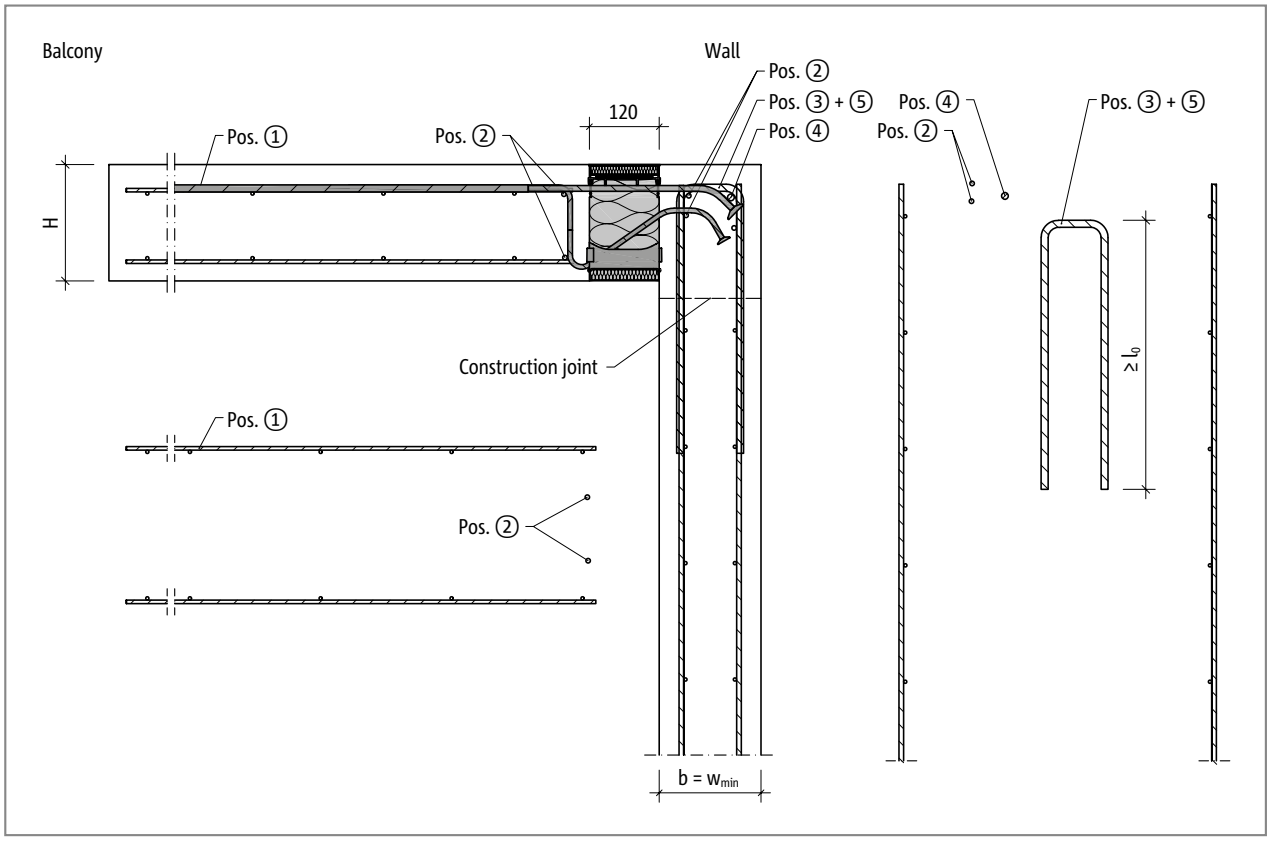


Fig. 115: Schöck Isokorb® XT type K-O: On-site reinforcement for wall connection upwards with minimum structural element dimension ($w_{vorh} = w_{min}$)

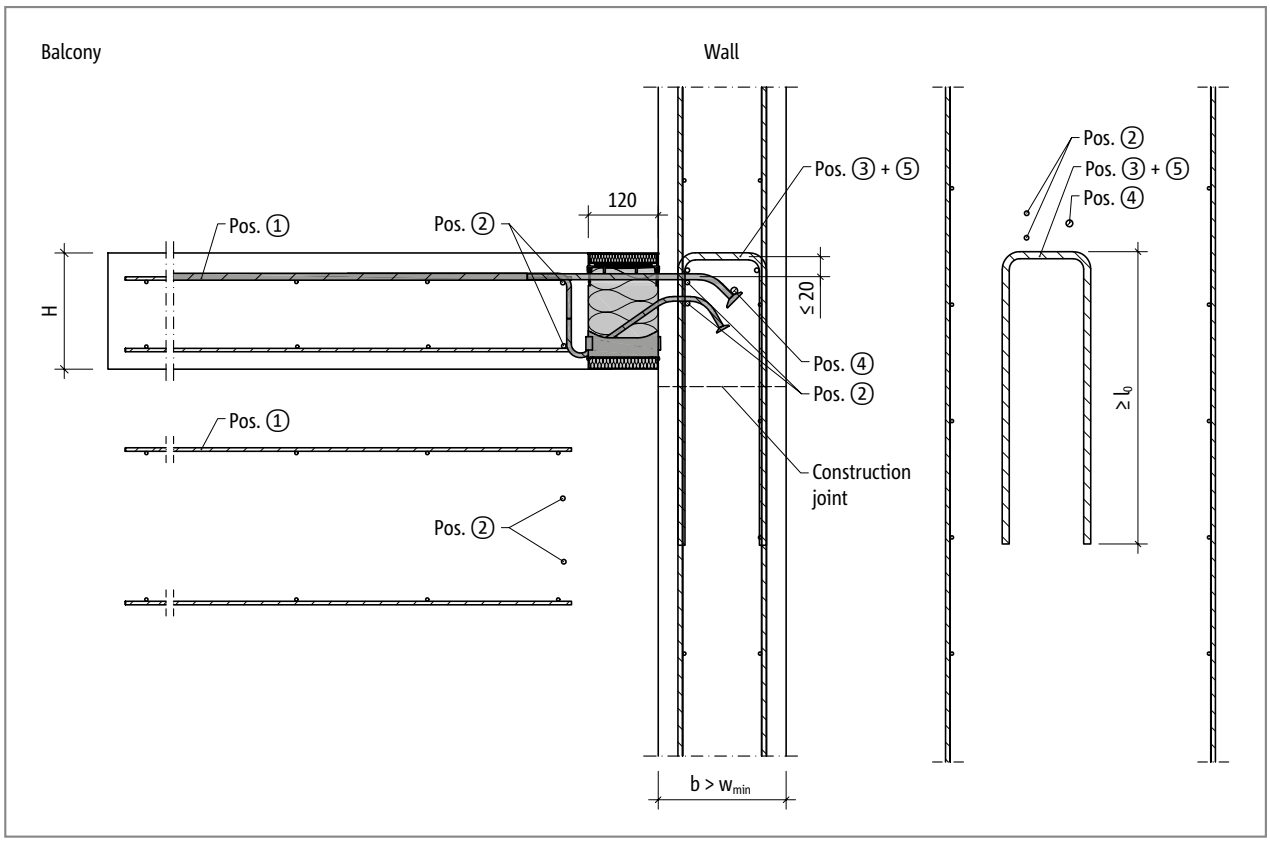


Fig. 116: Schöck Isokorb® XT type K-O: On-site reinforcement for wall connection with larger structural element dimension (($w_{vorh} > w_{min}$)

On-site reinforcement - Schöck Isokorb® XT type K-O

Recommendation for 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; variants adapted to load-bearing level. The required reinforcement cross-section depends on the bar diameter of the steel bar or wire mesh reinforcement.

Schöck Isokorb® XT type K-O			M1	M2	M3	M4
On-site reinforcement	Location	Height [mm]	Concrete strength class ≥ C25/30 Downstand beam width ≥ 175 mm wall thickness ≥ 175 mm			
Pos. 1 overlap reinforcement depending on bar diameter						
Pos. 1 with ⌀8 [mm²/m]	Balcony side	160 - 250	517	689	862	1170
Pos. 1 with ⌀10 [mm²/m]			558	751	923	1232
Pos. 1 with ⌀12 [mm²/m]			599	813	985	1293
Pos. 2 Steel bars along the insulation joint						
Pos. 2	balcony side/ downstand beam, wall	160 - 250	2 • 2 • H8			
Pos. 3 Vertical reinforcement						
Pos. 3 [mm²/m] minimum reinforcement	downstand beam, wall	160 - 250	≥ 640	≥ 960	≥ 1163	≥ 1400
Pos. 3 Structural component design	downstand beam, wall	160 - 250	Taking into account the moments and shear forces provided by the structural engineer			
Pos. 4 Steel bars along the insulation joint						
Pos. 4	downstand beam, wall	160 - 250	≥ 1 ⌀ 12			
Pos. 5 splitting tension reinforcement						
Pos. 5 [mm²/m]	downstand beam, wall	160 - 250	130			
Pos.6 Slip in bracket						
Pos. 6	Floor side	160 - 250	acc. to the specifications of the structural engineer			
Pos. 7 Slanting reinforcement						
Pos.7	Downstand beam	160 - 250	acc. to the specifications of the structural engineer			

Information about on-site reinforcement

Information about on-site reinforcement see page 90.

Hazard warning - missing connection bar

For the given load-bearing capacity, the transverse reinforcement bar is absolutely necessary. This transverse reinforcement bar must be fitted directly to the anchor head.

On-site reinforcement - Schöck Isokorb® XT type K-O

Information about on-site reinforcement

- 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.
- When reinforcing with different diameters the reinforcement specification for the largest diameter is relevant.
- The minimum reinforcement of Pos. 3 serves for the transfer of the active bar axial forces from the Isokorb®. This minimum reinforcement must be complied with.
  The required reinforcement from the structural element design as a result of the loading of the balcony, floors, walls and the supporting width of the downstand/upstand beam is to be verified by the structural engineer. The reinforcement determined from this must be compared with the minimum reinforcement of Pos, 3.
  The greater of the two values is relevant.
- Isokorb® height for CV35: H = 160 - 210 mm for downstand beam width w_{min} < 190 mm
  H = 160 - 230 mm for downstand beam width w_{min} < 210 mm
- Pos. 3 and Pos. 5 are to be brought as close as possible over the tension bar of the Schöck Isokorb®. The distance between the on-site stirrup reinforcement and the upper edge of the tension bar is smaller than 2 cm.
- The required lateral reinforcement in the overlap area is to be verified according to BS EN 1992-1-1 (EC2), 8.7 to 8.8 and BS EN 1992-1-1/NA, NDPs nd NCIs to 8.7 and 8.8.
- l_0 for l_0 (⌀10) ≥ 570 mm, l_0 for l_0 (⌀12) ≥ 680 mm, l_0 (⌀14) ≥ 790 mm nd l_0 (⌀16) ≥ 910 mm.
- With the selection of the Isokorb® type channels and inclinations must be taken into account, in order to maintain the required concrete cover.
- For safe application of force the information with regard to the lift joint is to be complied with, see page 91.

Hazard warning - missing connection bar

- For the given load-bearing capacity, the transverse reinforcement bar is absolutely necessary. This transverse reinforcement bar must be fitted directly to the anchor head.

Design example

- Numerical example for stirrup design (Pos. 3 + 5):

Geometry: Isokorb® height H = 230 mm
downstand beam width w_{vorh} = 175 mm
concrete cover CV30

Concrete strength: C25/30

Internal forces from balcony: m_{Ed} = -69.2 kNm/m
v_{Ed} = 21.6 kN/m

Selected: XT type K-O-M4-V1-REI120-CV50-LR145-X120-H230-7.0

Minimum reinforcement for Pos. 3: $a_{s,min}$ = 14.00 cm²/m
Required reinforcement from structural element design: $a_{s,req}$ = 14.46 cm²/m > 14.00 cm²/m = $a_{s,min}$

⇒ The required reinforcement from bending design $a_{s,req}$ = 14.46 cm²/m is relevant!

Required splitting tensile reinforcement Pos. 5: $a_{s,req}$ = 1.30 cm²/m

⇒ Required stirrup cross-section: $a_{s,req}$ = 14.46 cm²/m + 1.30 cm²/m = 15.76 cm²/m

Tight fit/Concreting section | Installation instructions

Tight fit/Concreting section

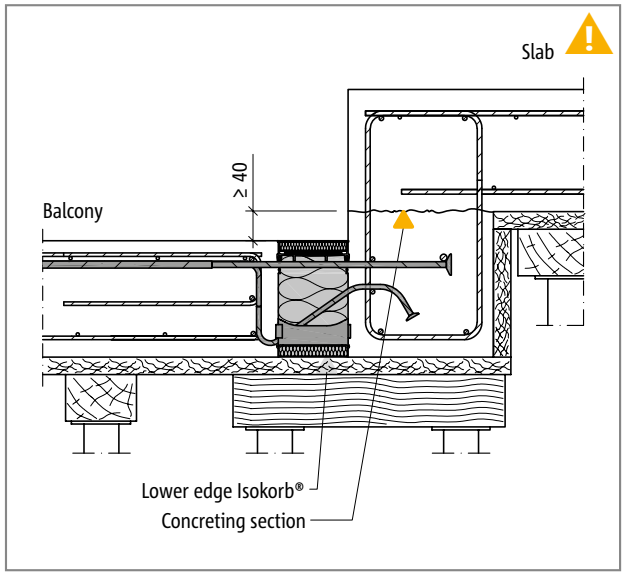


Fig. 117: Schöck Isokorb® XT type K-U: In-situ concrete balcony with height offset downwards

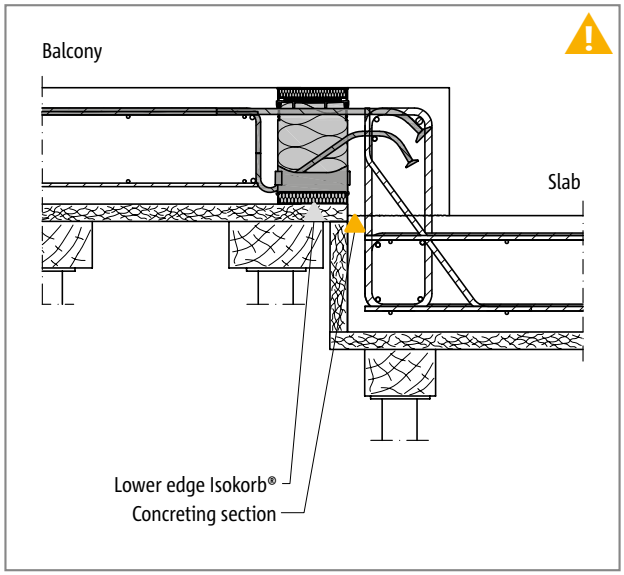


Fig. 118: Schöck Isokorb® XT type K-O: In-situ concrete balcony with height offset upwards

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.

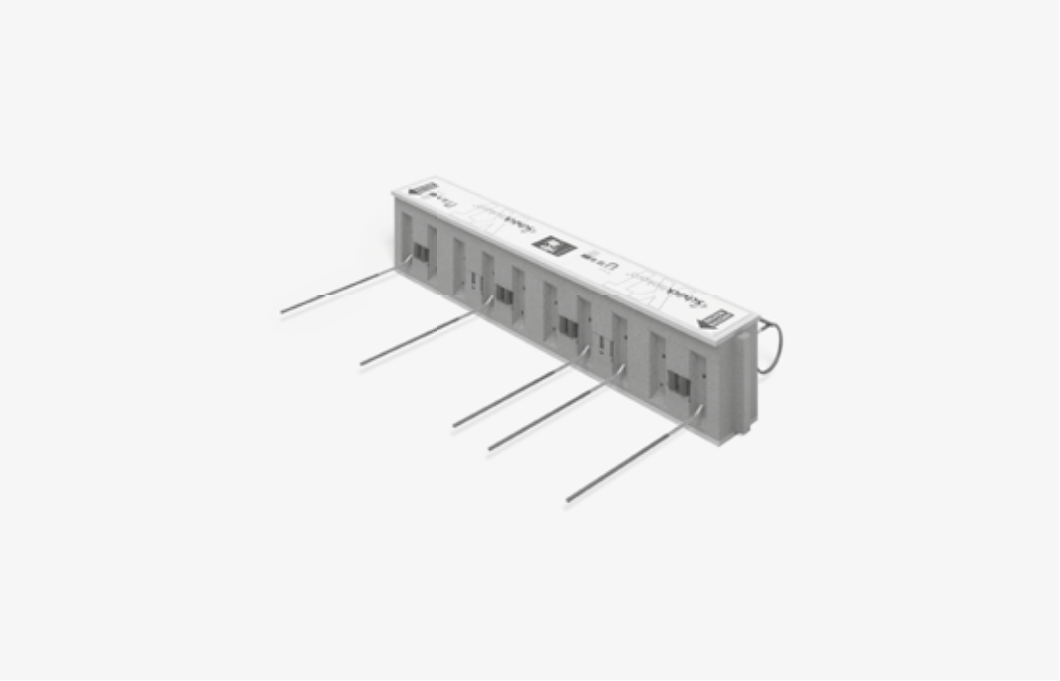
Installation instructions

- Download further installation instructions under www.schoeck.de/de/download

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 proportionate deflection resulting from 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?
- ☐ With the XT type K-U, K-O in conjunction with prefabricated floors is the insitu concrete strip required in the compression joint (width ≥ 100 mm from pressure element) plotted in the implementation plans?
- ☐ Is the required component geometry present with the connection to a floor or a wall? Is a special design required?
- ☐ Have the requirements for on-site reinforcement of connections been defined in each case?
- ☐ Is the on-site supplementary bar (Pos. 4) incorporated?
- ☐ With precast balconies are possibly necessary gaps for the front side transportation anchors and downpipes with internal drainage taken into account? Is the maximum centre distance of 300 mm for the Isokorb® bars observed?

Schöck Isokorb® XT type Q, Q-VV, Q-Z



Schöck Isokorb® XT type Q
Suitable for supported balconies. It transfers positive shear forces.

Schöck Isokorb® XT type Q-VV
Suitable for supported balconies. It transfers positive and negative shear forces.

Schöck Isokorb® XT type Q-Z
Suitable for supported balconies with connection free of constraint forces. It transfers positive shear forces.

Element arrangement

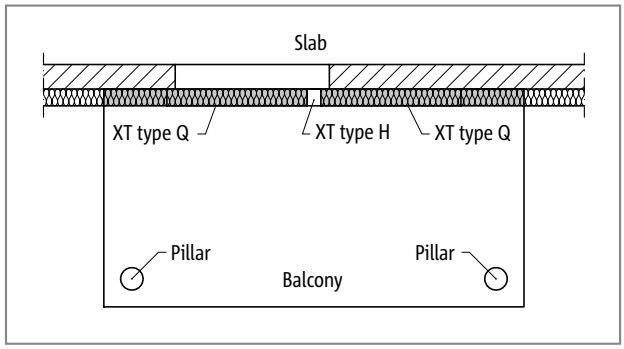


Fig. 119: Schöck Isokorb® XT type Q: Balcony with column support

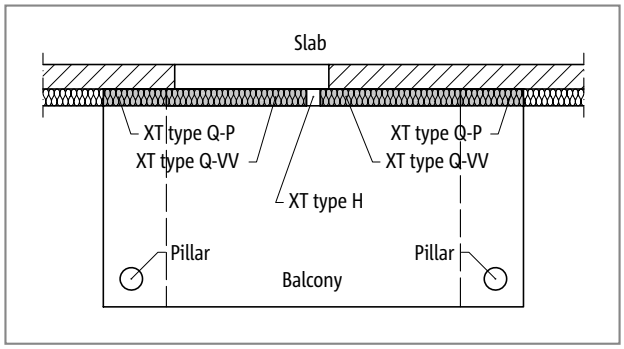


Fig. 120: Schöck Isokorb® XT type Q-P, Q-VV: Balcony with pillar support with different support stiffnesses; optionally with XT type H for the transmission of planned horizontal force

Installation cross sections

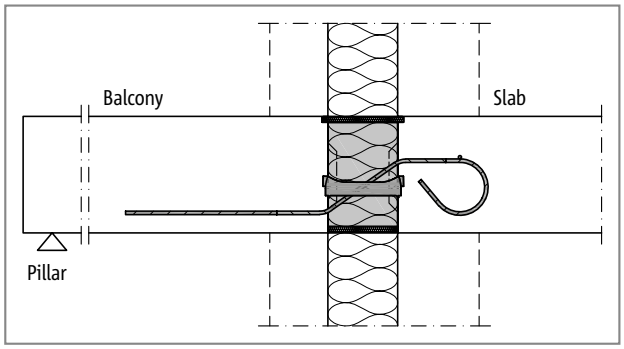


Fig. 121: Schöck Isokorb® XT type Q: Connection with non-load-bearing double wall masonry (XT type Q-V1 to V4)

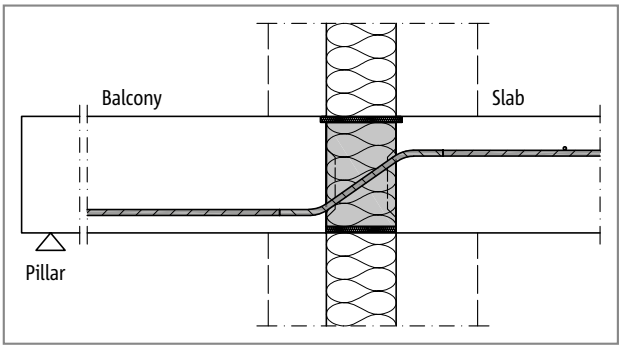


Fig. 122: Schöck Isokorb® XT type Q: Connection with non-load-bearing double wall masonry (XT type Q-V5 to V8)

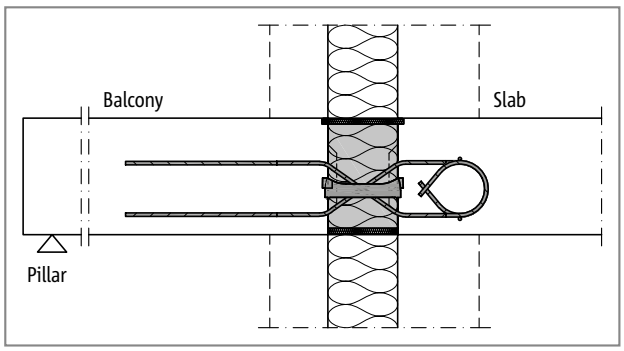


Fig. 123: Schöck Isokorb® XT Type Q: Connection with non-load-bearing cavity masonry

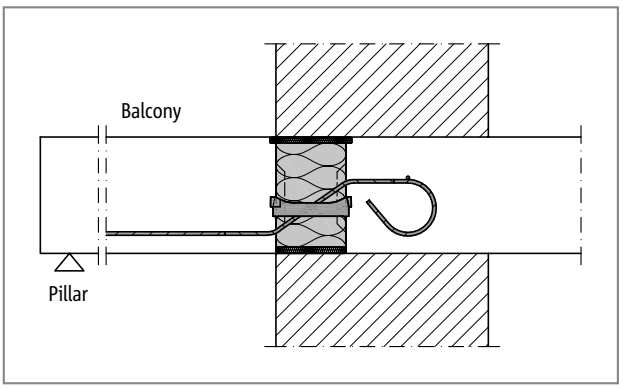


Fig. 124: Schöck Isokorb® XT type Q: Connection with single wall, thermally insulating masonry (XT type Q-V1 to V4)

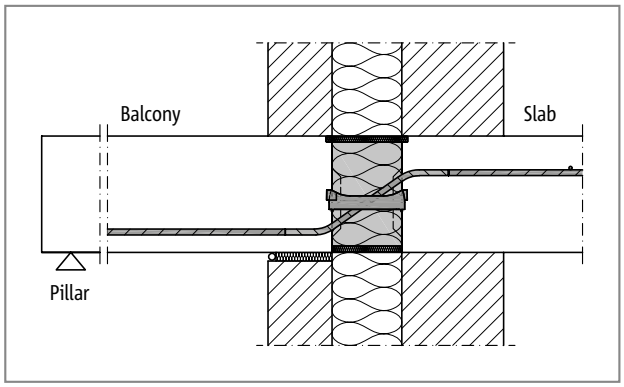


Fig. 125: Schöck Isokorb® XT type Q: Connection with double wall masonry with core insulation (XT type Q-V5 to V8)

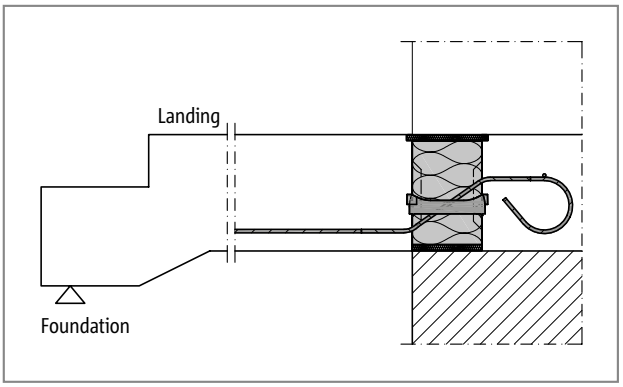


Fig. 126: Schöck Isokorb® XT type Q: Connection stair landing with single wall thermally insulating masonry (XT type Q-V1 to V4)

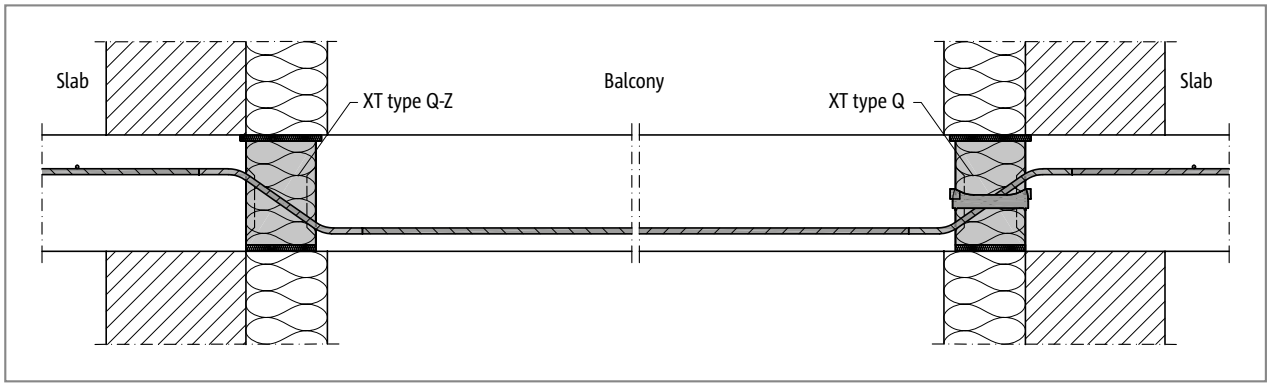


Fig. 127: Schöck Isokorb® XT type Q, Q-Z: Application case single direction tensioned reinforced concrete slab

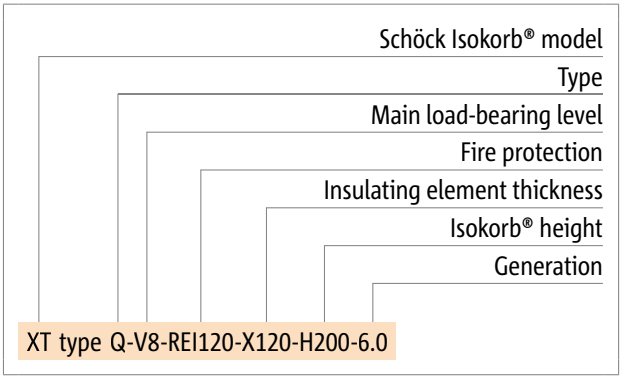
Product selection | Type designations | Special designs

Schöck Isokorb® XT type Q, Q-VV, Q-Z variants

The configuration of the Schöck Isokorb® XT types Q, Q-VV, Q-Z can vary 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: Constraint-free 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 on floor side bent, balcony side straight.
  Main load-bearing levels V5 to V8: Shear force bar on floor side straight, 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
Design values with	$v_{Rd,z}$ [kN/m]							
Concrete C25/30	35.3	42.3	56.4	70.5	87.7	97.9	117.5	137.1
Isokorb® length [mm]	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
Pressure bearing (piece)	4	4	4	4	4	4	5	6
H_{min} width REI120 [mm]	160	160	160	160	170	180	180	180

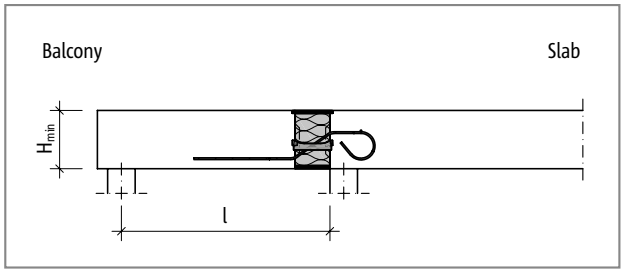


Fig. 128: Schöck Isokorb® XT type Q: Static system (XT type Q-V1 to V4)

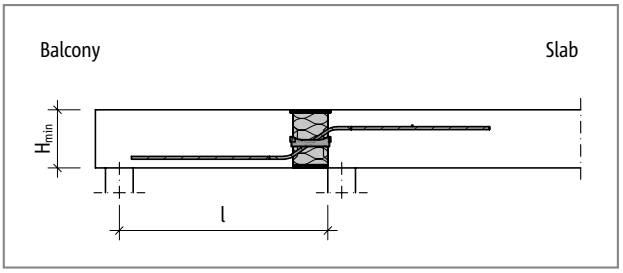


Fig. 129: Schöck Isokorb® XT type Q: Static system (XT type Q-V5 to V8)

Schöck Isokorb® XT type Q-Z	V1	V2	V3	V4	V5	V6	V7	V8
Design values with	$v_{Rd,z}$ [kN/m]							
Concrete C25/30	35.3	42.3	56.4	70.5	87.7	97.9	117.5	137.1
Isokorb® length [mm]	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
Pressure bearing (piece)	-	-	-	-	-	-	-	-
H_{min} width REI120 [mm]	160	160	160	160	170	180	180	180

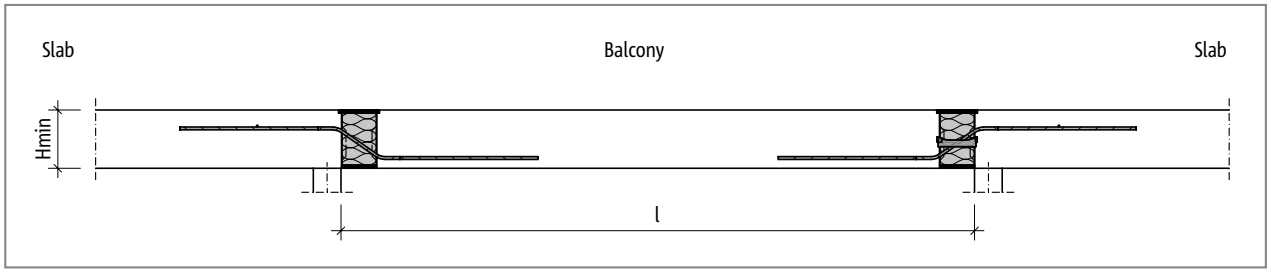


Fig. 130: Schöck Isokorb® XT type Q-Z, Q: Static system (XT type Q-Z-V5 to Q-Z-V8, Q-V5 to Q-V8)

C25/30 design

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

Isokorb® length [mm]	1000	1000	1000	1000
Shear force bars	5 ⌀ 6 + 5 ⌀ 6	6 ⌀ 6 + 6 ⌀ 6	8 ⌀ 6 + 8 ⌀ 6	10 ⌀ 6 + 10 ⌀ 6
Pressure bearing (piece)	4	4	4	4
H_{min} width REI120 [mm]	160	160	160	160

Schöck Isokorb® XT type Q	VV5	VV6	VV7	VV8
Design values with	$v_{Rd,z}$ [kN/m]			
Concrete C25/30	±87.8	±97.9	±117.5	±137.1

Isokorb® length [mm]	1000	1000	1000	1000
Shear force bars	7 ⌀ 8 + 7 ⌀ 8	5 ⌀ 10 + 5 ⌀ 10	6 ⌀ 10 + 6 ⌀ 10	7 ⌀ 10 + 7 ⌀ 10
Pressure bearing (piece)	4	4	5	6
H_{min} width REI120 [mm]	170	180	180	180

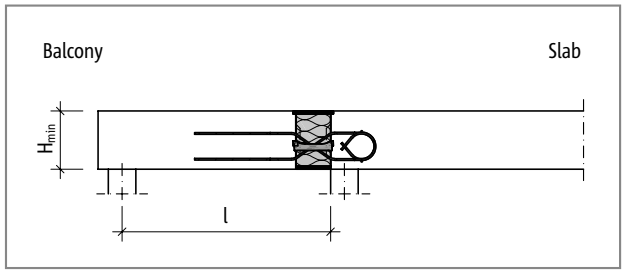


Fig. 131: Schöck Isokorb® XT type Q-VV: Static system (XT type Q-VV1 to VV4)

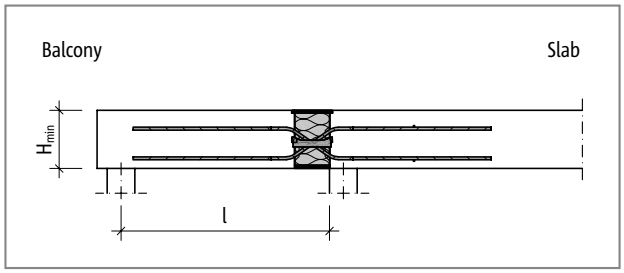


Fig. 132: Schöck Isokorb® XT type Q-VV: Static system (XT type Q-VV5 to VV8)

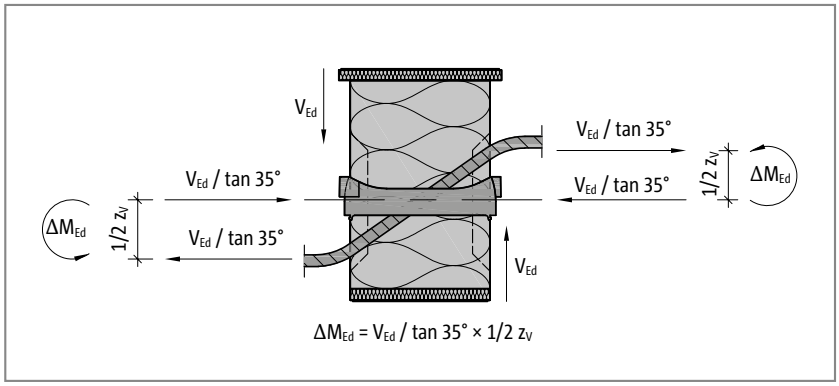
Notes on design

- 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 analysiis is to be produced for the reinforced concrete structural components adjacent on both sides of the Schöck Isokorb®. With a connection using Schöck Isokorb® XT type Q as static system, a freely rotating support (pin connection) is to be adopted.
- 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 from excentric connection

Moments from excentric connection are to be taken into account for the design of the reinforcement connection on both sides of the shear force transfering Schöck Isokorb® XT types Q and Q-VV . These moments are to be respectively overlaid with the moments from the ordinary loading if they have the same sign.
The following table values ΔM_{Ed} have been calculated with 100% utilisation of v_{Rd}.



Schöck Isokorb® XT type Q	V1, VV1	V2, VV2	V3, VV3	V4, VV4
Design values with	Δ M_{Ed} [kNm/m]			
Concrete C25/30	2.2	2.7	3.6	4.5

Schöck Isokorb® XT type Q	V5, VV5	V6, VV6	V7, VV7	V8, VV8
Design values with	Δ M_{Ed} [kNm/m]			
Concrete C25/30	5.9	7.1	8.6	10.0

Expansion joint spacing

Maximum expansion joint spacing

If the structural element length exceeds the maximum expansion joint spacing e, expansion joints must be installed in the outer lying concrete structural elements at right angles to the insulation plane, in order to limit the impacts as a result of temperature changes. For fixed points such as corners of balconies, parapets and balustrades or when using the Schöck Isokorb® XT types H, half the maximum expansion joint spacing e/2 applies out from th fixed point.
The shear force transmission in the expansion joint can be ensured using a longitudinally displaceable shear force dowel, e.g. Schöck Dorn.

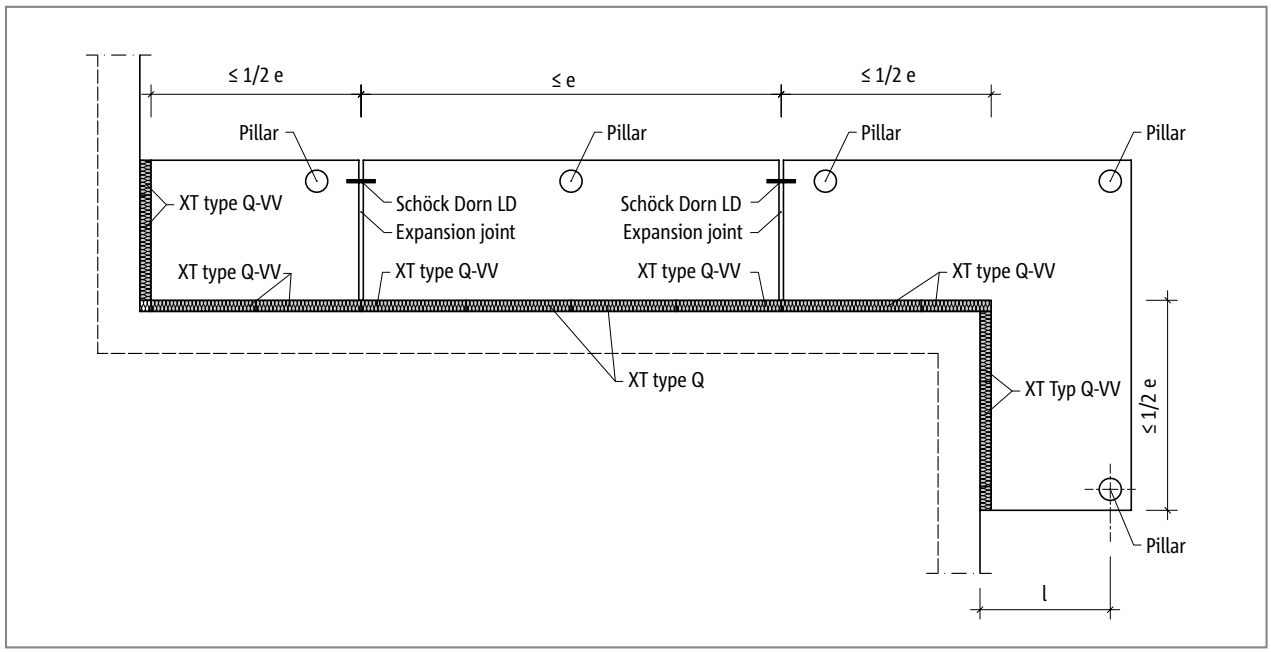


Fig. 133: Schöck Isokorb® XT type Q, Q-VV: Expansion joint arrangement

Schöck Isokorb® XT type Q, Q-Z		V1 - V5 VV1 - VV5	V6 - V8 VV6 - VV8
Maximum expansion joint spacing		e [m]	
Insulating element thickness [mm]	120	23.0	21.7

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

Product description

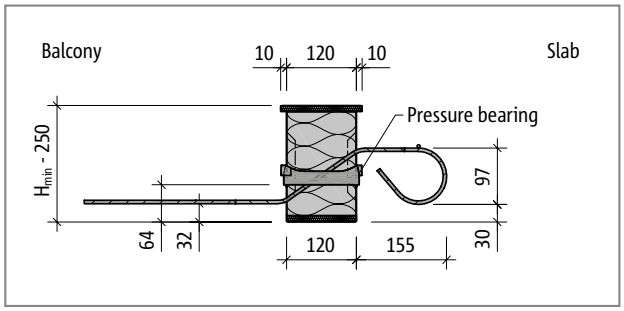


Fig. 134: Schöck Isokorb® XT type Q-V1 to Q-V4: Product section

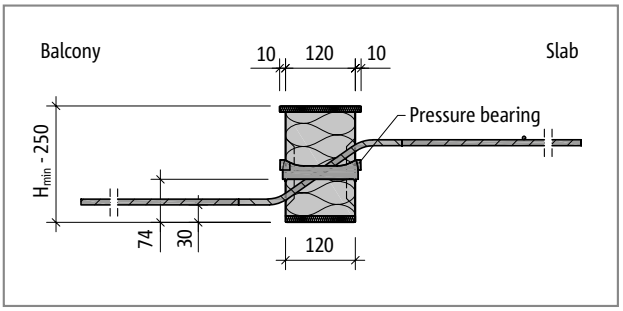


Fig. 135: Schöck Isokorb® XT type Q-V5 to Q-V8: Product section

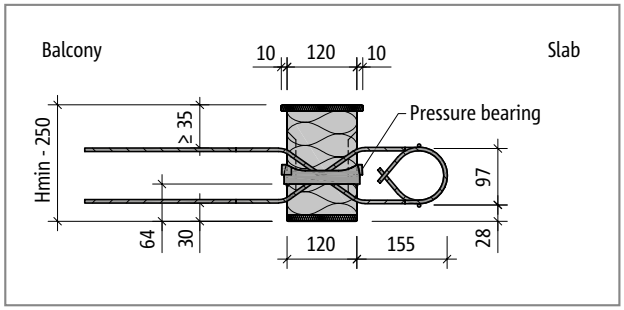


Fig. 136: Schöck Isokorb® XT type Q-VV1 to Q-VV4: Product section

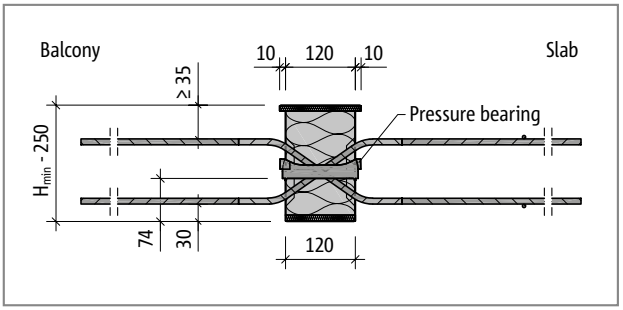


Fig. 137: Schöck Isokorb® XT type Q-VV5 to Q-VV8: Product section

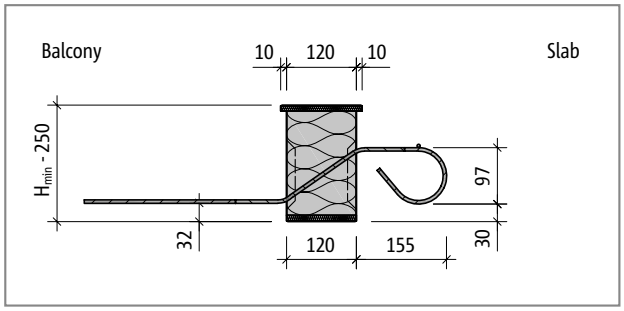


Fig. 138: Schöck Isokorb® XT type Q-Z-V1 to Q-Z-V4: Product section

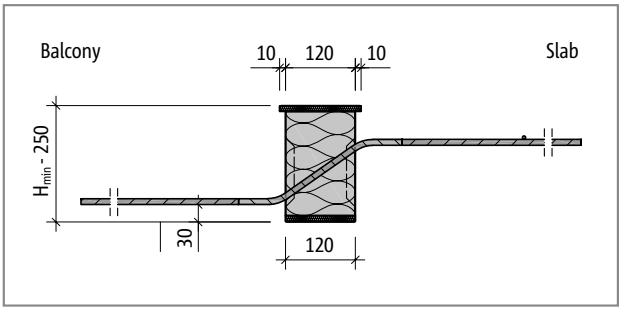


Fig. 139: Schöck Isokorb® XT type Q-Z-V5 to Q-Z-V8: Product section

Product description

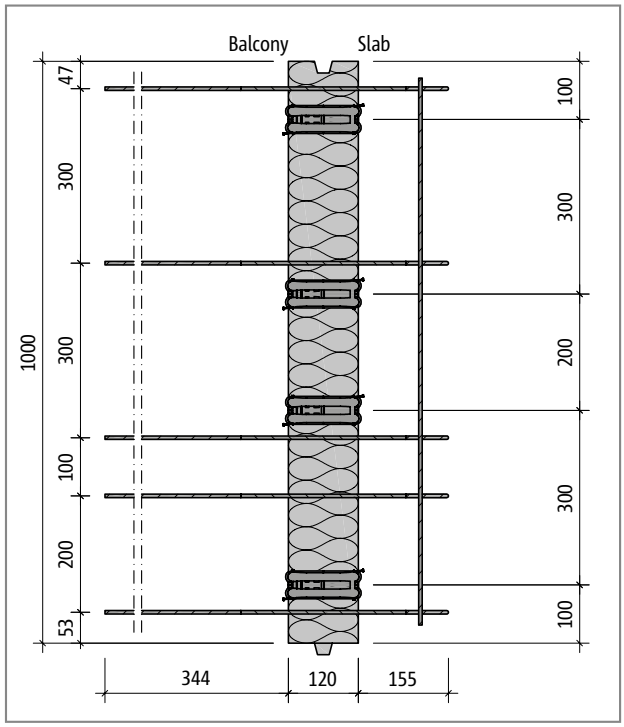


Fig. 140: Schöck Isokorb® XT type Q-V1: Product plan view

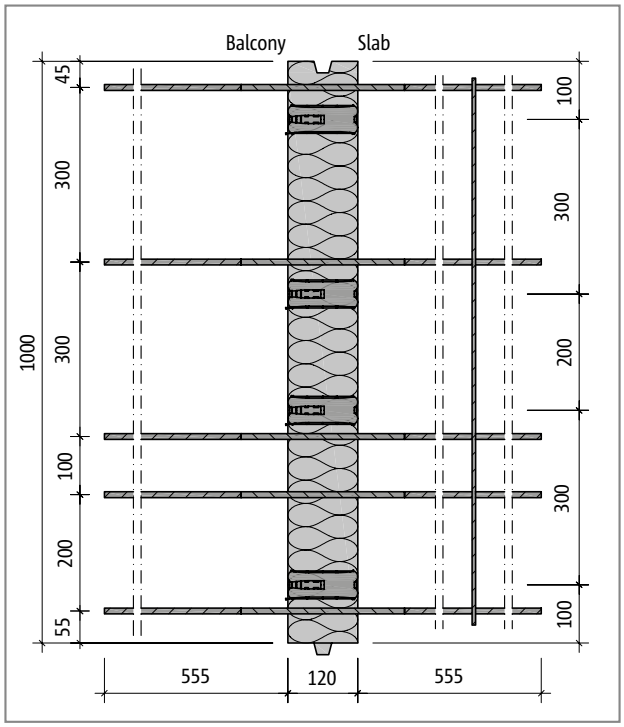


Fig. 141: Schöck Isokorb® XT type Q-V6: Product plan view

Product information

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

On-site reinforcement

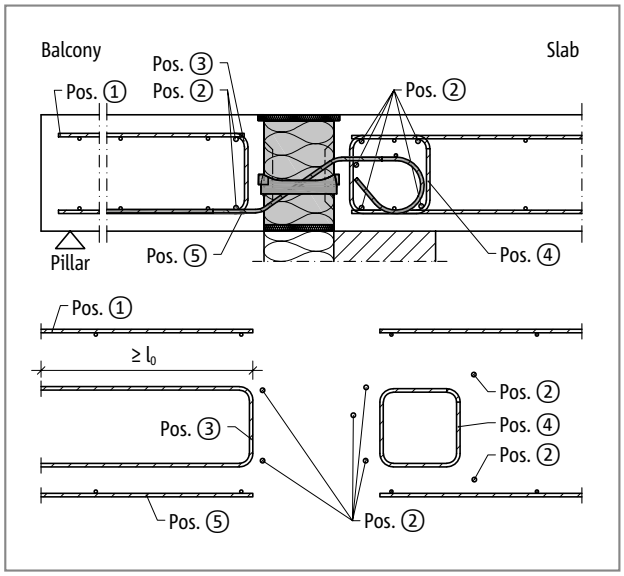


Fig. 142: Schöck Isokorb® XT type Q-V1 to V4: On-site reinforcement

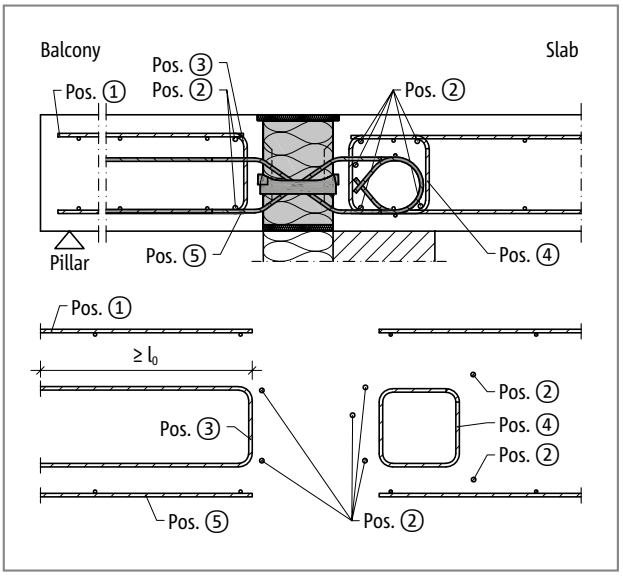


Fig. 143: Schöck Isokorb® XT type Q-VV1 to VV4: On-site reinforcement

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 shear force bars of the Schöck Isokorb® are 100% lapped, insofar as they lie in the tension zone.

Schöck Isokorb® XT type Q, Q-Z			V1, VV1	V2, VV2	V3, VV3	V4, VV4
On-site reinforcement	**Concrete strength**	**Location**	**Concrete strength class ≥ C25/30**			
Pos. 1 Lapping reinforcement						
Pos. 1		Balcony side	acc. to the specifications of the structural engineer			
Pos. 2 Steel bars along the insulation joint						
Pos. 2		Balcony side	2 • H8	2 • H8	2 • H8	2 • H8
Pos. 2		Floor side	5 • H8	5 • H8	5 • H8	5 • H8
Pos. 3 Stirrup						
Pos. 3 [mm²/m]	C25/30	Balcony side	81	97	130	162
Pos. 4 Closed stirrup (edge beam according to Z-15.7-240)						
Pos. 4 [mm²/m]		Floor side	141	141	141	141
Pos. 4		Floor side	H8@200	H8@200	H8@200	H8@200
Pos. 5 Lapping reinforcement						
Pos. 5		Balcony side	necessary in the tension zone, as specified by the structural engineer			
Pos. 6 Side reinforcement at the free edge						
Pos. 6			Edging as per BS EN 1992-1-1 (EC2), 9.3.1.4 (not pictured)			

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.

On-site reinforcement

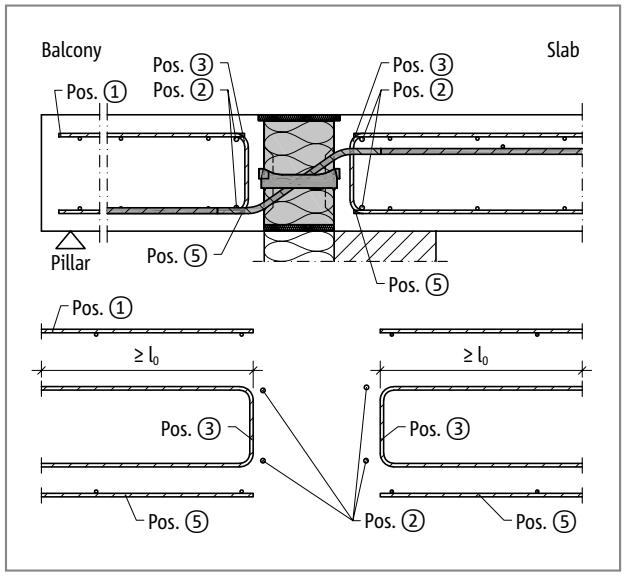


Fig. 144: Schöck Isokorb® XT type Q-V5 to Q-V8: On-site reinforcement

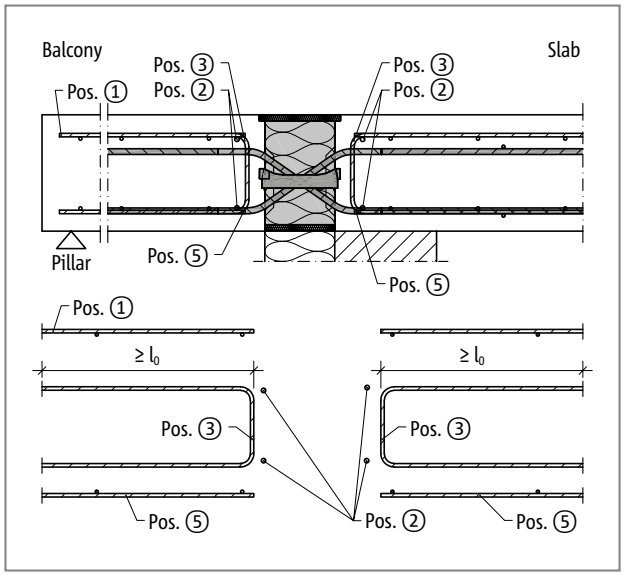


Fig. 145: Schöck Isokorb® XT type Q-VV5 to Q-VV8: On-site reinforcement

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 shear force bars of the Schöck Isokorb® are 100% lapped, insofar as they lie in the tension zone.

Schöck Isokorb® XT type Q, Q-Z			V5, VV5	V6, VV6	V7, VV7	V8, VV8
On-site reinforcement	**Concrete strength**	**Location**	**Concrete strength class ≥ C25/30**			
Pos. 1 Lapping reinforcement						
Pos. 1		Balcony/floor side	acc. to the specifications of the structural engineer			
Pos. 2 Steel bars along the insulation joint						
Pos. 2		Balcony/floor side	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8
Pos. 3 Stirrup						
Pos. 3 [mm²/m]	C25/30	Balcony/floor side	202	225	270	315
Pos. 5 Lapping reinforcement						
Pos. 5		Balcony/floor side	necessary in the tension zone, as specified by the structural engineer			
Pos. 6 Side reinforcement at the free edge						
Pos. 6			Edging as per BS EN 1992-1-1 (EC2), 9.3.1.4 (not pictured)			

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.

Application example reinforced concrete slab spanning in one direction

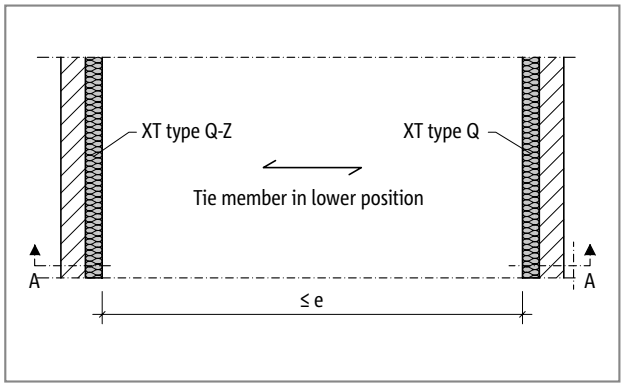


Fig. 146: Schöck Isokorb® XT type Q-Z, Q: One-way spanning reinforced concrete slab

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 101

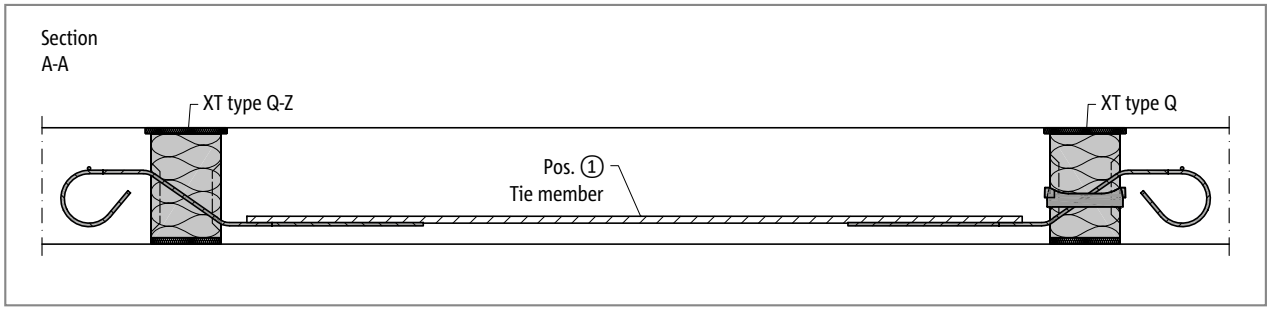


Fig. 147: Schöck Isokorb® XT type Q-Z-V1 to Q-Z-V4, Q-V1 to Q-V4: Section A-A; one direction spanned reinforced concrete slab

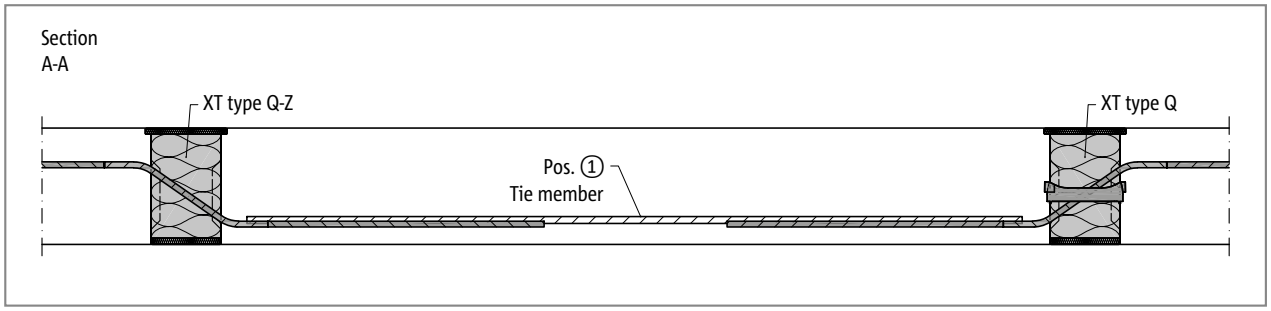


Fig. 148: Schöck Isokorb® XT type Q-Z-V5 to Q-Z-V8, Q-V5 to Q-V8: Section A-A; one direction spanned reinforced concrete slab

Schöck Isokorb® XT type Q, Q-Z	V1	V2	V3	V4	V5	V6	V7	V8
On-site reinforcement	Concrete strength class ≥ C25/30							
Pos. 1 Tie								
Pos. 1	5 • H8	6 • H8	8 • H8	10 • H8	7 • H8	5 • H10	6 • H10	7 • H10

Information about on-site reinforcement

- The required suspension reinforcement and the on-site slab reinforcement are not shown here.
- On-site reinforcement analogue to Schöck Isokorb® XT type Q see page 104

Type of bearing: supported

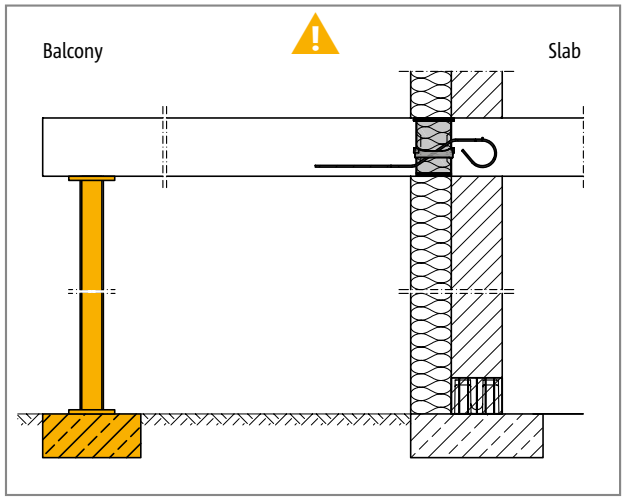


Fig. 149: Schöck Isokorb® XT type Q: Continuous support required

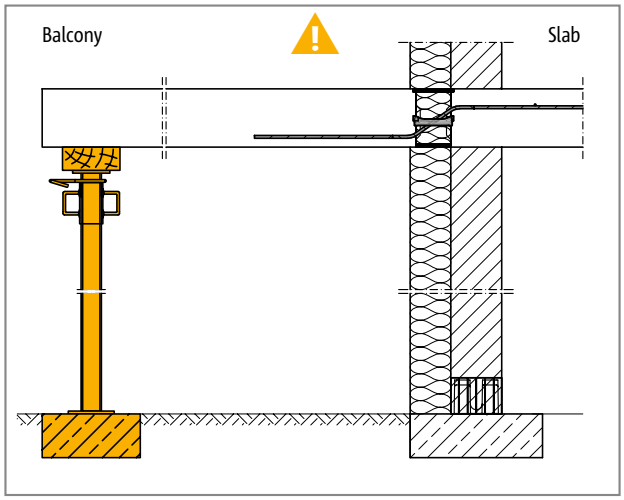


Fig. 150: Schöck Isokorb® XT type Q: Continuous support required

Supported balcony

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

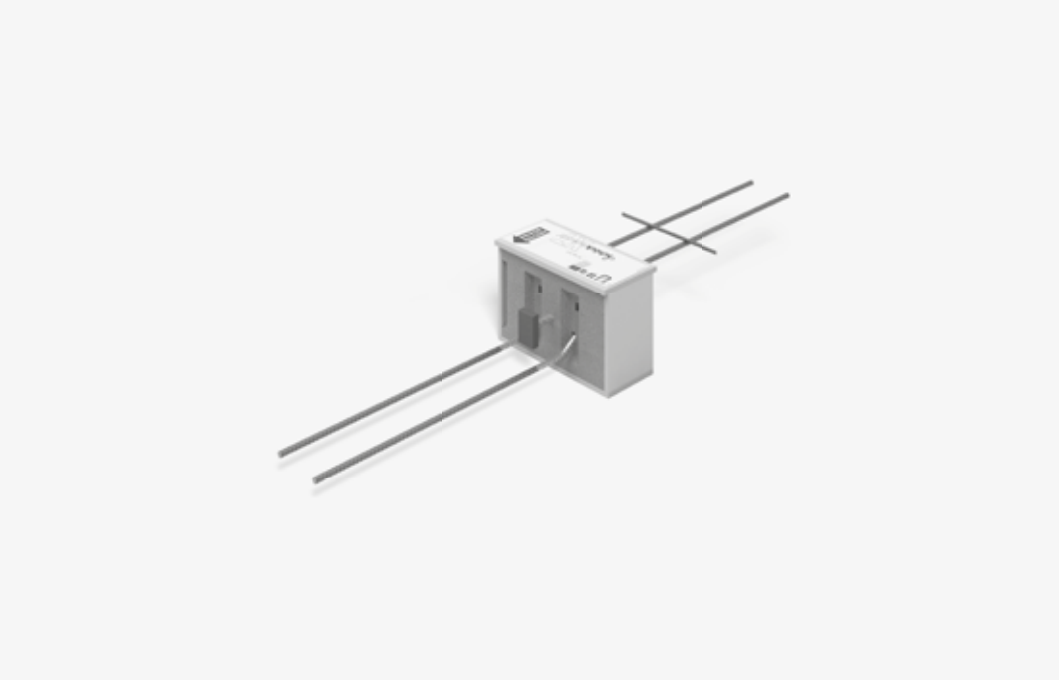
Warning - omitting the pillars

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

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 danger notice for missing support entered in the implementation plans?
- ☐ Is the balcony so planned that a continuous support is ensured in all stages of construction and in the final status?
- ☐ 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?
- ☐ With precast balconies are possibly necessary gaps for the front side transportation anchors and downpipes with internal drainage taken into account? Is the maximum centre distance of 300 mm for 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)?

Schöck Isokorb® XT type Q-P, Q-P-VV, Q-PZ



Schöck Isokorb® XT type Q-P (shear force)
suitable for load peaks with supported balconies. It transmits positive shear forces.

Schöck Isokorb® XT type Q-P-VV (shear force)
Suitable for load peaks with supported balconies. It transmits positive and negative shear forces.

Schöck Isokorb® XT type Q-PZ (shear force constraint free)
Suitable for peak loads with supported balconies with connection free of constraint. It transmits positive shear forces.

Element arrangement | Installation cross section

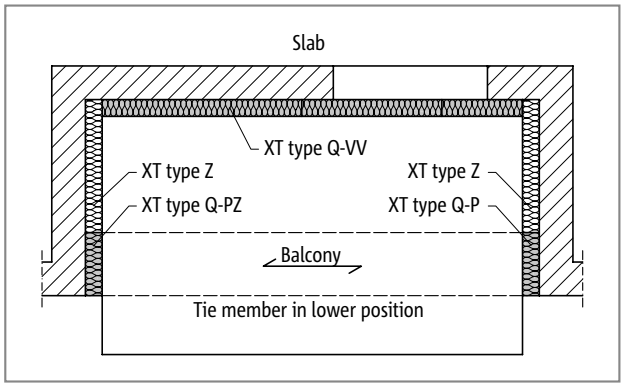


Fig. 151: Schöck Isokorb® XT type Q-VV, Q-P, Q-PZ: Recessed balcony, supported on three sides with tie member

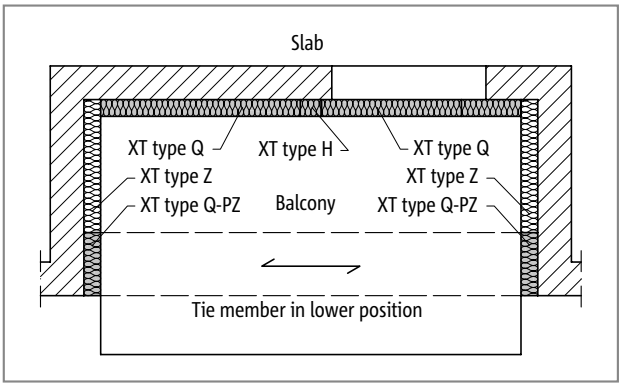


Fig. 152: Schöck Isokorb® XT type Q, Q-PZ: Recessed balcony, supported on three sides - symmetric with tie member

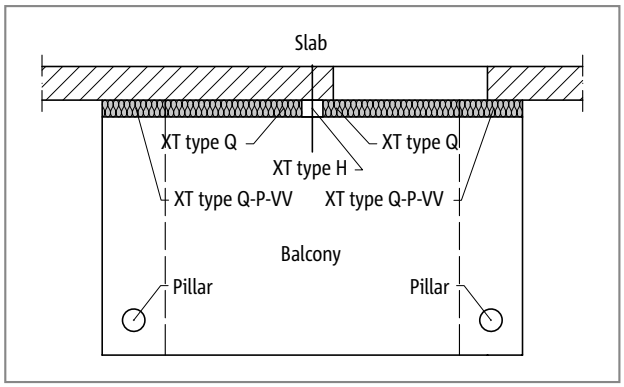


Fig. 153: Schöck Isokorb® XT type Q-P-VV, Q: Balcony with column support with various bearing stiffnesses; optionally with XT type H for transmission of ordinary horizontal force

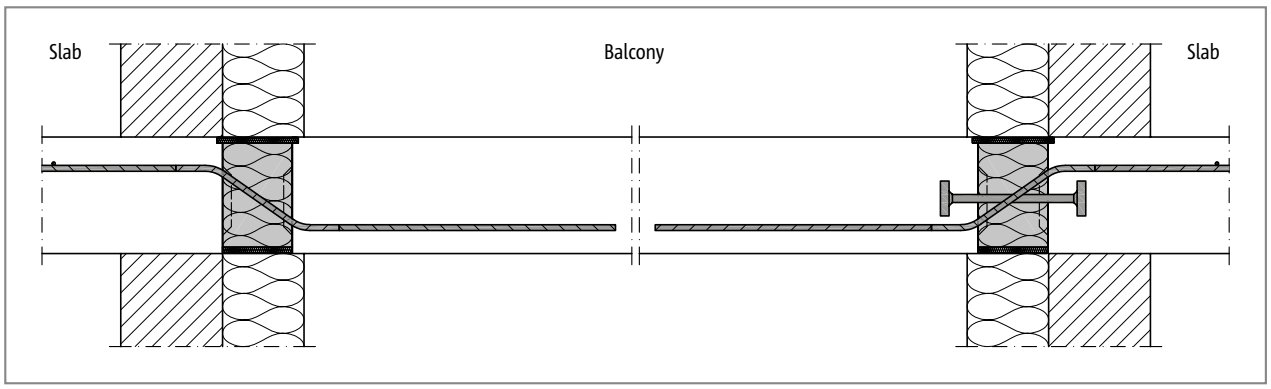


Fig. 154: Schöck Isokorb® XT type Q-P, Q-PZ: Application case recessed balcony *see p. 119*

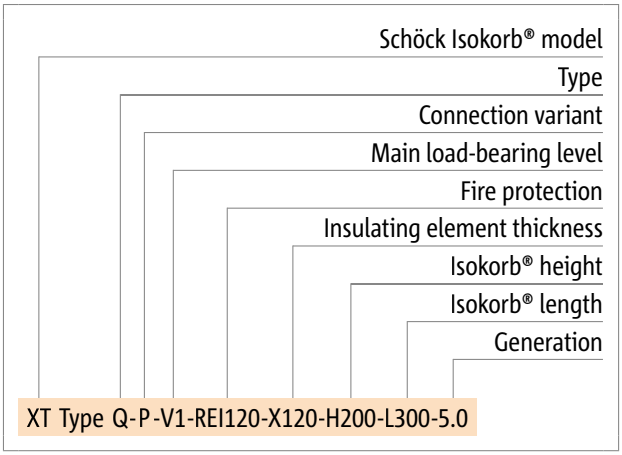
Product selection | Type designations | Special designs

Schöck Isokorb® XT type Q-P, Q-P-VV, Q-PZ variants

The configuration of the Schöck Isokorb® XT types Q-P, Q-P-VV, Q-PZ variants can vary as follows:
For all load-bearing levels shear force bar on floor side straight, on balcony side straight applies.
XT type Q-P: Shear force bar for positive shear force
XT type Q-P-VV: Shear fore bar for positive and negative shear force
XT type Q-PZ: Free of constraint without pressure bearing, shear force bar for positive shear force

- Connection variant: P - puntual
- Main load-bearing level:
  V1 to V9
  VV1 to VV9
- Fire resistance class:
  REI120 (Standard): Projection upper fire protection board, both sides 10 mm
- Concrete cover:
  bottom: CV = 40 mm
  top: CV ≥ 28 mm (depending on height of the shear force bars)
- Insulating element thickness:
  X120 = 120 mm
- Isokorb® height:
  H = H_{min} to 250 mm (take note of minimum slab height depending on load-bearing level and fire protection)
- Isokorb® length:
  L = 300 to 500 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.
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-P	V1	V2	V3	V4	V5	V6	V7	V8	V9
Design values with	$V_{Rd,z}$ [kN/element]								
Concrete C25/30	34.5	58.8	68.9	56.4	68.9	68.9	92.0	115.2	137.8
Isokorb® length [mm]	300	400	500	300	400	300	400	400	500
Shear force bars	2 ⌀ 10	3 ⌀ 10	4 ⌀ 10	2 ⌀ 12	3 ⌀ 12	2 ⌀ 14	3 ⌀ 14	3 ⌀ 14	4 ⌀ 14
Pressure bearing (piece)	1 ⌀ 14	2 ⌀ 12	2 ⌀ 14	2 ⌀ 12	2 ⌀ 14	2 ⌀ 14	3 ⌀ 12	4 ⌀ 12	4 ⌀ 14
H_{min} width REI120 [mm]	190	190	190	200	200	210	210	210	210

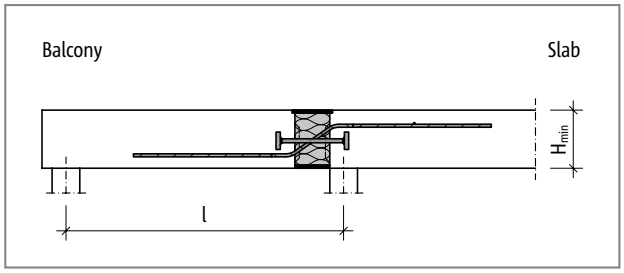


Fig. 155: Schöck Isokorb® XT type Q-P: Static system

Schöck Isokorb® XT type Q-PZ	V1	V2	V3	V4	V5	V6	V7	V8	V9
Design values with	$V_{Rd,z}$ [kN/element]								
Concrete C25/30	34.5	58.8	68.9	56.4	68.9	68.9	115.2	115.2	137.8
Isokorb® length [mm]	300	400	500	300	400	300	400	400	500
Shear force bars	2 ⌀ 10	3 ⌀ 10	4 ⌀ 10	2 ⌀ 12	3 ⌀ 12	2 ⌀ 14	3 ⌀ 14	3 ⌀ 14	4 ⌀ 14
Pressure bearing (piece)	-	-	-	-	-	-	-	-	-
H_{min} width REI120 [mm]	190	190	190	200	200	210	210	210	210

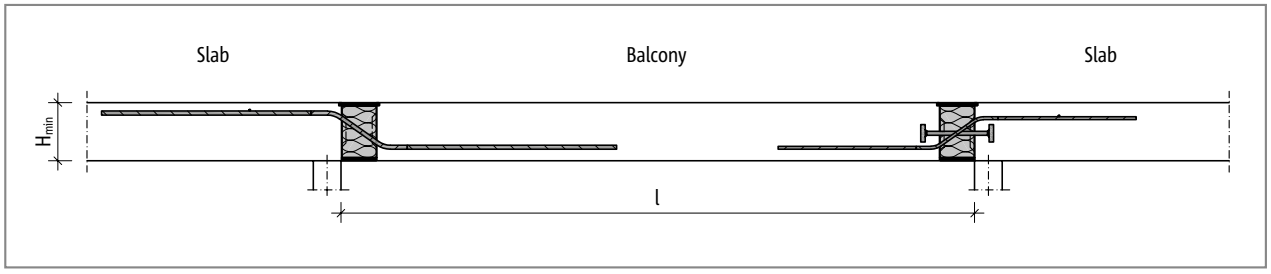


Fig. 156: Schöck Isokorb® XT type Q-PZ, Q-P: Static system

C25/30 design

Schöck Isokorb® XT type Q-P	VV1	VV2	VV3	VV4	VV5
Design values with	$V_{Rd,z}$ [kN/element]				
Concrete C25/30	±34.5	±58.8	±68.9	±56.4	±68.9
Isokorb® length [mm]	300	400	500	300	400
Shear force bars	2 x 2 ⌀ 10	2 x 3 ⌀ 10	2 x 4 ⌀ 10	2 x 2 ⌀ 12	2 x 3 ⌀ 12
Pressure bearing (piece)	1 ⌀ 14	2 ⌀ 12	2 ⌀ 14	2 ⌀ 12	2 ⌀ 14
H_{min} width REI120 [mm]	190	190	190	200	200

Schöck Isokorb® XT type Q-P	VV6	VV7	VV8	VV9
Design values with	$V_{Rd,z}$ [kN/element]			
Concrete C25/30	±68.9	±92.0	±115.2	±137.8
Isokorb® length [mm]	300	400	400	500
Shear force bars	2 x 2 ⌀ 14	2 x 3 ⌀ 14	2 x 3 ⌀ 14	2 x 4 ⌀ 14
Pressure bearing (piece)	2 ⌀ 14	3 ⌀ 12	4 ⌀ 12	4 ⌀ 14
H_{min} width REI120 [mm]	210	210	210	210

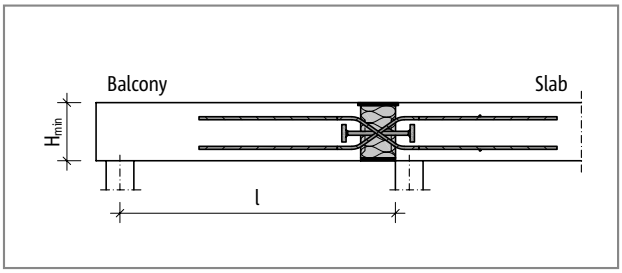


Fig. 157: Schöck Isokorb® XT type Q-P-VV: Static system

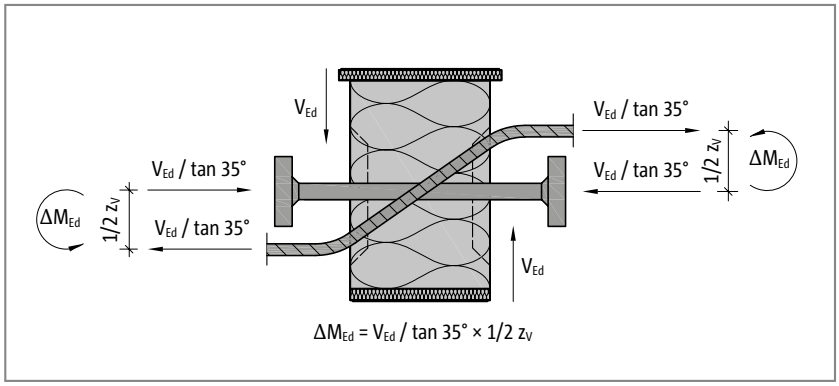
Notes on design

- Additional Schöck Isokorb® XT type H are required for the transmission of scheduled horizontal forces.
- 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 producedo be provided for the reinforced concrete elements adjacent on both sides of the Schöck Isokorb®. For a connection using Schöck Isokorb® XT type Q-P and XT type Q-P-VV ia freely rotatable support (pin connection) is to be assumed.
- The Schöck Isokorb® XT type Q-PZ requires a reinforcing tie member in the lower position for constraint-free connection. Select $A_{s,req}$ corresponding to application example recessed balcony page 119.
- The Schöck Isokorb® XT type Q-P-VV is also available as variant XT type Q-PZ-VV.
- 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.

Design

Moments for 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 transmitting Schöck Isokorb® XT types Q-P and Q-P-VV. These moments are in each case to be overlaid with the moments from planned loading if they have the same sign.
The following table values ΔM_{Ed} have been calculated with 100% utilisation V_{Rd} with a lever arm of $z_{v,max}$ = 140 mm.



Schöck Isokorb® XT type Q-P	V1, VV1	V2, VV2	V3, VV3	V4, VV4	V5, VV5
Design values with	Δ M_{Ed} [kNm/Element]				
Concrete C25/30	2.6	4.3	5.1	4.4	5.5

Schöck Isokorb® XT type Q-P	V6, VV6	V7, VV7	V8, VV8	V9, VV9
Design values with	Δ M_{Ed} [kNm/Element]			
Concrete C25/30	5.8	7.6	9.5	11.6

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 Dorn.

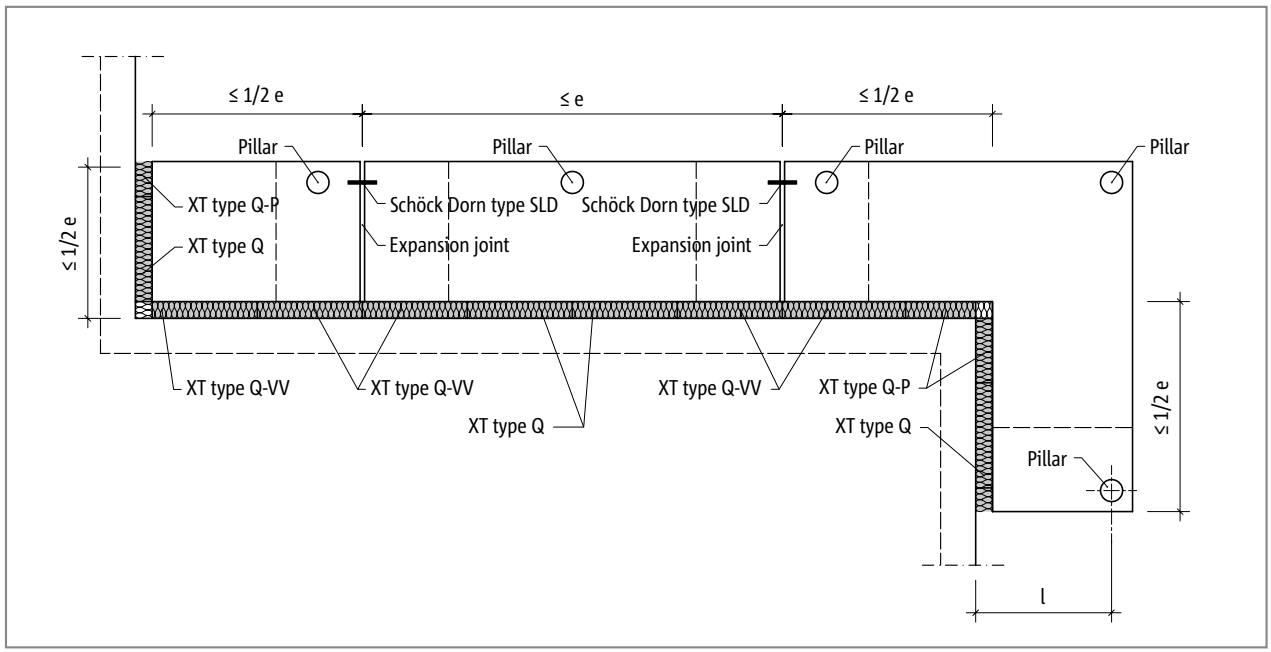


Fig. 158: Schöck Isokorb® XT type Q-P, Q-P-VV: Expansion joint arrangement

Schöck Isokorb® XT type Q-P		V1, VV1	V2, VV2	V3, VV3	V4, VV4
Maximum expansion joint spacing		e [m]			
Insulating element thickness [mm]	120	17.0	19.5	17.0	17.7

Schöck Isokorb® XT type Q-P		V5, VV5	V6 - V9, VV6 - VV9
Maximum expansion joint spacing		e [m]	
Insulating element thickness [mm]	120	17.0	15.3

Schöck Isokorb® XT type Q-PZ		V1 - V3	V4	V5	V6 - V9
Maximum expansion joint spacing		e [m]			
Insulating element thickness [mm]	120	19.5	17.7	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 from the expansion joint: $e_R \geq 50$ mm applies.
- For the centre distance of the shear force bars from the free edge or from the expansion joint: $e_R \geq 100$ mm and $e_R \leq 150$ mm applies.

Product description

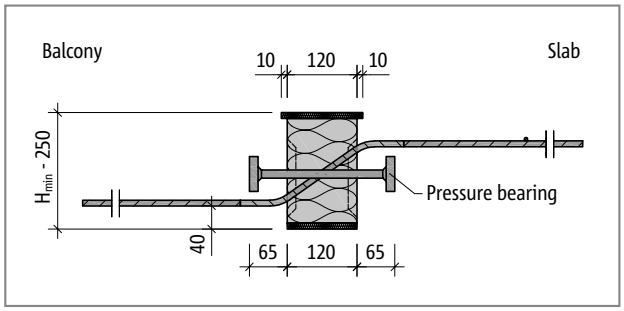


Fig. 159: Schöck Isokorb® XT type Q-P: Product section

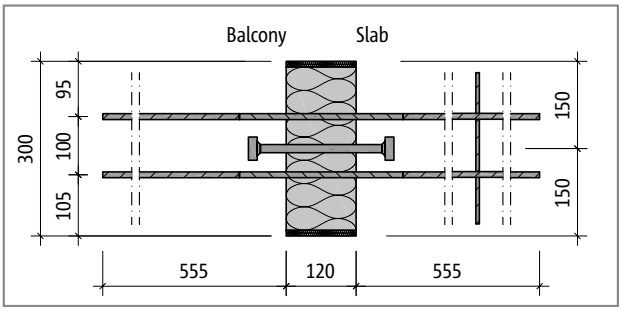


Fig. 160: Schöck Isokorb® XT type Q-P-V1: Product plan view

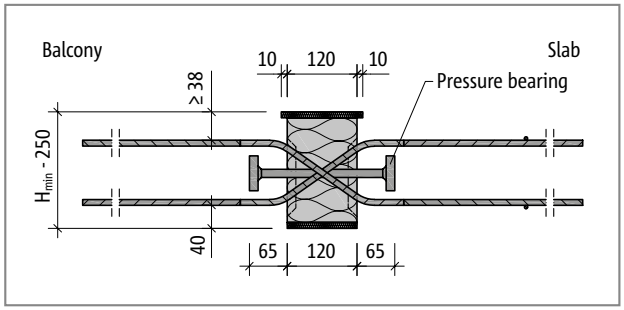


Fig. 161: Schöck Isokorb® XT type Q-P-VV1: Product section

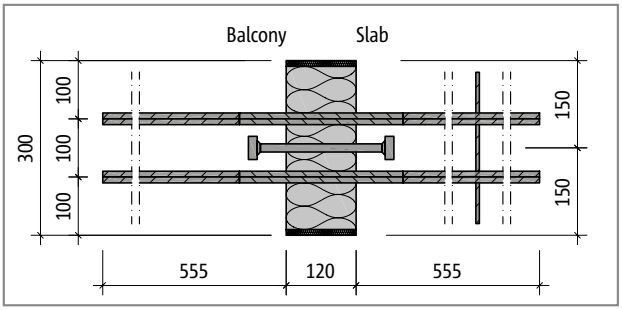


Fig. 162: Schöck Isokorb® XT type Q-P-VV1: Product plan view

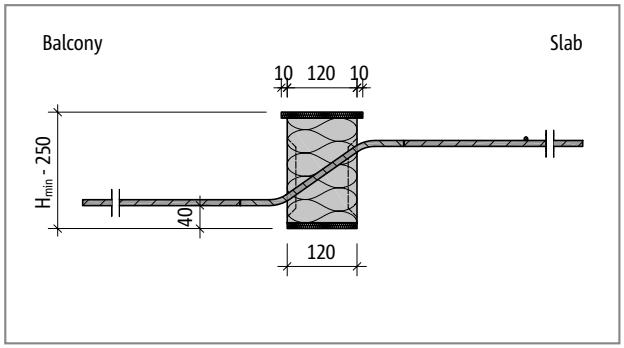


Fig. 163: Schöck Isokorb® XT type Q-PZ: Product section

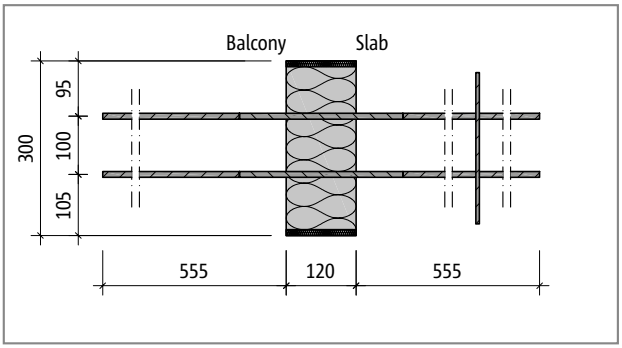


Fig. 164: Schöck Isokorb® XT type Q-PZ-V1: Product plan view

Product information

- Observe minimum height H_{min} Schöck Isokorb® XT type Q-P, Q-P-VV, Q-PZ.
- The length of the Schöck Isokorb® varies dependent on the load-bearing level.
- The upper fire protection board projects on both sides of the Schöck Isokorb® by 10 mm.
- Download further product plan views and cross-sections at www.schoeck.co.uk/download

On-site reinforcement - In-situ concrete construction

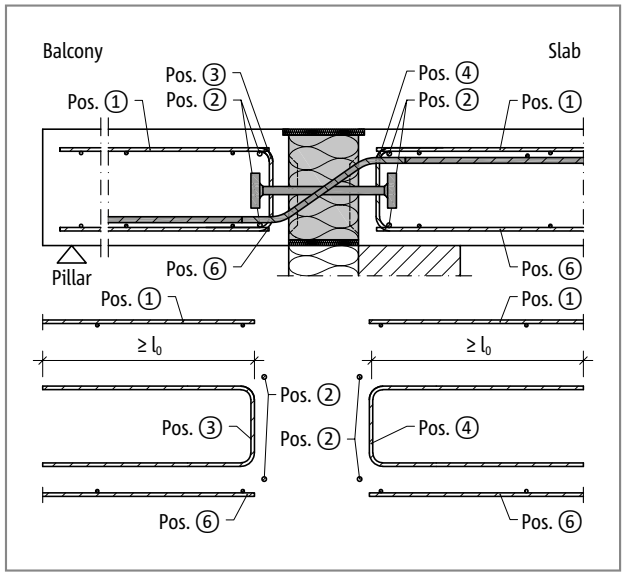


Fig. 165: Schöck Isokorb® XT type Q-P: On-site reinforcement

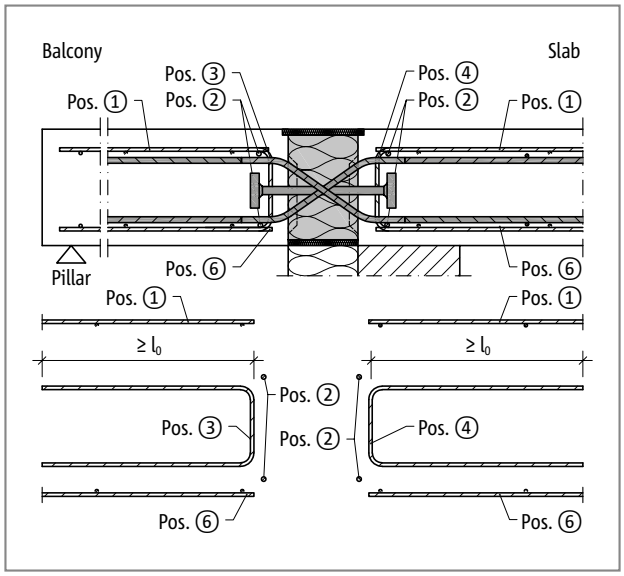


Fig. 166: Schöck Isokorb® XT type Q-P-VV: On-site reinforcement

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 shear force bars of the Schöck Isokorb® are 100% lapped, insofar as they lie in the tension zone.

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 side reinforcement Pos. 5 should be selected so low that it can be arranged between the upper and lower reinforcement position.
- The Schöck Isokorb® XT type Q-PZ requires a reinforcing tie member in the lower position for constraint-free connection. Select $A_{s,req}$ corresponding to application example recessed balcony page 119.
- 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 indicative minimum concrete strength class of the external structural component is C32/40.

On-site reinforcement - In-situ concrete construction

Schöck Isokorb® XT type Q-P, Q-PZ			V1, VV1	V2, VV2	V3, VV3	V4, VV4	V5, VV5
On-site reinforcement	Concrete strength	Location	Concrete strength class ≥ C25/30				
Pos. 1 Lapping reinforcement							
Pos. 1		Balcony/floor side	acc. to the specifications of the structural engineer				
Pos. 2 Steel bars along the insulation joint							
Pos. 2		Balcony/floor side	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8
Pos. 3 Stirrup							
Pos. 3 [mm²/Element]	C25/30	Balcony side	79	135	158	130	158
Pos. 4 Slip-in bracket							
Pos. 4		Floor side	positive, according to information from the structural engineer				
Pos. 5 Side reinforcement at the free edge							
Pos. 5			Edging as per BS EN 1992-1-1 (EC2), 9.3.1.4 (not pictured)				
Pos. 6 Lapping reinforcement							
Pos. 6		Balcony/floor side	necessary in the tension zone, as specified by the structural engineer				

Schöck Isokorb® XT type Q-P, Q-PZ			V6, VV6	V7, VV7	V8, VV8	V9, VV9
On-site reinforcement	Concrete strength	Location	Concrete strength class ≥ C25/30			
Pos. 1 Lapping reinforcement						
Pos. 1		Balcony/floor side	acc. to the specifications of the structural engineer			
Pos. 2 Steel bars along the insulation joint						
Pos. 2		Balcony/floor side	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8
Pos. 3 Stirrup						
Pos. 3 [mm²/Element]	C25/30	Balcony side	158	212	265	317
Pos. 4 Slip-in bracket						
Pos. 4		Floor side	positive, according to information from the structural engineer			
Pos. 5 Side reinforcement at the free edge						
Pos. 5			Edging as per BS EN 1992-1-1 (EC2), 9.3.1.4 (not pictured)			
Pos. 6 Lapping reinforcement						
Pos. 6		Balcony/floor side	necessary in the tension zone, as specified by the structural engineer			

Application case recessed balcony

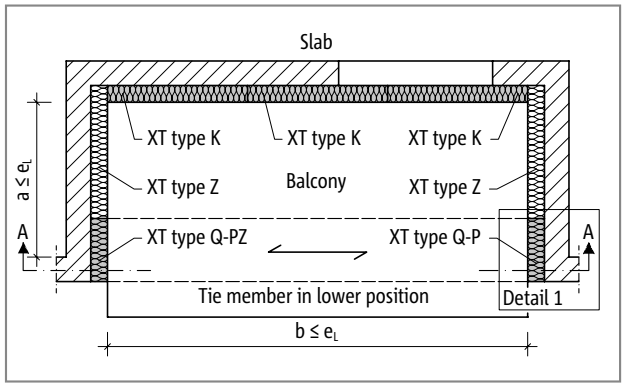


Fig. 167: Schöck Isokorb® XT type Q-PZ, Q-P: Plan view recessed balcony

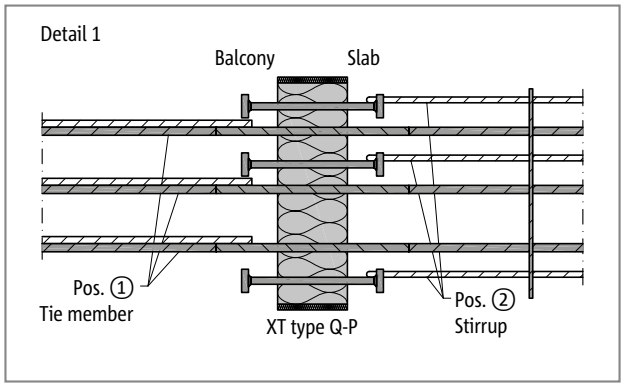
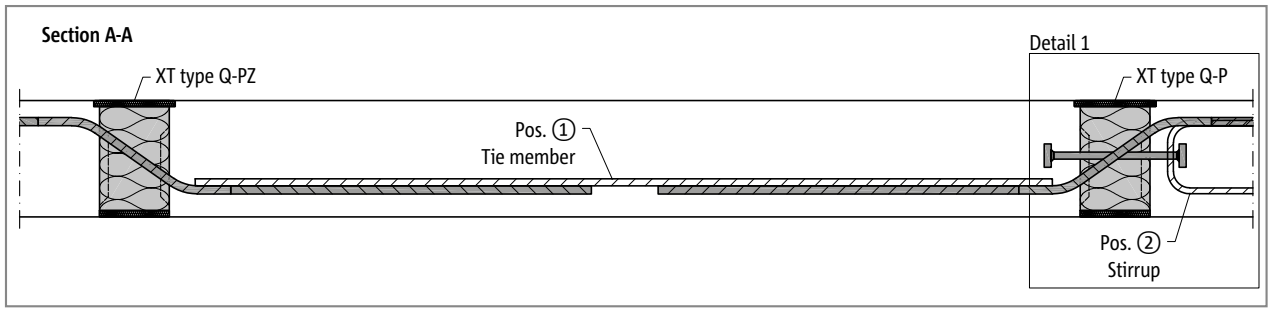


Fig. 168: Schöck Isokorb® XT type Q-P, Q-PZ: Detail 1; Reinforcement connection tie member

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



Schöck Isokorb® XT type Q-P, Q-PZ	V1	V2	V3	V4	V5	V6	V7	V8	V9
On-site reinforcement	Concrete strength class ≥ C25/30								
Pos. 1 Tie									
Pos. 1	2 • H10	3 • H10	4 • H10	2 • H12	3 • H12	2 • H16	3 • H16	3 • H16	4 ⌀ 14
Pos. 2 Stirrup (bracing)									
Pos. 2	1 • H10	2 • H10	2 • H10	2 • H10	2 • H10	2 • H10	3 • H10	3 • H10	4 • H10

Schöck Isokorb® XT type Q-P, Q-PZ	V1	V2	V3	V4	V5	V6	V7	V8	V9
Fixed point separation recessed balcony	e_L [m]								
a, b ≤	8.5	9.8	8.5	8.9	8.5	7.7	7.7	7.7	7.7

Recessed balcony

- The fixed point separations a, b are to be selected witht $a \leq e_L$ and $b \leq e_L$.
- The floor side bracing of the tie is carried out via on-site stirrups, which are tied to the pressure bearings.
- The required suspension reinforcement and the on-site slab reinforcement are not shown here.

Type of bearing: supported

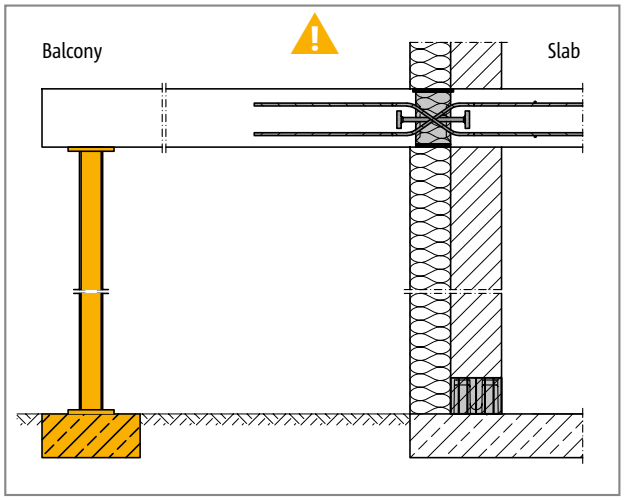


Fig. 169: Schöck Isokorb® XT type Q-P-VV: Continuous support required

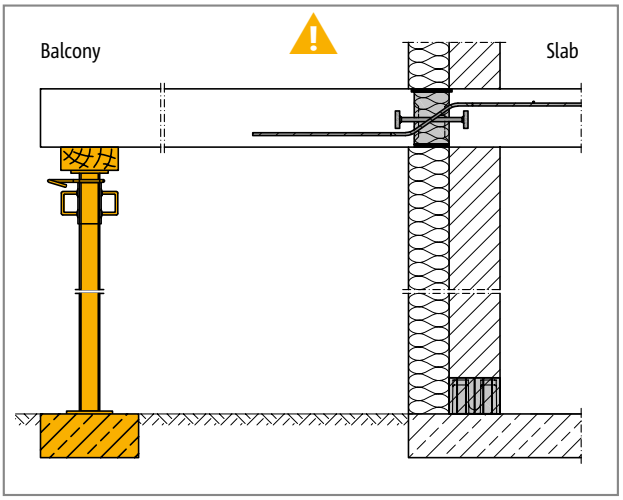


Fig. 170: Schöck Isokorb® XT type Q-P: Continuous support required

Supported balcony

The Schöck Isokorb® XT type Q-P, Q-P-VV is developed for supported balconies. It transmits exclusively shear forces, no bending moments.

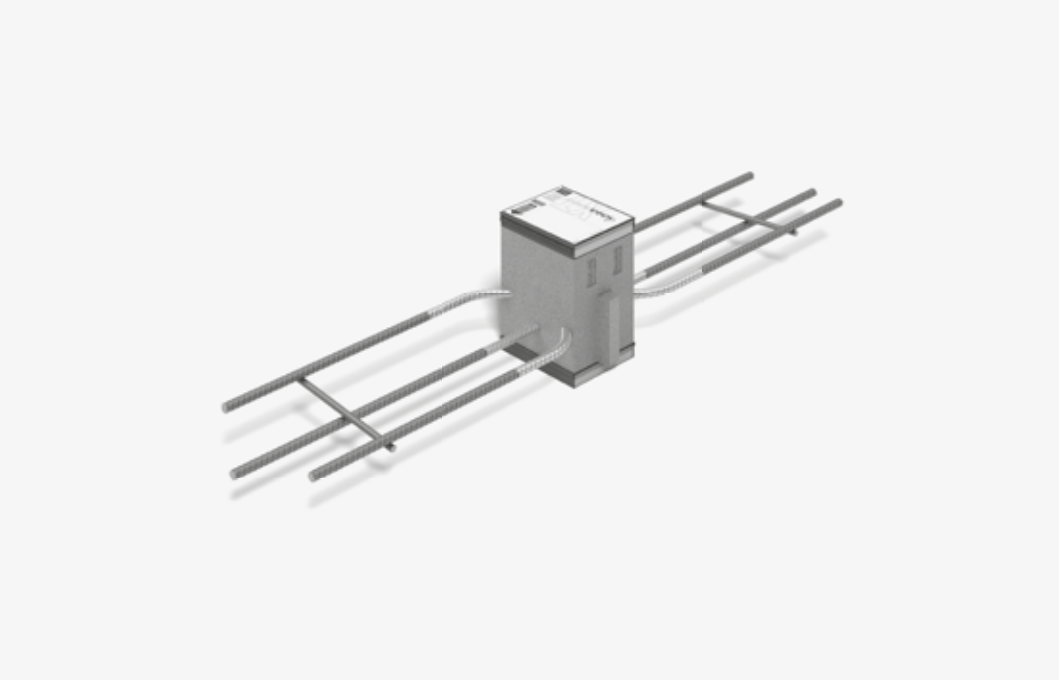
Warning - omitting the pillars

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

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?
- ☐ With precast balconies are possibly necessary gaps for the front side transportation anchors and downpipes with internal drainage taken into account? Is the maximum centre distance of 300 mm for 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)?

Schöck Isokorb® XT type H



Schöck Isokorb® XT type H
Load-bearing thermal insulation element for the transmission of planned horizontal forces parallel and perpendicular to the insulation plane. The element may be used only in conjunction with other Isokorb® types that can absorb moments or shear forces.
The element with the load bearing capacity NN transmits forces perpendicular to the insulation plane.
The element with the load bearing capacity VV-NN transmits forces parallel and perpendicular to the insulation plane.

Element arrangement | Installation cross sections

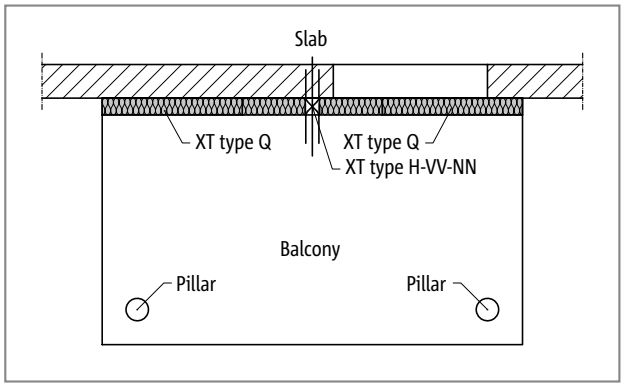


Fig. 171: Schöck Isokorb® XT type H: Balcony with column support

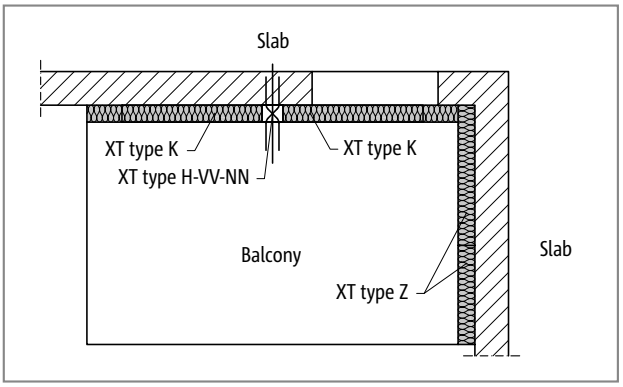


Fig. 172: Schöck Isokorb® XT type H: Balcony freely cantilevered

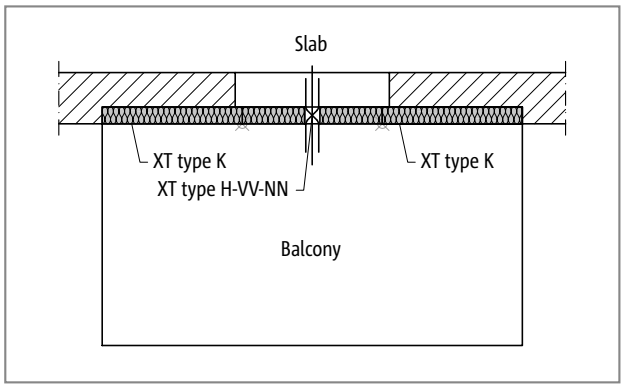


Fig. 173: Schöck Isokorb® XT type H: Balcony freely cantilevered

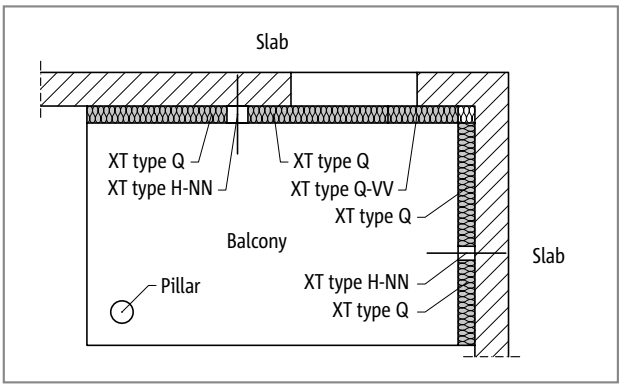


Fig. 174: Schöck Isokorb® XT type H: Balcony supported on two sides using columns

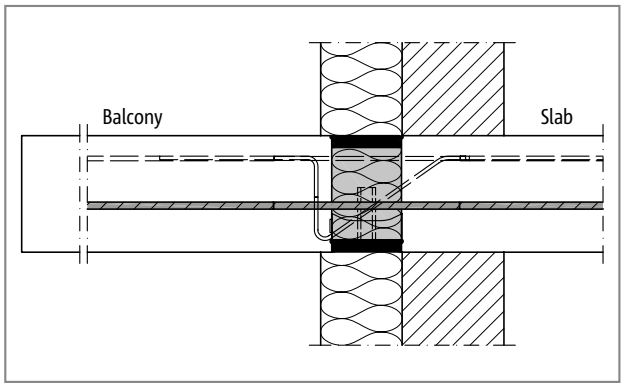


Fig. 175: Schöck Isokorb® XT type K, H-NN: Masonry with external insulation

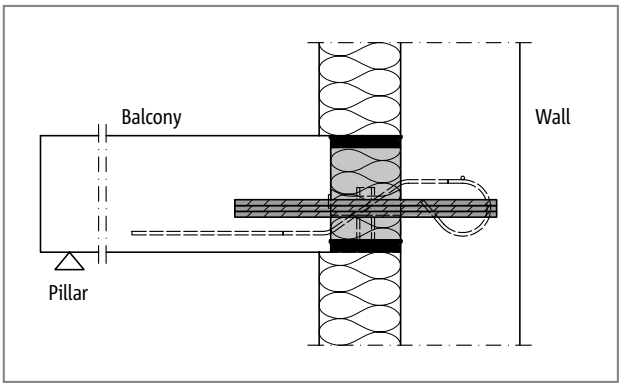


Fig. 176: Schöck Isokorb® XT type Q, H-VV-NN: Connection to a reinforced concrete wall with external insulation

Geometry

- The employment of Schöck Isokorb® XT types H-NN1 and H-VV1-NN1 is possible for a wall connection with a minimum wall thickness of 200 mm.

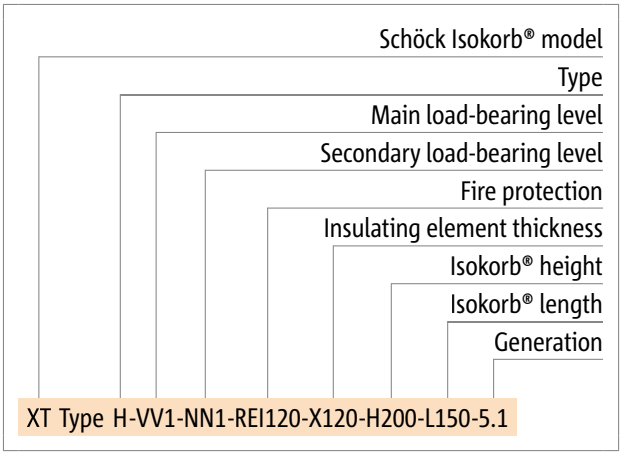
Product selection | Type designations | Special designs

Schöck Isokorb® XT type H variants

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

- Main load-bearing level:
  VV1, VV2, NN1, NN2
- Secondary load-bearing level:
  NN1
  NN2 is available on request
- Fire resistance class:
  REI120 (standard)
- Insulating element thickness:
  X120 = 120 mm
- Isokorb® height:
  H = 160 to 250 mm
- Isokorb® length:
  L = 150 mm
- Generation:
  5.1

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).

C25/30 design

Schöck Isokorb® XT type H	NN1		NN2		VV1-NN1		VV2-NN1	
Design values with	$V_{Rd,y}$ [kN]	$N_{Rd,x}$ [kN]	$V_{Rd,y}$ [kN]	$N_{Rd,x}$ [kN]	$V_{Rd,y}$ [kN]	$N_{Rd,x}$ [kN]	$V_{Rd,y}$ [kN]	$N_{Rd,x}$ [kN]
C25/30	0.0	±11.6	0.0	±49.2	±10.4	±11.6	±39.2	±49.2

Shear force bars, horizontal	-	-	2 × 1 ⌀ 10	2 × 1 ⌀ 12
Tension bars/compression bars	1 ⌀ 10	1 ⌀ 12	1 ⌀ 10	1 ⌀ 12
Isokorb® length [mm]	150	150	150	150
Isokorb® height H [mm]	160 - 250	160 - 250	160 - 250	160 - 250

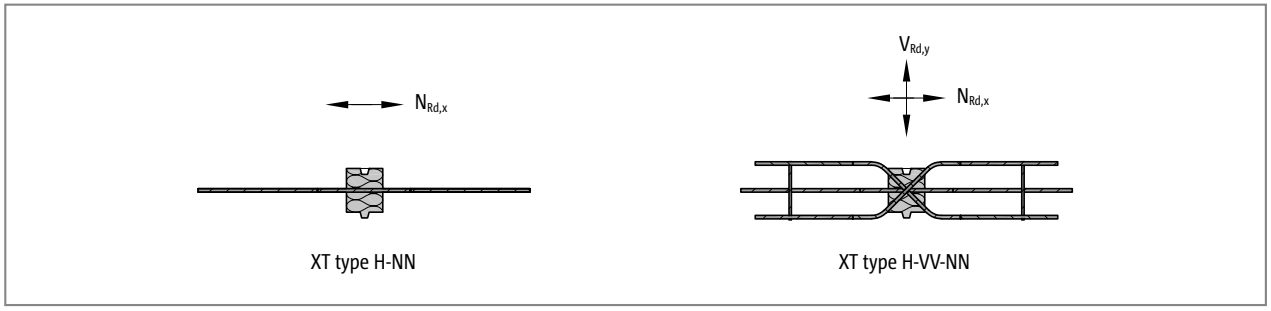


Fig. 177: Schöck Isokorb® XT type H: Type selection

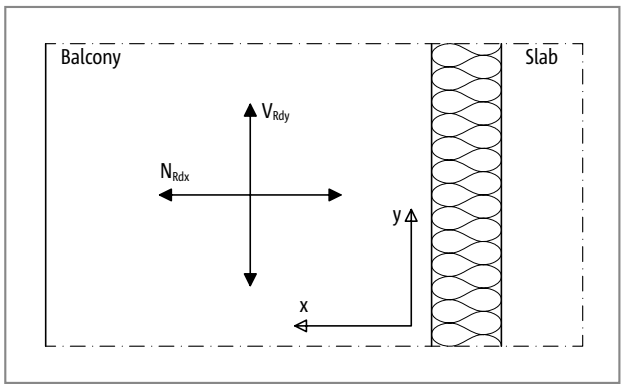


Fig. 178: Schöck Isokorb® XT type H: Sign rule for the design

Notes on design

- With the design of a linear connection attention is to be paid that, with the employment of the supplementary type H the design values of the linear connection can be reduced (e.g. XT type Q with L = 1.0 m and XT type H with L = 0.15 m in the regular exchange signifies a reduction by ca. 13 % of v_{Rd} of the linear connection using XT type Q).
- With the type selection (XT type H-NN or H-VV-NN) and - type arrangement attention is to be paid that no unnecessary fixed points are created and the maximum expansion joint spacings (of for example XT type K, XT type Q or XT type D) are maintained.
- The required number of Schöck Isokorb® XT type H-NN or H-VV-NN is to be determined according to static requirements.
- 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.

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 Dorn.

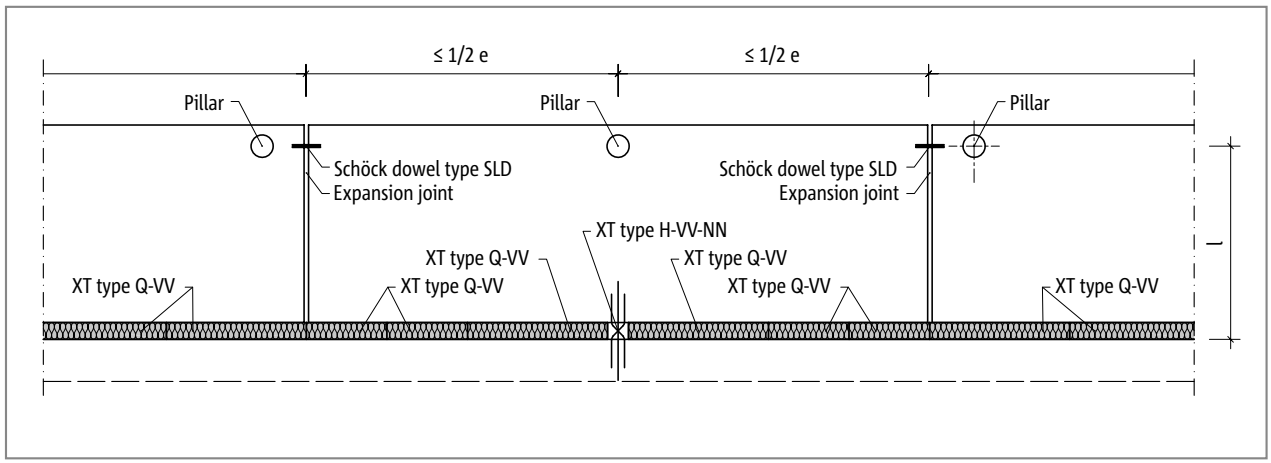


Fig. 179: Schöck Isokorb® XT type H: Expansion joint arrangement

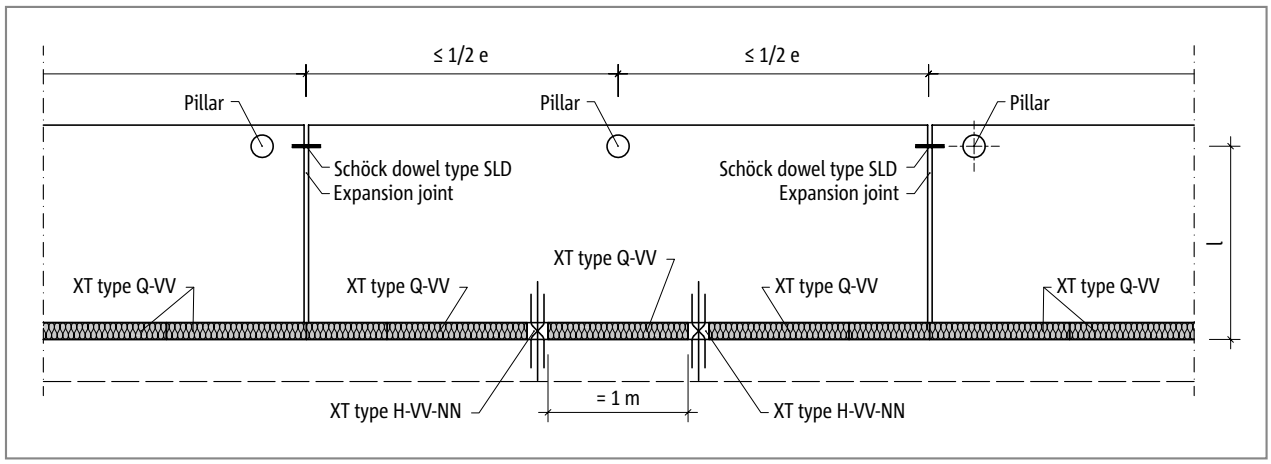


Fig. 180: Schöck Isokorb® XT type H: Expansion joint arrangement

Expansion joint spacing

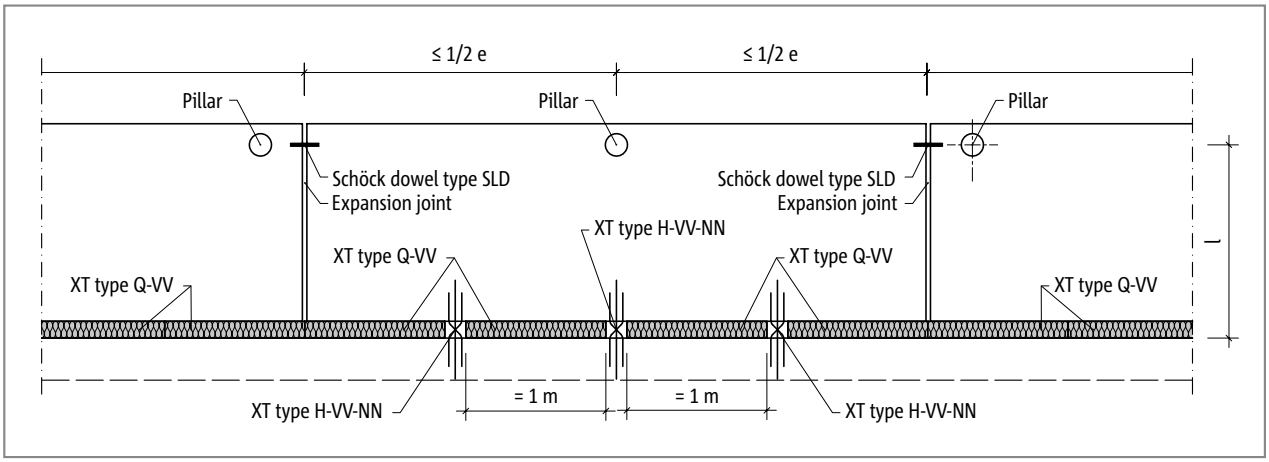


Fig. 181: Schöck Isokorb® XT type H: Expansion joint arrangement

Schöck Isokorb® XT type H combined with	XT type K	XT type K-U, K-O	XT type Q, Q-VV	XT type Q-P, Q-P-VV, Q-PZ	XT type D
maximum expansion joint spacing from fixed point e/2 [m]	≤ e/2 see p. 32	10.9	≤ e/2 see p. 101	≤ e/2 see p. 115	9.9

Expansion joints

- A maximum of three Schöck Isokorb® XT type H-VV-NN only may be connected to a balcony. Another Schöck Isokorb® type with a connection length of one metre must be arranged between two of these elements.
- If two Schöck Isokorb® XT type H-NN are arranged respectively at the edge of the expansion joint the following permitted expansion joint spacings for XT type are to be observed:
  XT type H-NN1: 21.7 m
  XT type H-NN2: 19.8 m
  With the determination of the maximum expansion joint spacing in addition the combination of Schöck Isokorb® types is to be taken into account.

Product description

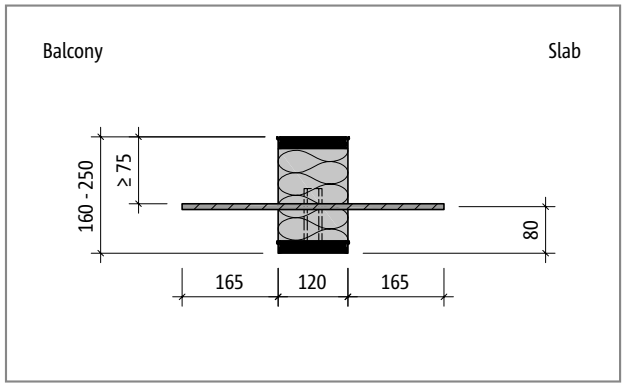


Fig. 182: Schöck Isokorb® XT type H-NN1: Product section

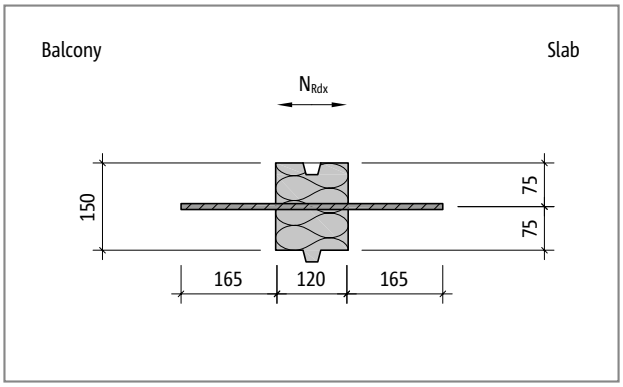


Fig. 183: Schöck Isokorb® XT type H-NN1: Product plan view

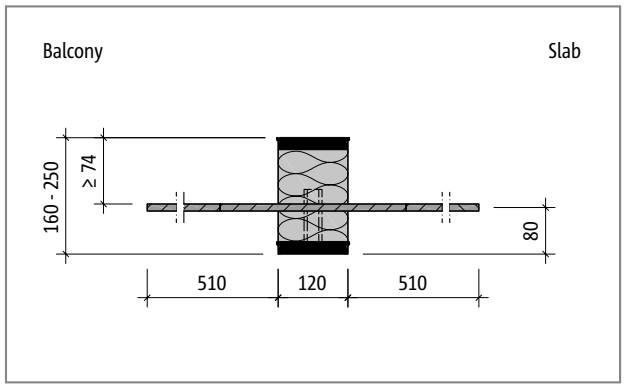


Fig. 184: Schöck Isokorb® XT type H-NN2: Product section

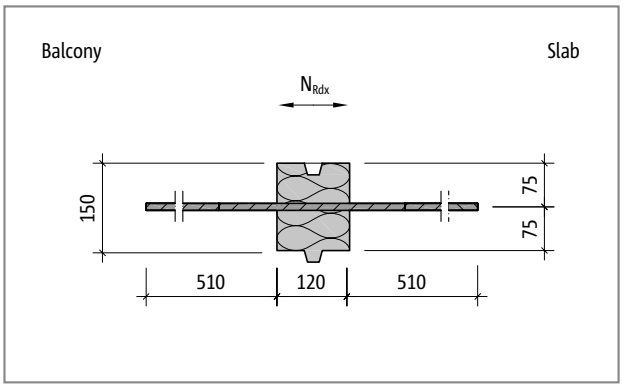


Fig. 185: Schöck Isokorb® XT type H-NN2: Product plan view

Product description

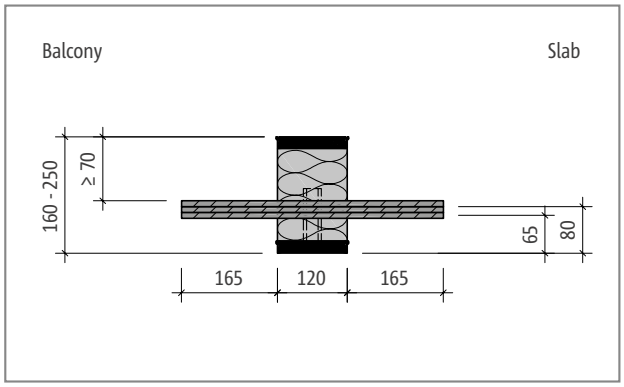


Fig. 186: Schöck Isokorb® XT type H-VV1-NN1: Product section

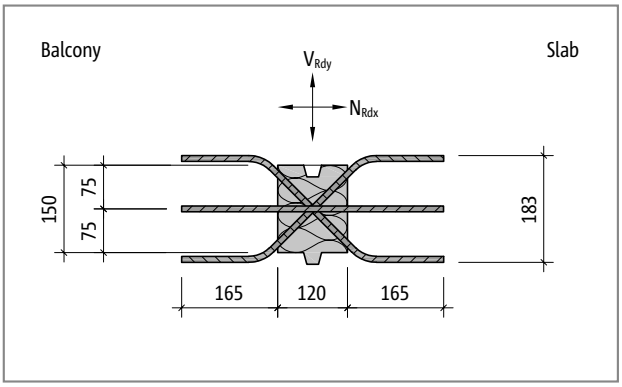


Fig. 187: Schöck Isokorb® XT type H-VV1-NN1: Product plan view

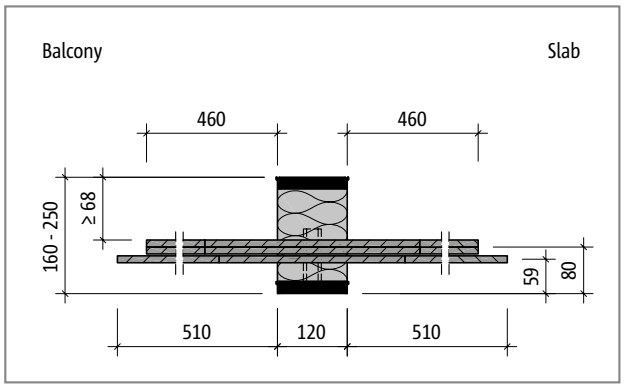


Fig. 188: Schöck Isokorb® XT type H-VV2-NN1: Product section

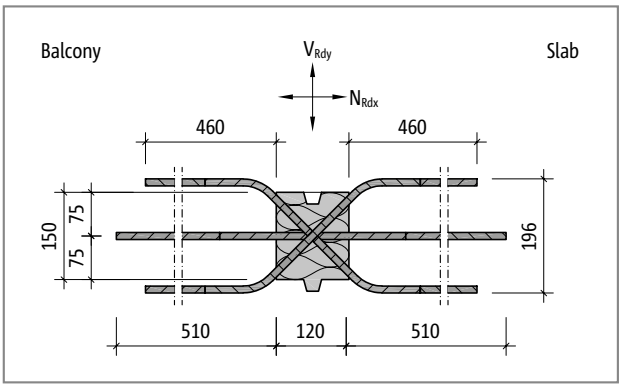


Fig. 189: Schöck Isokorb® XT type H-VV2-NN1: Product plan view

Product information

- Download further product plan views and cross-sections at www.schoeck.co.uk/download

Design example

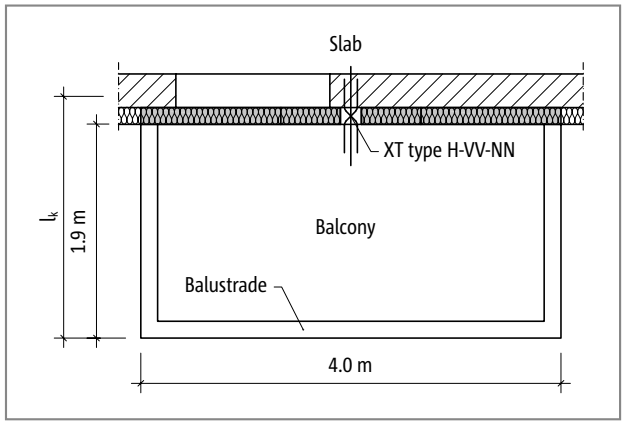


Fig. 190: Schöck Isokorb® XT type K, H: Plan view

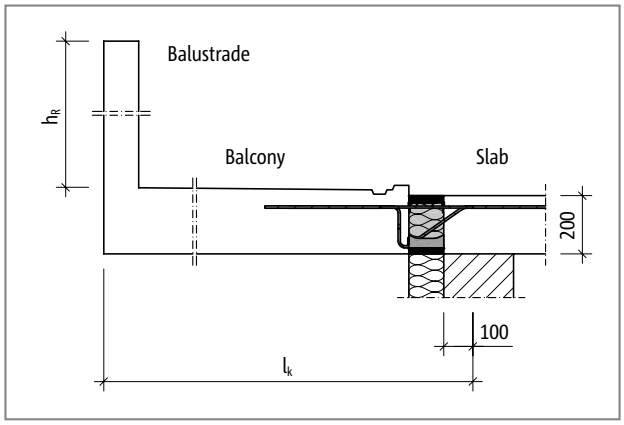


Fig. 191: Schöck Isokorb® XT type K: Static system

Static system and design loads

Geometry:	Cantilever length	l_k = 2.12 m
	Balcony slab thickness	h = 200 mm
	Surrounding parapet on three sides	h_R = 1.0 m
Design loads:	Balcony slab and surface	g = 6.5 kN/m²
	Live load	q = 4.0 kN/m²
	Edge load (parapet)	g_R = 3.0 kN/m
	Wind pressure	w_e = 1.0 kN/m²
Exposure classes:	Outer XC 4	
	Inner XC 1	
Selected:	Concrete quality C25/30 for balcony and floor	
	Concrete cover c_{nom} = 35 mm for Isokorb® tension bars	
	(Reduction Δc_{def} by 5mm, wg. Quality measures Schöck Isokorb® production)	
Connection geometry:	No height offset, no floor edge downstand beam, no balcony upstand	
Support floor:	Floor edge directly supported	
Support balcony:	Restraint of the cantilever slab using XT type K	

Design example

Verification in the ultimate limit state

Internal forces:

$m_{Ed} = -[(\gamma_G \cdot g + \gamma_Q \cdot q) \cdot l_k^2/2 + \gamma_G \cdot (g_R \cdot l_k + 2 \cdot g_R \cdot l_k^2/2/4)]$
$m_{Ed} = -[(1.35 \cdot 6.5 + 1.5 \cdot 4) \cdot 2.12^2/2 + 1.35 \cdot (3,. \cdot 2.12 + 2 \cdot 3.0.\cdot 2.12^2/2/4)]$
$m_{Ed} = -46.3$ kNm/m

$v_{Ed,z} = +(\gamma_G \cdot g + \gamma_Q \cdot q) \cdot l_k + \gamma_G \cdot (g_R + 2 \cdot g_R \cdot l_k/4)$
$v_{Ed,z} = +(1.35 \cdot 6.5 + 1.5 \cdot 4.0) \cdot 2.12 + 1.35 \cdot (3.0 + 2 \cdot 3.0 \cdot 2.12/4)$
$v_{Ed,z} = +39.7$ kN/m

$N_{Ed,x} = \gamma_Q \cdot w_e \cdot 4.0 \cdot (h + h_R) = 1.5 \cdot 1.0 \cdot 4.0 \cdot (0.2 + 1.0) = 7.2$ kN (frontal wind)
$V_{Ed,y} = \gamma_Q \cdot w_e \cdot 2 \cdot 1.9 \cdot (h + h_R) = 1.5 \cdot 1.0 \cdot 2 \cdot 1.9 \cdot (0.2 + 1.0) = 6.8$ kN (lateral wind)

Selected: **1 Schöck Isokorb® XT type H-VV1-NN1-REI120-H200-L150-5.1**
$N_{Rd,x} = \pm 11.6$ kN (see page 126) > $N_{Ed,x}$
$V_{Rd,y} = \pm 10.4$ kN (see page 126) > $V_{Ed,y}$

selected: **Schöck Isokorb® XT type K-M7-V1-REI120-CV35-X120-H200-6.0**
Increased effect taking into account the installation of the Schöck Isokorb® XT type H:
$|m_{Rd}| = 50.7$ kNm/m (see XT type K)
> 48.1 kNm/m = (4.00 m /3.85 m) · 46.3 kNm/m = $|m_{Ed}|$
$v_{Rd,z} = 75.2$ kN/m (see XT type K) > 41.2 kN/m = (4.00 m /3.85 m) · 39.7 kN/m = $v_{Ed,z}$

Verification for the exceptional load case earthquake

Load assumptions for earthquakes: $F_{a,x} = \pm 15.0$ kN/m (horizontal, parallel to the joint)
$F_{a,y} = \pm 15.0$ kN/m (horizontal, perpendicular to the joint)

Internal forces:
$N_{EdA,x} = \pm 4.0$ m · $F_{a,x} = \pm 4.0$ m · 15.0 kN/m = 60.0 kN (force perpendicular to the joint)
$V_{EdA,y} = \pm 4.0$ m · $F_{a,y} = \pm 4.0$ m · 15.0 kN/m = 60.0 kN (force parallel to the joint)

Selected: **2 Schöck Isokorb® XT type H-VV2-NN1-REI120-H200-L150-5.1**
$N_{Rd,x} = \pm 49.2$ kN · 2 = 98.4 kN (see page 126) > $N_{EdA,x}$
$V_{Rd,y} = \pm 39.2$ kN · 2 = 78.4 kN (see page 126) > $V_{EdA,y}$

selected: **Schöck Isokorb® XT type K-M7-V1-REI120-CV35-X120-H200-6.0**
Increased effect taking into account the installation of the Schöck Isokorb® XT type H:
$|m_{Rd}| = 50.7$ kNm/m (see XT type K)
> 50.1 kNm/m = (4.00 m /3.70 m) · 46.3 kNm/m = $|m_{Ed}|$
$v_{Rd,z} = 75.2$ kN/m (see XT type K) > 42.9 kN/m = (4.00 m /3.70 m) · 39.7 kN/m = $v_{Ed,z}$

i Design example

- Information on the expansion joint spacing is to be noted, see page 128.

Check list

- ☐ Have the loads on the Schöck Isokorb® connection been specified at design level?
- ☐ With a linear connection in combination with Schöck Isokorb® of length 1 m, has the reduction of the design values of the linear connection been taken into account?
- ☐ With the selection of the design table is the relevant concrete strength class taken into account?
- ☐ 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?

Schöck Isokorb® XT type Z

Schöck Isokorb® XT type Z
Suitable as insulating spacer for various installation situations and fire protection requirements. The Schöck Isokorb® XT type Z transfers no forces.

Element arrangement | Installation cross sections

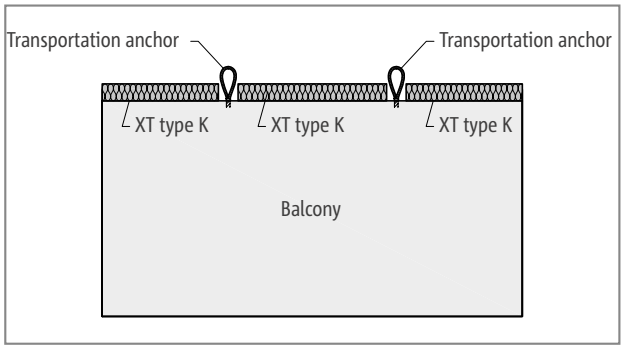


Fig. 192: Schöck Isokorb® XT type K: Precast balcony with transport anchor; insulating adapter XT type Z can be inserted on-site

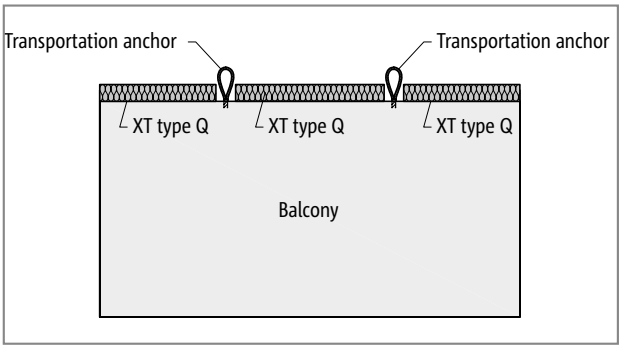


Fig. 193: Schöck Isokorb® XT type Q: Precast balcony with transport anchor; insulating adapter XT type Z can be inserted on-site

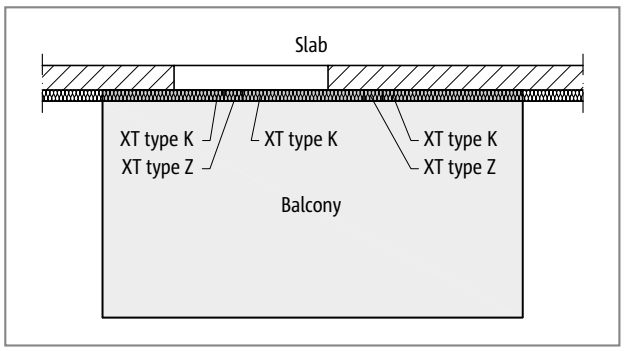


Fig. 194: Schöck Isokorb® XT type Z, K: Balcony freely cantilevered

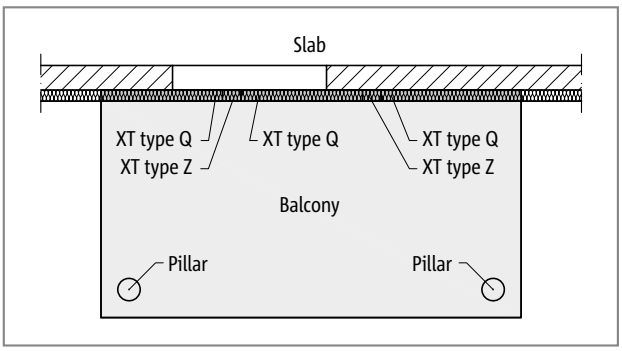


Fig. 195: Schöck Isokorb® XT type Z, Q: Balcony with column support

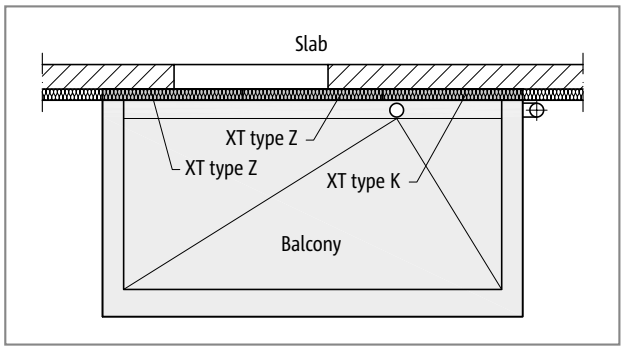


Fig. 196: Schöck Isokorb® XT type Z, K: Block-out for drainage with Schöck Isokorb® XT type Z

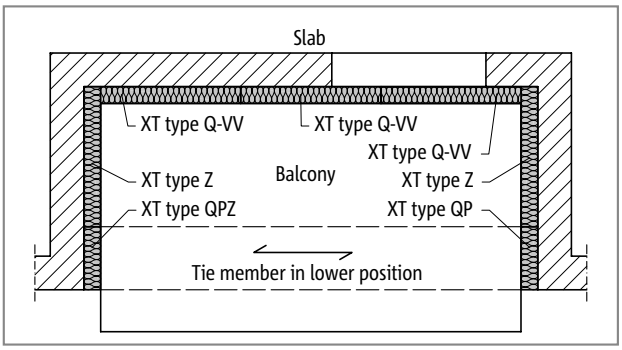


Fig. 197: Schöck Isokorb® XT type Z, Q-VV, Q-P, Q-PZ: Recessed balcony supported on three sides with tie member

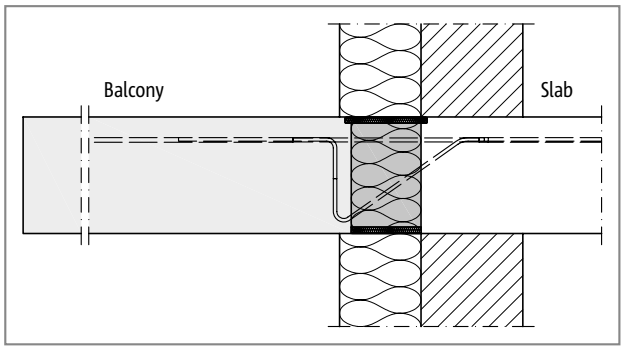


Fig. 198: Schöck Isokorb® XT type Z, K: Thermal insulating composite system (TICS)

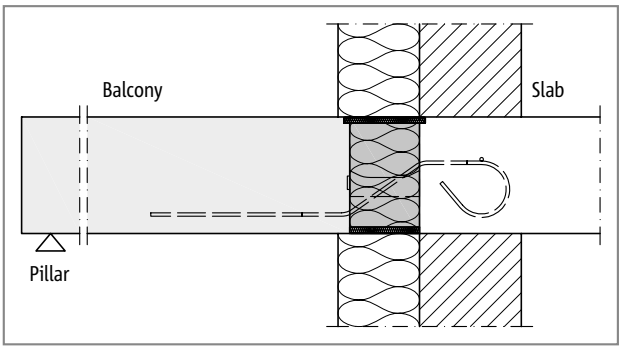


Fig. 199: Schöck Isokorb® XT type Z, Q: Thermal insulating composite system (TICS)

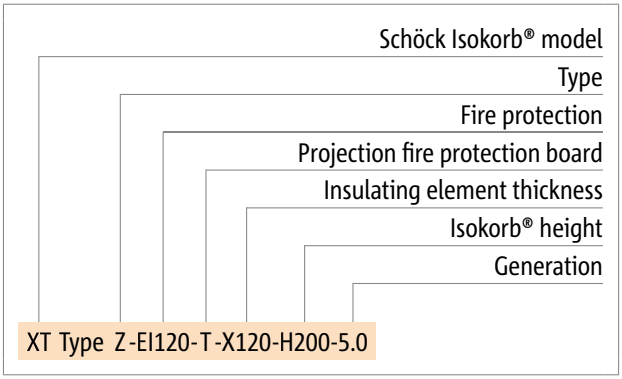
Product selection | Type designations

Schöck Isokorb® XT type Z variants

Configuration of the Schöck Isokorb® XT type Z can be varied as follows:

- Fire resistance class
  EI120: Standard, Fire protection board top and bottom, upper fire protection board without overhang, with slide bar and fire protection tape
  EI120-T: Fire protection board top and bottom, upper fire protection board with overhang, 10 mm on both sides
- Overhang fire protection board:
  T = Overhang fire protection board
- Insulating element thickness:
  X120 = 120 mm
- Isokorb® height:
  H = 160 - 250 mm
- Generation:
  5.0
- Isokorb® length:
  L = 150 mm or 1000 mm

Type designations in planning documents



Product description

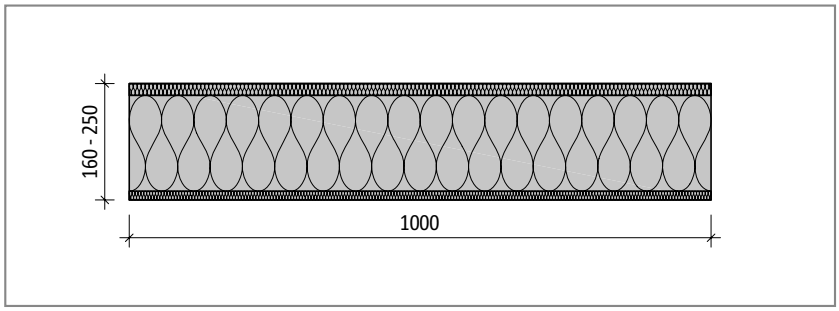


Fig. 200: Schöck Isokorb® XT type Z-EI120-L1000: Product view

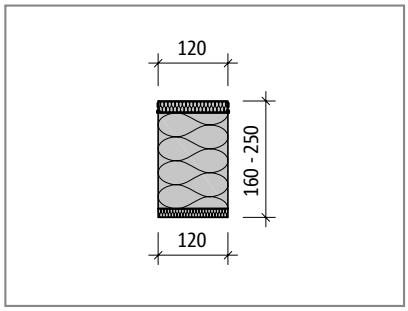


Fig. 201: Schöck Isokorb® XT type Z-EI120: Product section

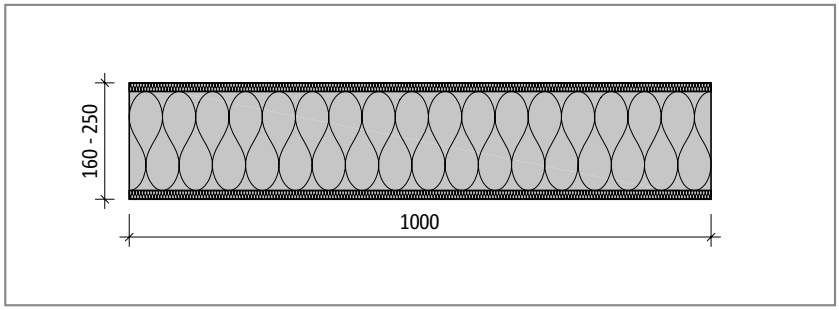


Fig. 202: Schöck Isokorb® XT type Z-EI120-T-L1000: Product view

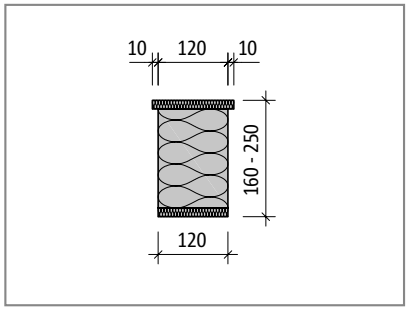


Fig. 203: Schöck Isokorb® XT type Z-EI120-T: Product section

Product information

- The Schöck Isokorb® XT type Z is supplied in lengths of 1000 mm (length 100 mm and 150 mm lengths on request)
- The Schöck Isokorb® XT type Z-L1000 can be shortened as required to the desired length.
- Download further product plan views and cross-sections at www.schoeck.co.uk/download

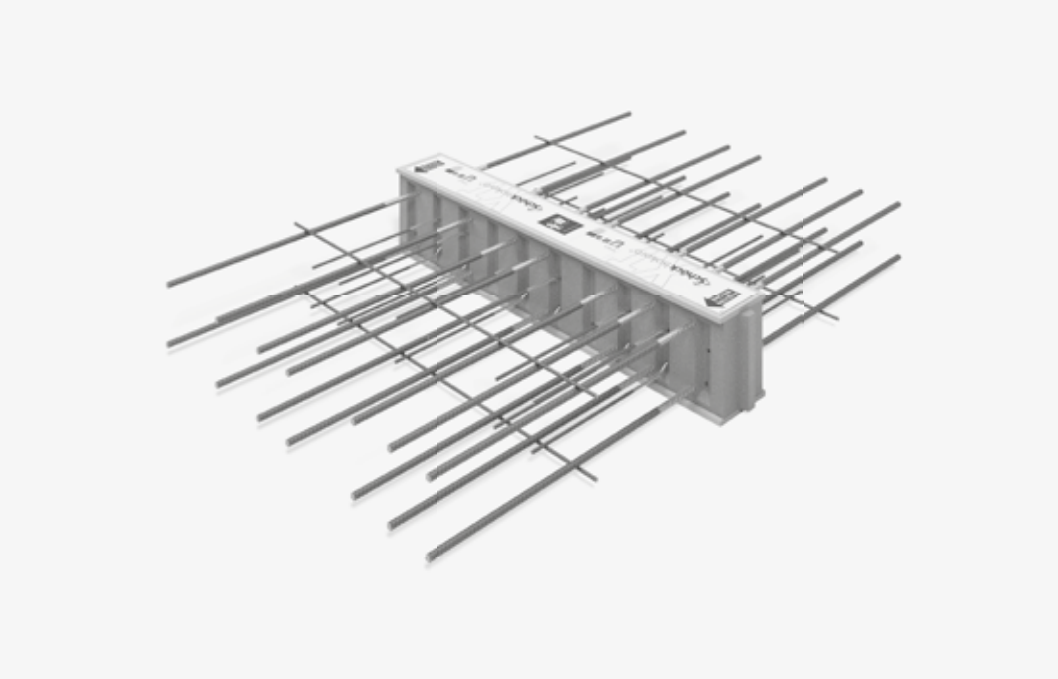
Notes on design

- Edge and centre distances of the adjacent Schöck Isokorb® types are to be noted.
- With the design of a linear connection it is to be noted that the use of the Schöck Isokorb® XT type Z can reduce the design values of the linear connection (e. g. Schöck Isokorb® type with L = 1.0 m and Schöck Isokorb® XT type Z with L = 0.1 m in regular alternation means a reduction m_{Rd} of the linear connection of ca. 9%)
- The Schöck Isokorb® XT type Z-EI120 is suitable for use with Schöck Isokorb® XT type K and A.
- The Schöck Isokorb® XT type Z-EI120-T is suitable for use with Schöck Isokorb® XT type K-U, K-O, K-HV, K-BH, K-WU, K-WO, Q, QP, D, F and O.
- The Schöck Isokorb® XT type Z-EI120 can be retrofitted (e.g. Transport anchor holes with prefabricated balconies), as fire protection board without overhang.
- The fire protection type corresponds with the maximum fire protection class of the connected load-bearing Schöck Isokorb type (e.g. XT type K→REI120, XT type QP→REI120 or XT type A→REI120).

Check list

- ☐ With a linear connection in combination with Schöck Isokorb® of length 1 m, has the reduction of the design values of the linear connection been taken into account?
- ☐ Are the requirements with regard to fire protection explained and is the appropriate addendum entered in the Isokorb® type description in the implementation plans?

Schöck Isokorb® XT type D



Schöck Isokorb® XT type D
Suitable for continuous floors. It transmits negative moment and positive shear forces with cantilevered balconies or positive moments with shear forces.

Element arrangement | Installation cross sections

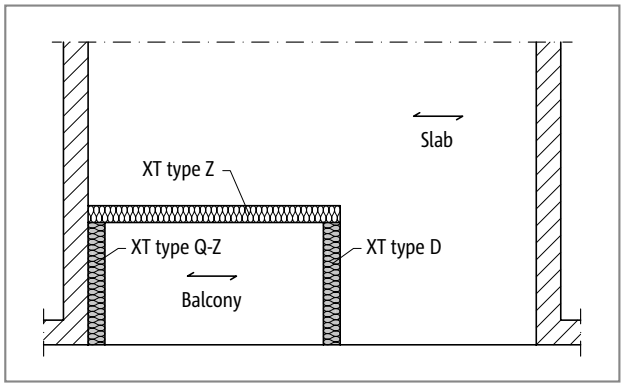


Fig. 204: Schöck Isokorb® XT type D, Q-Z: One-way spanning

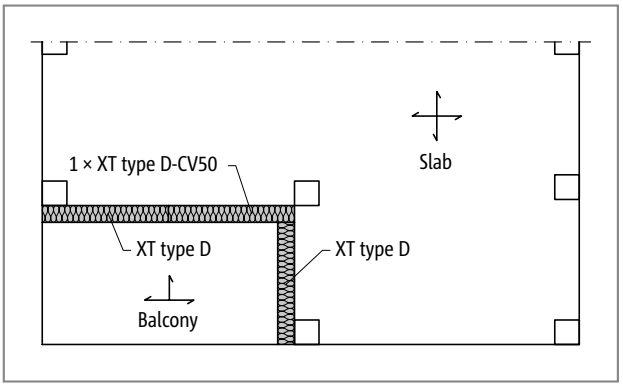


Fig. 205: Schöck Isokorb® XT type D: Two-way spanning

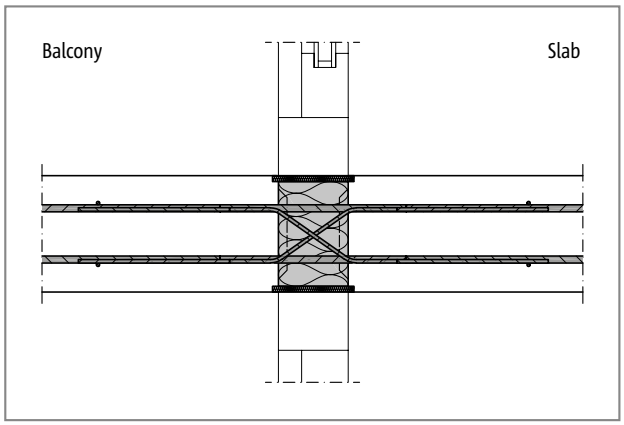


Fig. 206: Schöck Isokorb® XT type D: One-way spanning

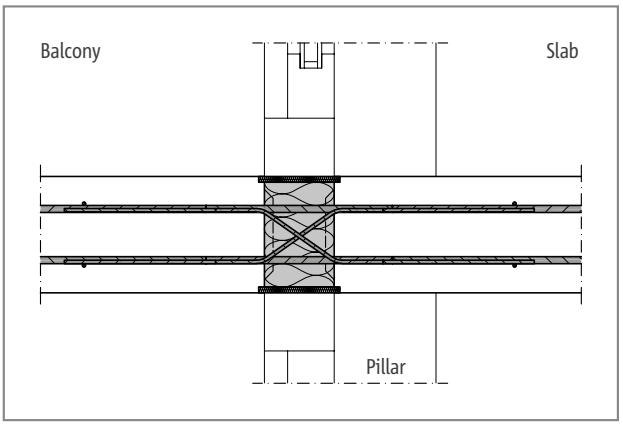


Fig. 207: Schöck Isokorb® XT type D: Two-way spanning

Element arrangement

- With connection across the corner with Schöck Isokorb® XT type D, a type D-CV50 (2nd position) is required in one axial direction Therefore a minimum slab thickness of 200 mm.
- The Schöck Isokorb® transmits moments vertically to the insulation joint, it transmit no moments parallel to the insulation joint. Therefore it is not suitable for employment within point supported floor bays or in balconies with 4 columns.

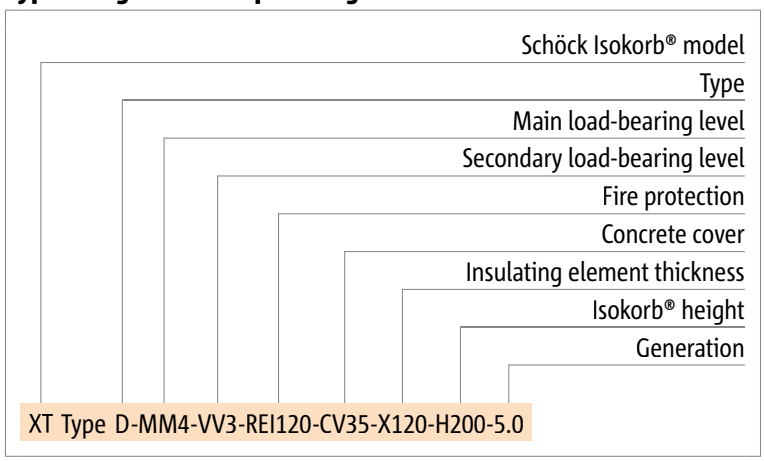
Product selection | Type designations | Special designs

Schöck Isokorb® XT type D variants

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

- Main load-bearing level:
  MM2 to MM5
  MM1 is available on request
- Secondary load-bearing level:
  VV1 to VV3
- Fire resistance class:
  REI120 (standard): Top and bottom fire protection projecting by 10mm on both sides
- Concrete cover of the tension bars:
  CV35: Top CV = 35 mm, bottom CV = 30 mm
  CV50: Top CV = 50 mm, bottom CV = 50 mm
- Insulating element thickness:
  X120 = 120 mm
- Isokorb® height:
  H = H_{min} to 250 mm (H_{min} i dependent on concrete cover and shear force load-bearing level see p.144)
- 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.

C25/30 design

Schöck Isokorb® XT type D			MM2-VV1	MM2-VV2	MM2-VV3	MM3-VV1	MM3-VV2	MM3-VV3
Design values with	Concrete cover CV [mm]		Concrete strength class ≥ C25/30					
	CV35	CV50	$m_{Rd,y}$ [kNm/m]					
Isokorb® height H [mm]	160		±15.7	-	-	±22.9	-	-
		200	±16.6	-	-	±24.3	-	-
	170		±17.6	±15.4	-	±25.7	±23.5	-
		210	±18.5	±16.2	-	±27.1	±24.8	-
	180		±19.5	±17.0	±13.9	±28.5	±26.1	±22.9
		220	±20.4	±17.9	±14.6	±29.9	±27.3	±24.1
	190		±21.3	±18.7	±15.3	±31.2	±28.6	±25.2
		230	±22.3	±19.5	±15.9	±32.6	±29.8	±26.3
	200		±23.2	±20.3	±16.6	±34.0	±31.1	±27.4
		240	±24.2	±21.2	±17.3	±35.4	±32.4	±28.5
	210		±25.1	±22.0	±18.0	±36.8	±33.6	±29.6
		250	±26.1	±22.8	±18.6	±38.1	±34.9	±30.7
	220		±27.0	±23.6	±19.3	±39.5	±36.2	±31.8
	230		±28.9	±25.3	±20.7	±42.3	±38.7	±34.1
	240		±30.8	±26.9	±22.0	±45.1	±41.2	±36.3
	250		±32.7	±28.6	±23.4	±47.8	±43.8	±38.5
Secondary load-bearing level			$v_{Rd,z}$ [kN/m]					
	VV1/VV2/VV3		±42.3	±75.2	±117.5	±42.3	±75.2	±117.5

Schöck Isokorb® XT type D	MM2-VV1	MM2-VV2	MM2-VV3	MM3-VV1	MM3-VV2	MM3-VV3
Isokorb® length [mm]	1000			1000		
Tension bars/compression members	2 × 5 ⌀ 12			2 × 7 ⌀ 12		
Shear force bars	2 x 6 ⌀ 6	2 x 6 ⌀ 8	2 x 6 ⌀ 10	2 x 6 ⌀ 6	2 x 6 ⌀ 8	2 x 6 ⌀ 10
H_{min} with CV35 [mm]	160	170	180	160	170	180
H_{min} with CV50 [mm]	200	210	220	200	210	220

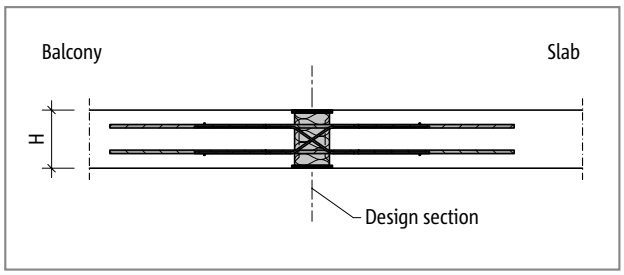


Fig. 208: Schöck Isokorb® XT type D: Static system

C25/30 design

Schöck Isokorb® XT type D			MM4-VV1	MM4-VV2	MM4-VV3	MM5-VV1	MM5-VV2	MM5-VV3
Design values with	Concrete cover CV [mm]		Concrete strength class ≥ C25/30					
	CV35	CV50	$m_{Rd,y}$ [kNm/m]					
Isokorb® height H [mm]	160		±33.9	-	-	±41.1	-	-
		200	±35.9	-	-	±43.6	-	-
	170		±37.9	±35.7	-	±46.1	±43.9	-
		210	±40.0	±37.7	-	±48.6	±46.3	-
	180		±42.0	±39.6	±36.5	±51.0	±48.6	±45.5
		220	±44.0	±41.5	±38.2	±53.5	±51.0	±47.7
	190		±46.1	±43.4	±40.0	±56.0	±53.3	±49.9
		230	±48.1	±45.4	±41.8	±58.5	±55.7	±52.1
	200		±50.2	±47.3	±43.6	±60.9	±58.0	±54.3
		240	±52.2	±49.2	±45.3	±63.4	±60.4	±56.5
	210		±54.2	±51.1	±47.1	±65.9	±62.8	±58.7
		250	±56.3	±53.0	±48.9	±68.4	±65.1	±61.0
	220		±58.3	±55.0	±50.6	±70.8	±67.5	±63.2
	230		±62.4	±58.8	±54.2	±75.8	±72.2	±67.6
	240		±66.5	±62.6	±57.7	±80.8	±76.9	±72.0
	250		±70.6	±66.5	±61.3	±85.7	±81.6	±76.4
Secondary load-bearing level			$v_{Rd,z}$ [kN/m]					
	VV1/VV2/VV3		±42.3	±75.2	±117.5	±42.3	±75.2	±117.5

Schöck Isokorb® XT type D	MM4-VV1	MM4-VV2	MM4-VV3	MM5-VV1	MM5-VV2	MM5-VV3
Isokorb® length [mm]	1000			1000		
Tension bars/compression members	2 × 10 ⌀ 12			2 × 12 ⌀ 12		
Shear force bars	2 x 6 ⌀ 6	2 x 6 ⌀ 8	2 x 6 ⌀ 10	2 x 6 ⌀ 6	2 x 6 ⌀ 8	2 x 6 ⌀ 10
H_{min} with CV35 [mm]	160	170	180	160	170	180
H_{min} with CV50 [mm]	200	210	220	200	210	220

Notes on design

- 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.
- A static verification is to be provided for the adjacent reinforced concrete structural component on both sides of the Schöck Isokorb®.
- 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 Schöck Isokorb® XT type D transmits only bending moments perpendicular to the insulation slab. The Schöck Isokorb® transmits no torsion moments. Therefore the arrangement of a Schöck Isokorb® XT type D is not sensible in a punctually supported slab without downstand beams.

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.

Schöck Isokorb® XT type D		MM2	MM3	MM4	MM5
Maximum expansion joint spacing e		e [m]			
Insulating element thickness [mm]	120	19.8			

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

Product description

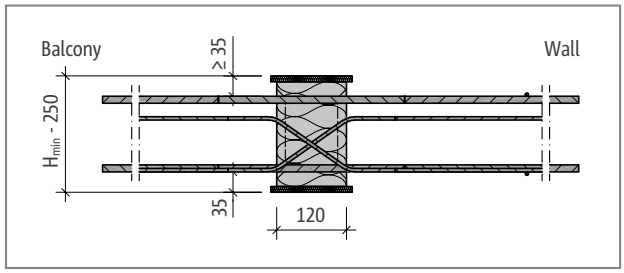


Fig. 209: Schöck Isokorb® XT type D with CV35: Product section

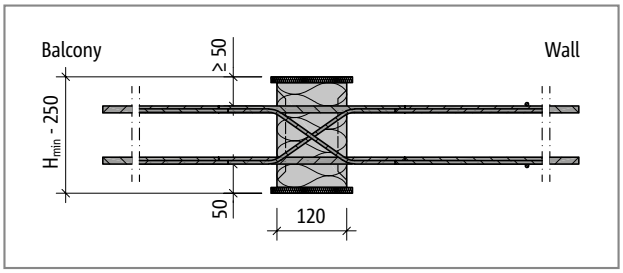


Fig. 210: Schöck Isokorb® XT type D with CV50: Product section

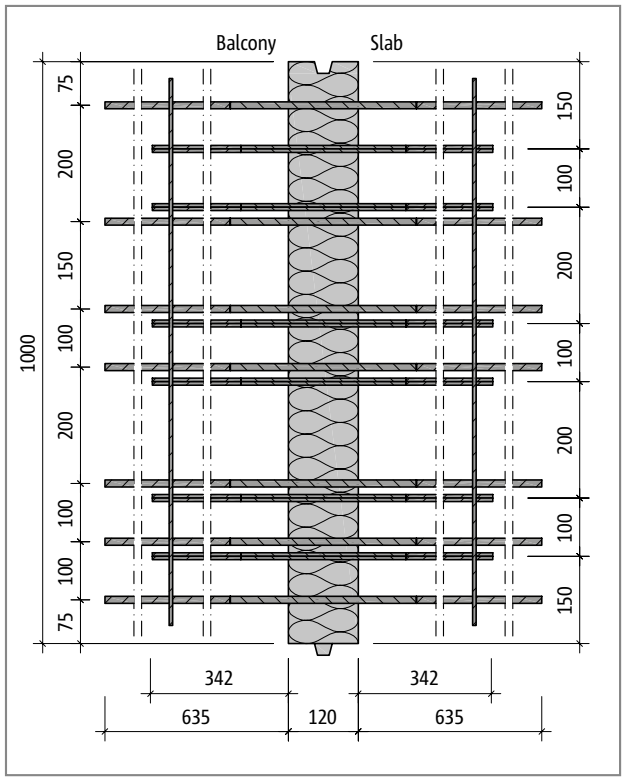


Fig. 211: Schöck Isokorb® XT type D-MM3-VV1: Plan view

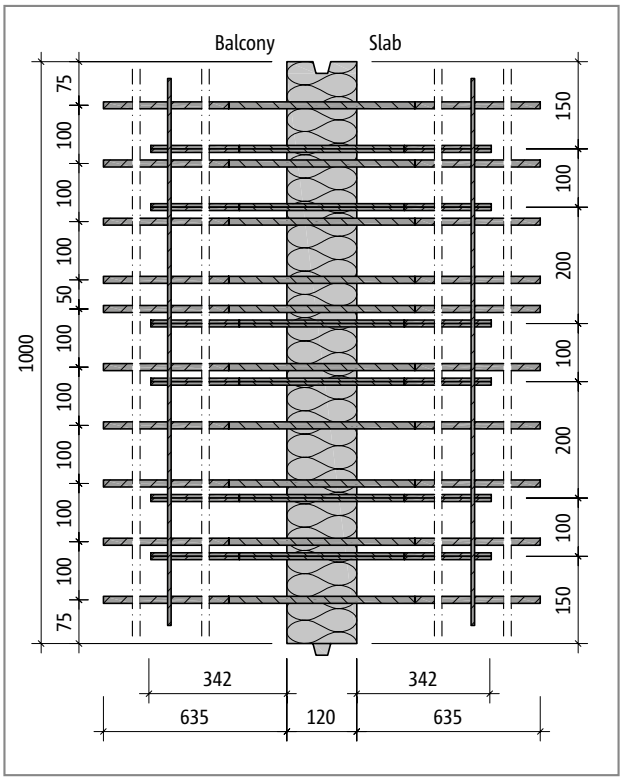


Fig. 212: Schöck Isokorb® XT type D-MM4-VV1: Plan view

Product information

- Download further product plan views and cross-sections at www.schoeck.co.uk/download

On-site reinforcement

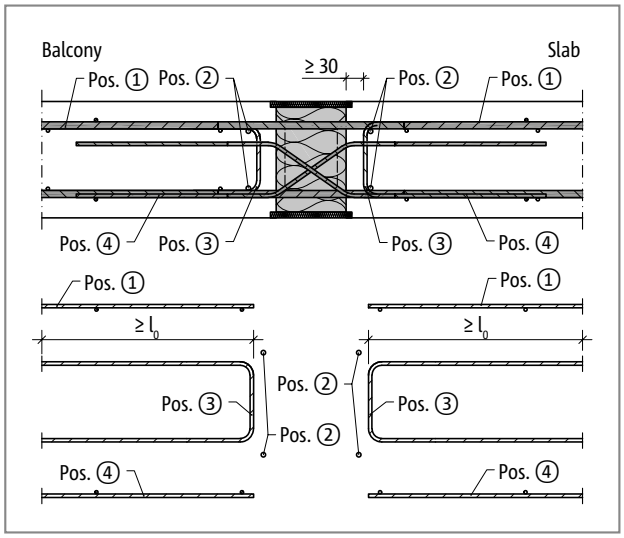


Fig. 213: Schöck Isokorb® XT type D: On-site reinforcement

Information about on-site reinforcement

- The rules according to BS EN 1992-1-1 (EC2) and BS EN 1992-1-1/NA apply for the determination of the overlap length. A reduction of the required overlap length with m_{Ed}/m_{Rd} is permitted. For the overlap (l) with the Schöck Isokorb® for the XT type D a length of the tension bars of 605 can be brought to account.
- An edge and suspension reinforcement (Pos. 3) is to be arranged on both sides of the Schöck Isokorb® XT type D. Details in the table apply for Schöck Isokorb® with a loading of 100% of the maximum design internal forces with 25/30.

On-site reinforcement

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.

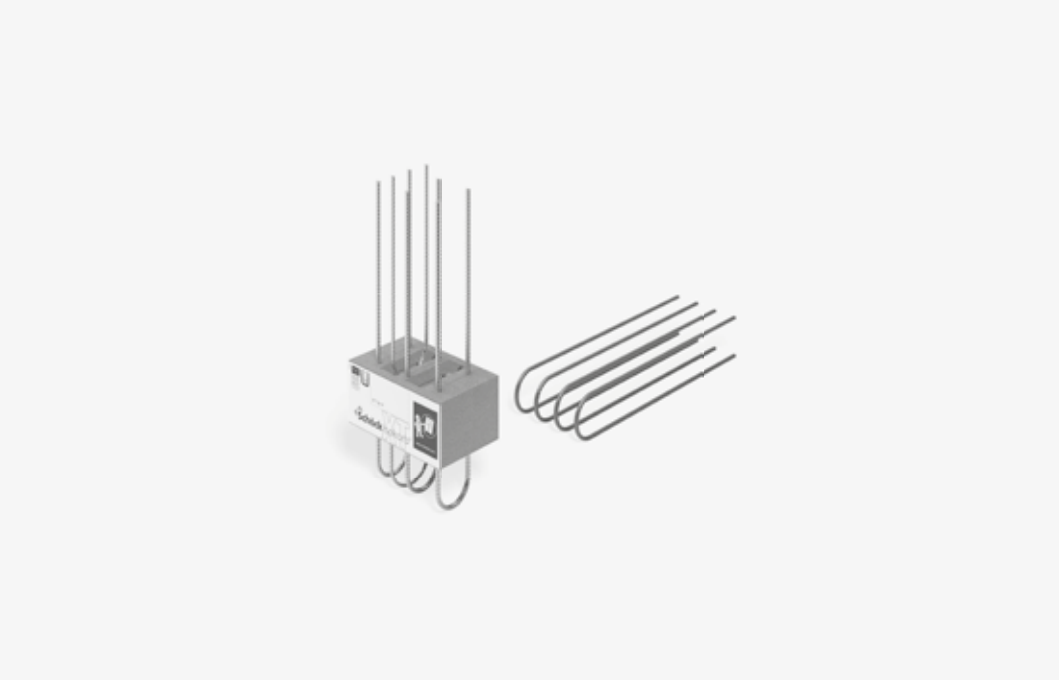
Schöck Isokorb® XT type D	MM2-VV1	MM2-VV2	MM2-VV3	MM3-VV1	MM3-VV2	MM3-VV3
On-site reinforcement	Concrete strength class ≥ C25/30					
Pos. 1 Lapping reinforcement (required with negative moment))						
Pos. 1 [mm²/m]	565	565	565	791	791	791
Pos. 2 Steel bars along the insulation joint						
Pos. 2	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8
Pos. 3 Edge and suspension reinforcement						
Pos. 3	H8@250	H8@150	H8@100	H8@250	H8@150	H8@100
Pos. 4 Lapping reinforcement (required with positive moment)						
Pos. 4 [mm²/m]	565	565	565	791	791	791

Schöck Isokorb® XT type D	MM4-VV1	MM4-VV2	MM4-VV3	MM5-VV1	MM5-VV2	MM5-VV3
On-site reinforcement	Concrete strength class ≥ C25/30					
Pos. 1 Lapping reinforcement (required with negative moment))						
Pos. 1 [mm²/m]	1130	1130	1130	1357	1357	1357
Pos. 2 Steel bars along the insulation joint						
Pos. 2	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8	2 • 2 • H8
Pos. 3 Edge and suspension reinforcement						
Pos. 3	H8@250	H8@150	H8@100	H8@250	H8@150	H8@100
Pos. 4 Lapping reinforcement (required with positive moment)						
Pos. 4 [mm²/m]	1130	1130	1130	1357	1357	1357

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?
- ☐ Are the maximum allowable expansion joint spacings taken into account?
- ☐ With the selection of the design table is the relevant concrete cover taken into account?
- ☐ Are the requirements with regard to fire protection explained and is the appropriate addendum entered in the Isokorb® type description in the implementation plans?
- ☐ Is the minimum slab thickness (≥ 200 mm) and the required concrete cover (-CV50) taken into account with connection over a corner using Schöck Isokorb® XT type D?
- ☐ With XT type D in conjunction with prefabricated floors is the required block-out (width ≥ 650 mm from insulating element) drawn into the implementation plans and is the on-site reinforcement adjusted?
- ☐ 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)?
- ☐ Have the requirements for on-site reinforcement of connections been defined in each case?

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

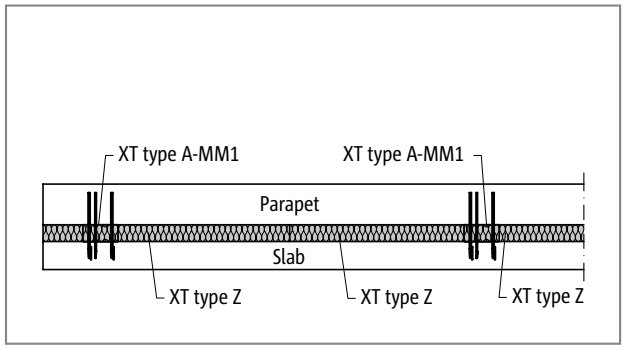


Fig. 214: Schöck Isokorb® XT type A, Z: Attic (XT type A-MM1)

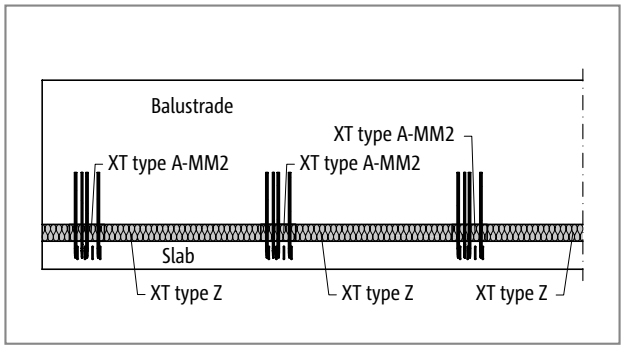


Fig. 215: Schöck Isokorb® XT type A, Z: Parapet (XT type A-MM2)

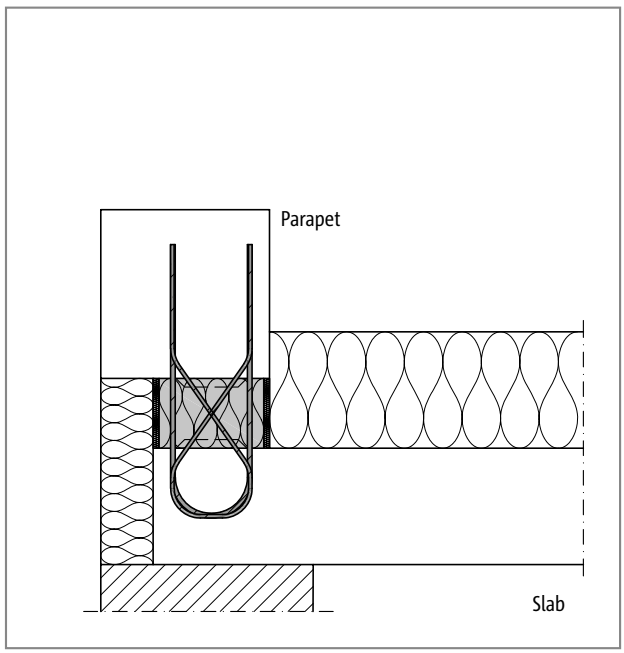


Fig. 216: Schöck Isokorb® XT type A: Connection of a parapet (XT type A-MM1)

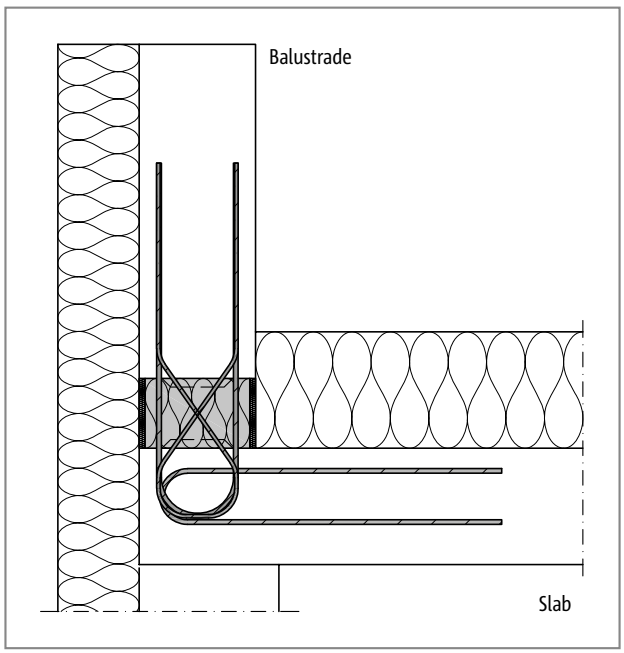


Fig. 217: Schöck Isokorb® XT type A: Connection to a balustrade (XT type A-MM2)

Element arangement/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.

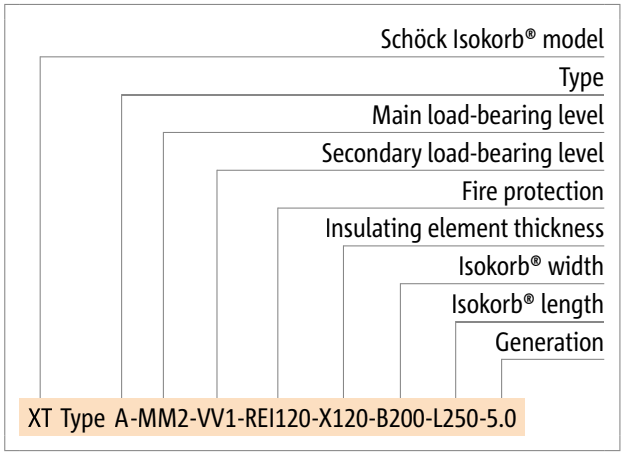
Product selection | Type designations | Special designs

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

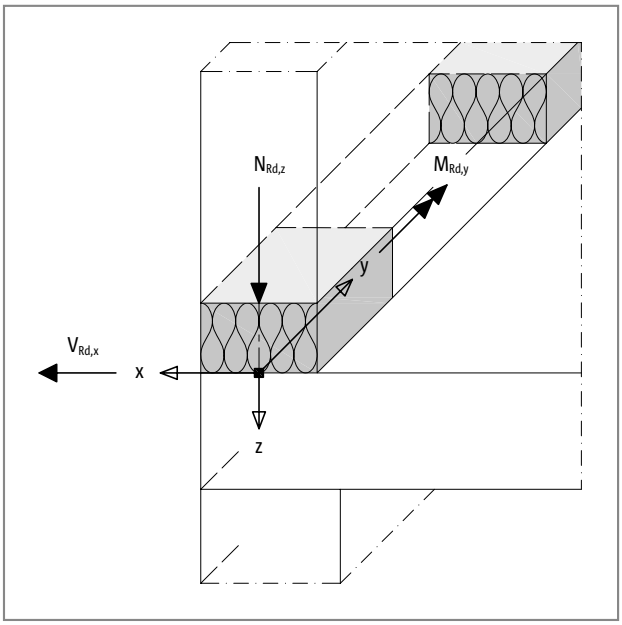


Fig. 218: Schöck Isokorb® XT type A: Sign convention for the design

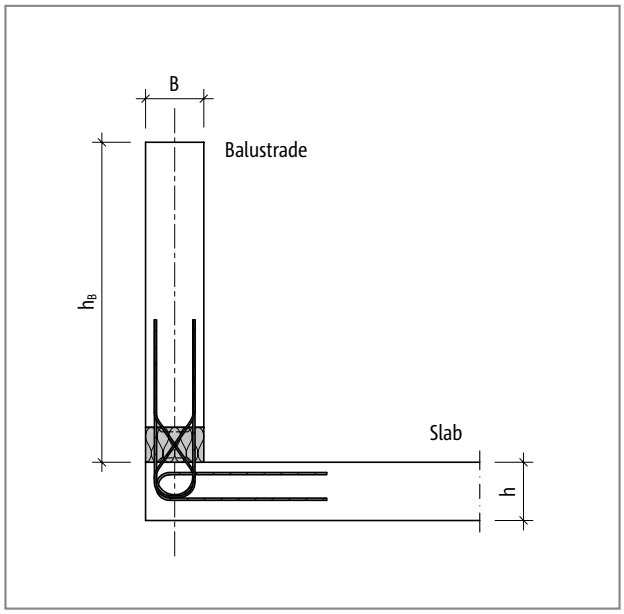


Fig. 219: Schöck Isokorb® XT type A: Static system

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 $a_{max,2}$

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

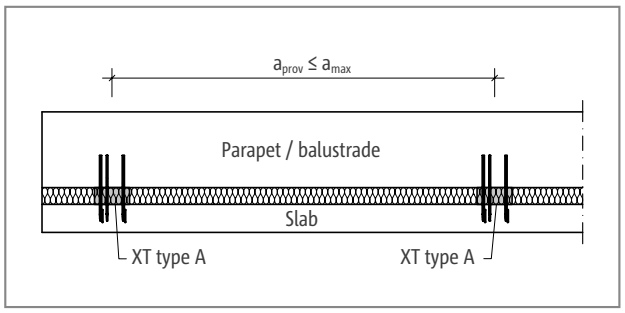


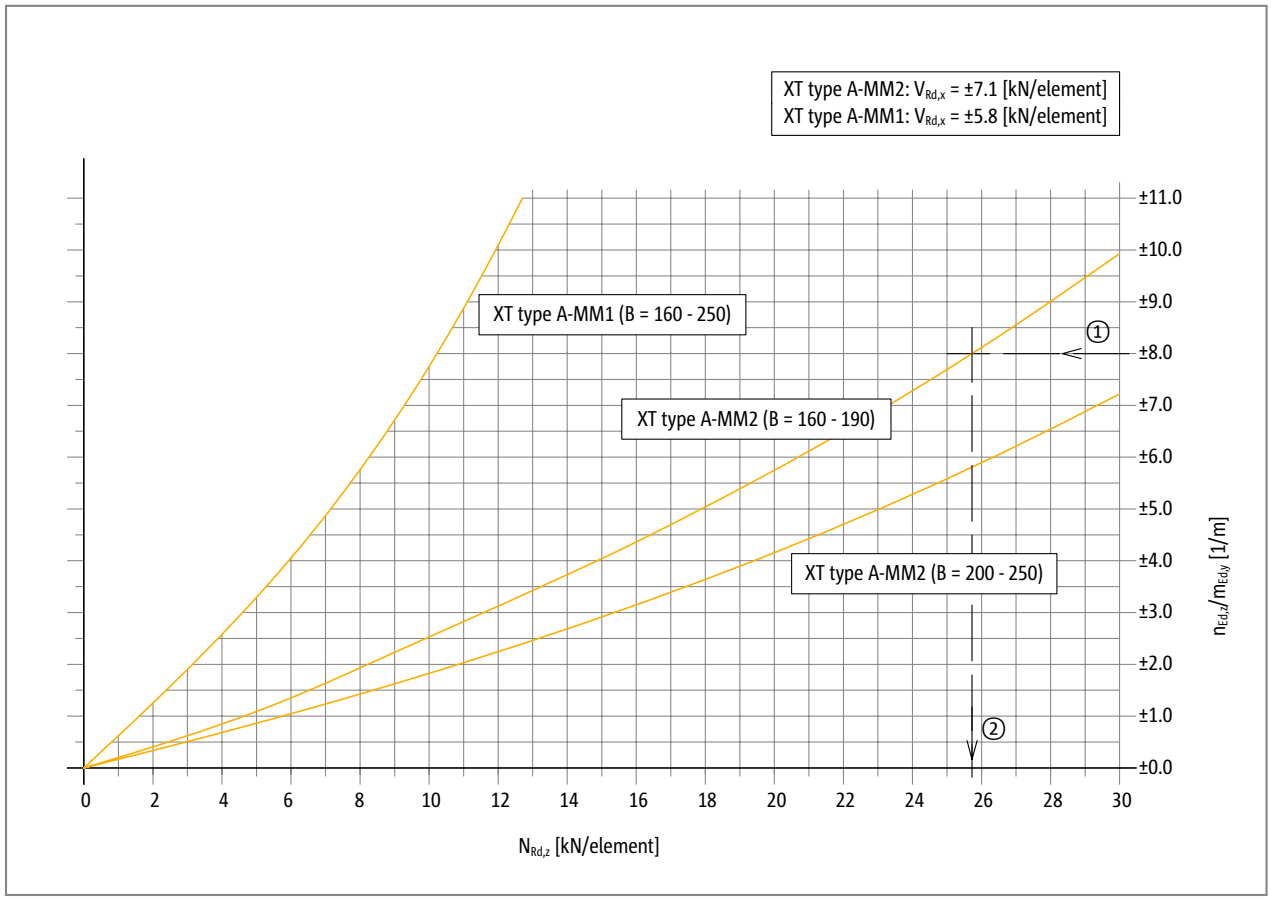
Fig. 220: Schöck Isokorb® XT type A: Verification met if selected distance $a_{prov} \leq a_{max}$

Numerical example of determination of centre distances

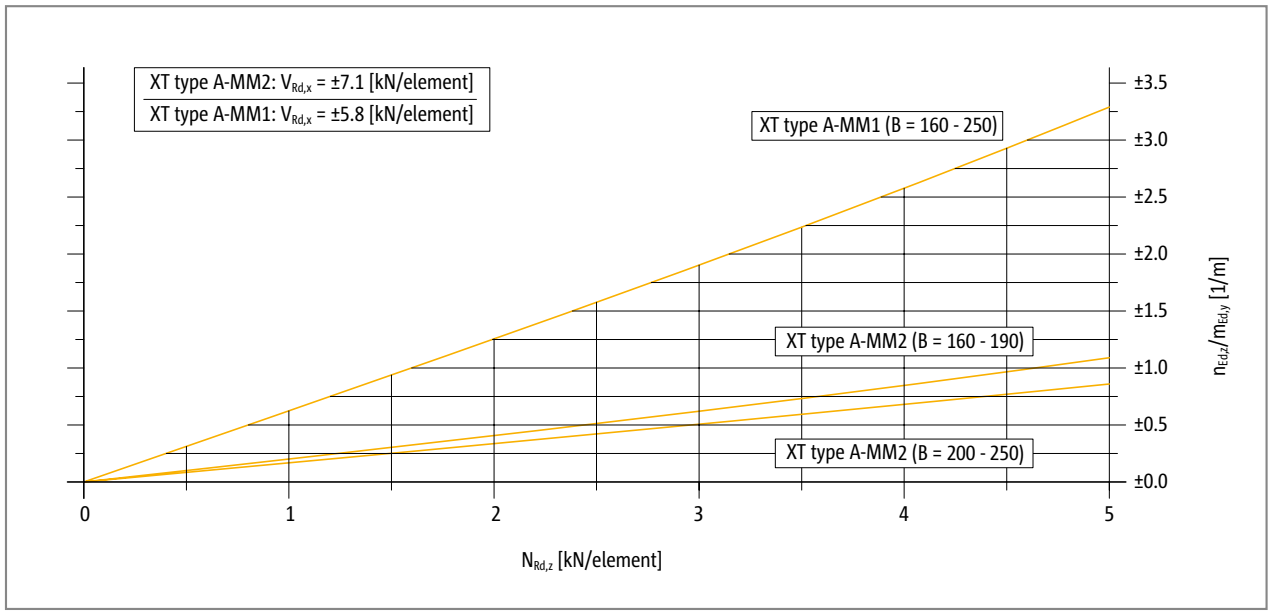
Given:	XT type A-MM2	B = 190 mm
Internal forces per metre connection length		
	$n_{Ed,z}$	= 12.0 kN/m
	$v_{Ed,x}$	= 2.0 kN/m
	$m_{Ed,y}$	=1.5 kNm/m
Determination of $a_{max,1}$		
Input value ①	$n_{Ed,z}/m_{Ed,y}$	= 12.0 [kN/m] / 1.5[kNm/m] = 8.0 [1/m]
Reading ②	$N_{Rd,z}$	= 25.7 kN
	$a_{max,1}$	= 25.7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

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].

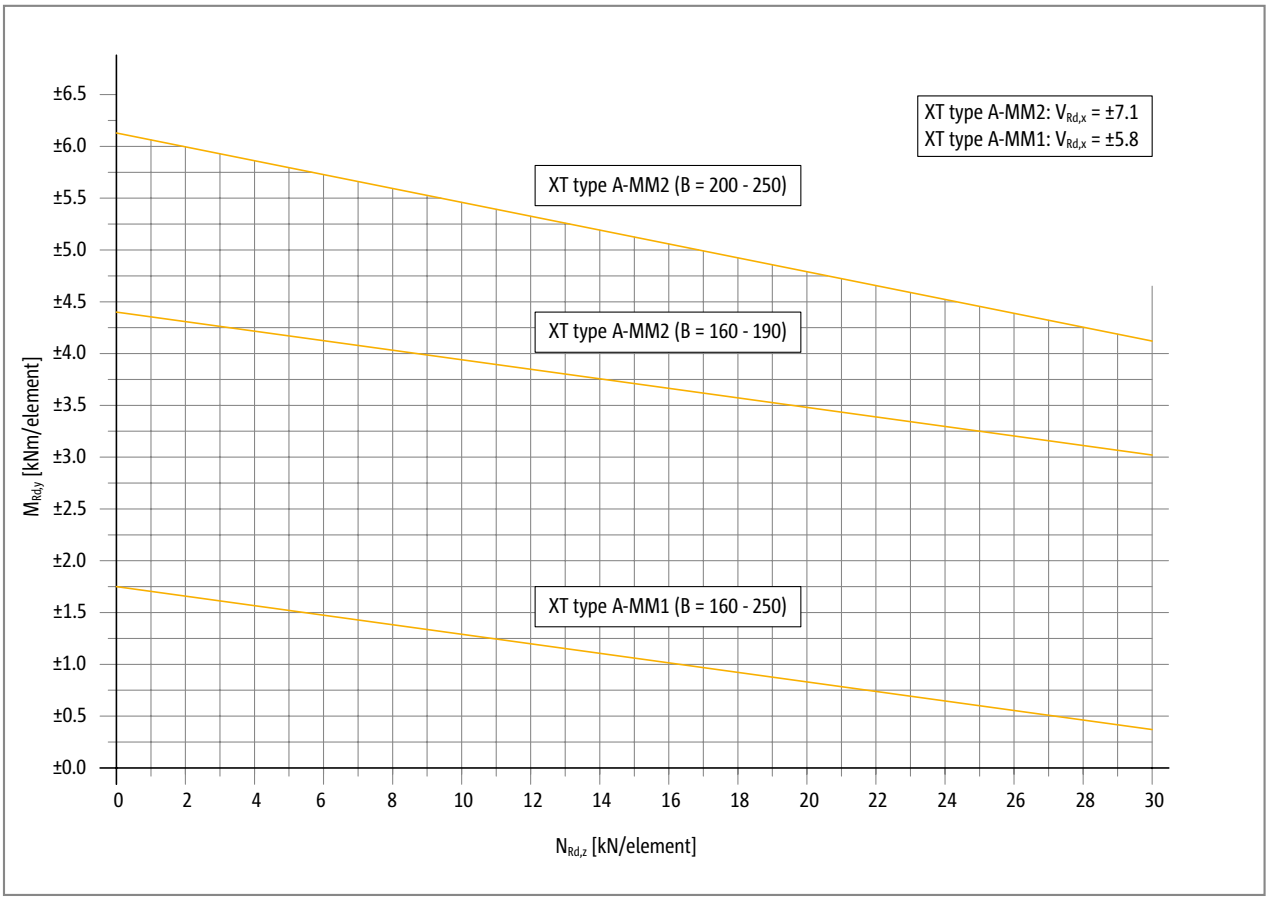
Design variant A: Design table

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.

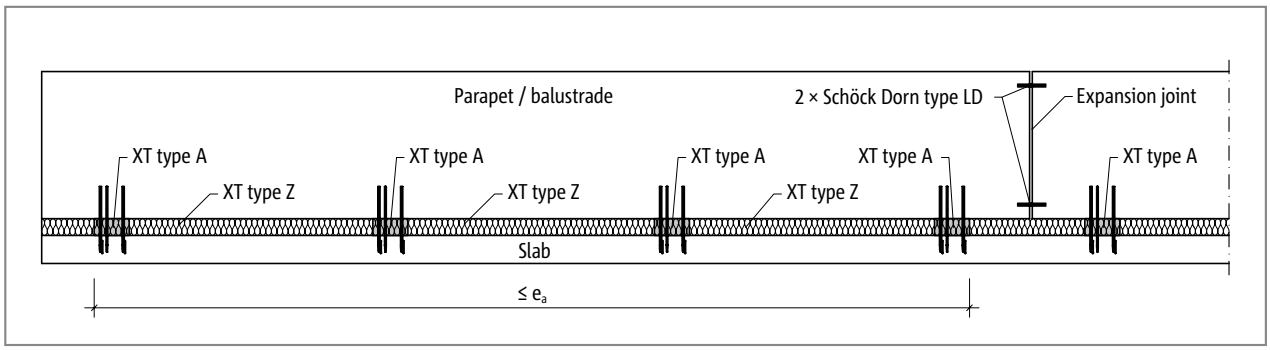


Fig. 221: Schöck Isokorb® XT type A: Expansion joint arrangement

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

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.

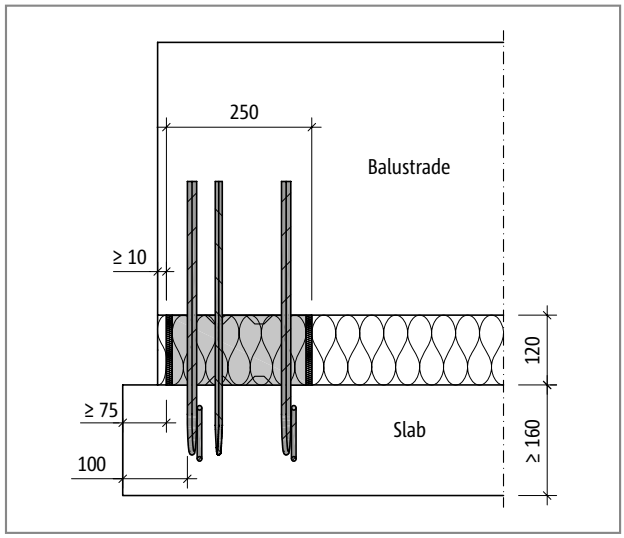


Fig. 222: Schöck Isokorb® XT type A: View edge distances

Edge distances

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

Product description

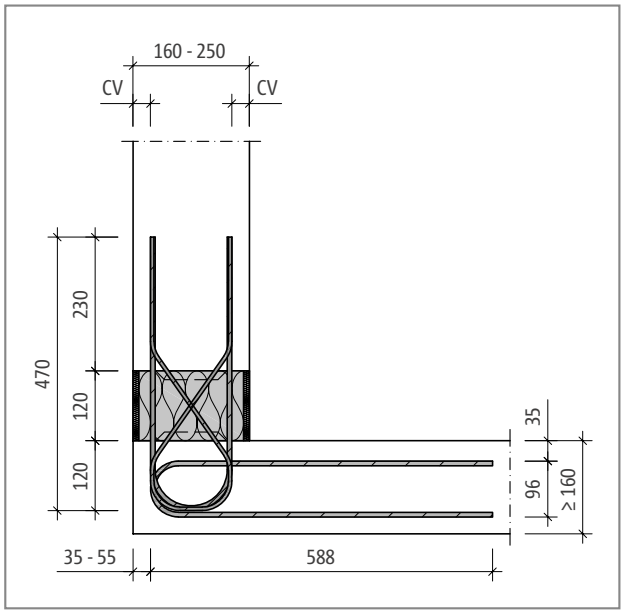


Fig. 223: Schöck Isokorb® XT type A-MM1: Product section

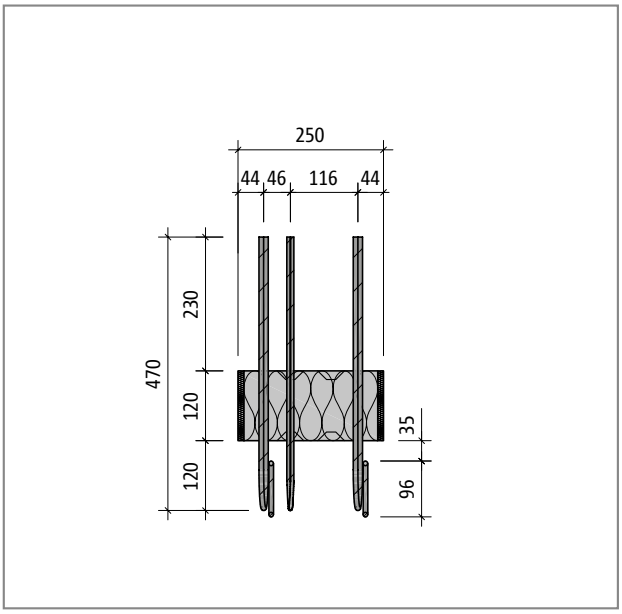


Fig. 224: Schöck Isokorb® XT type A-MM1: Product view

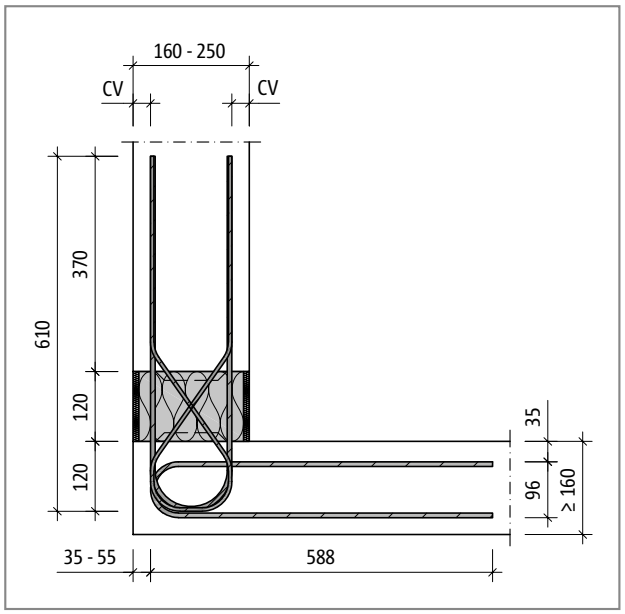


Fig. 225: Schöck Isokorb® XT type A-MM2: Product section

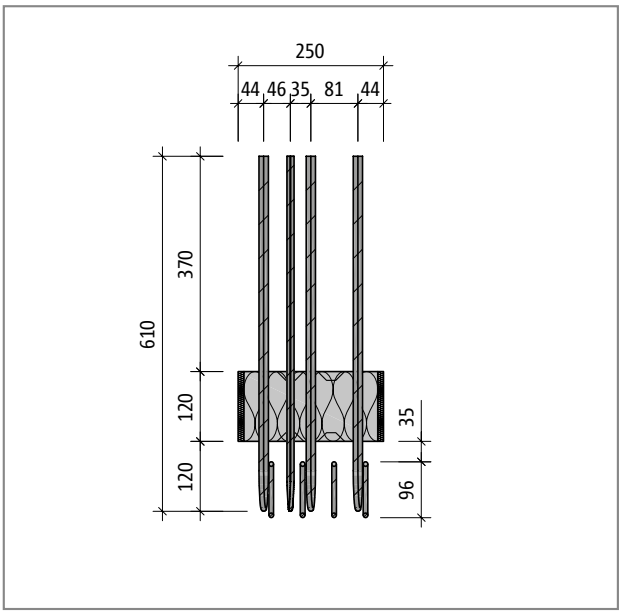


Fig. 226: Schöck Isokorb® XT type A-MM2: Product view

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

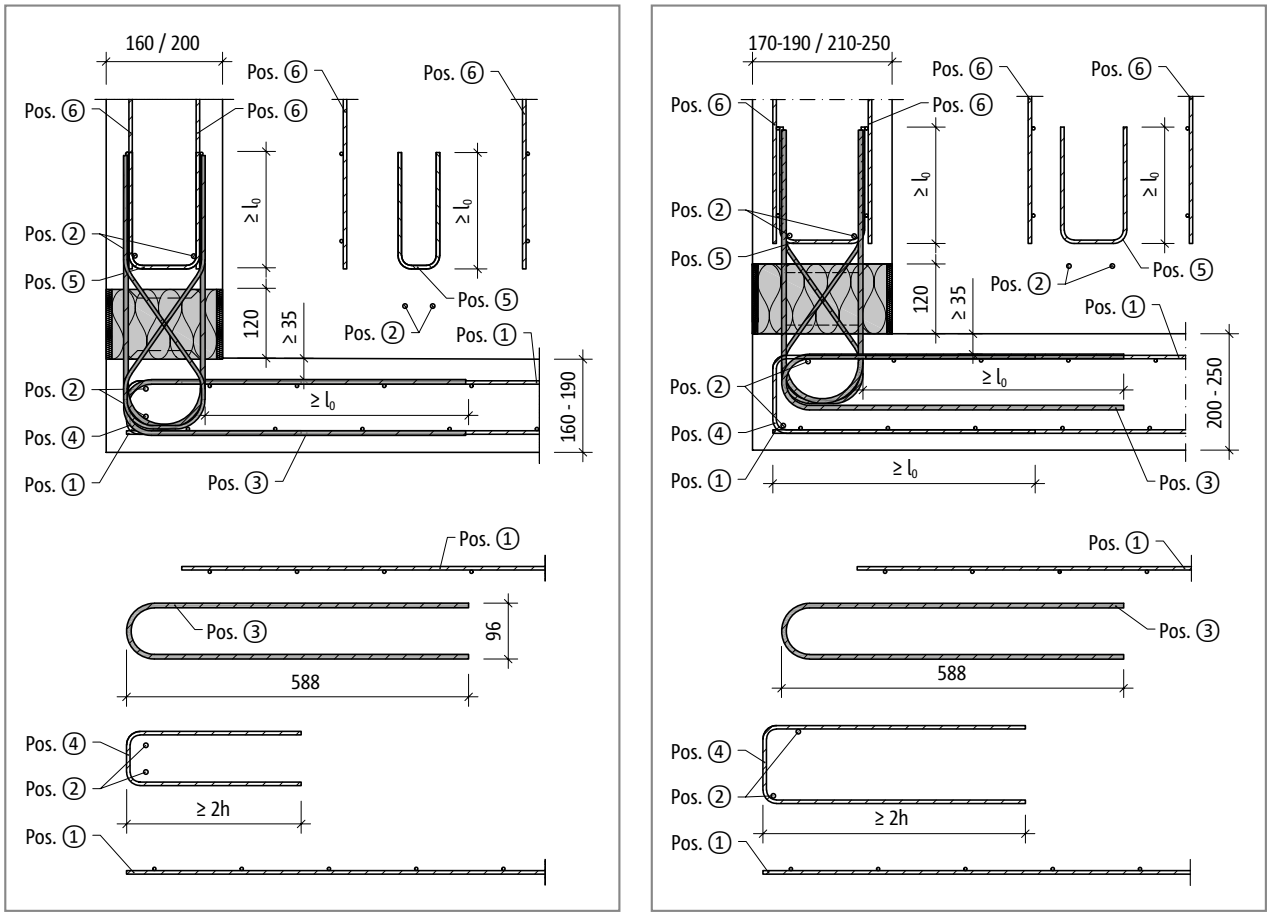


Fig. 227: Schöck Isokorb® XT type A: On-site reinforcement on the inside (B = 160 and B = 200)

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

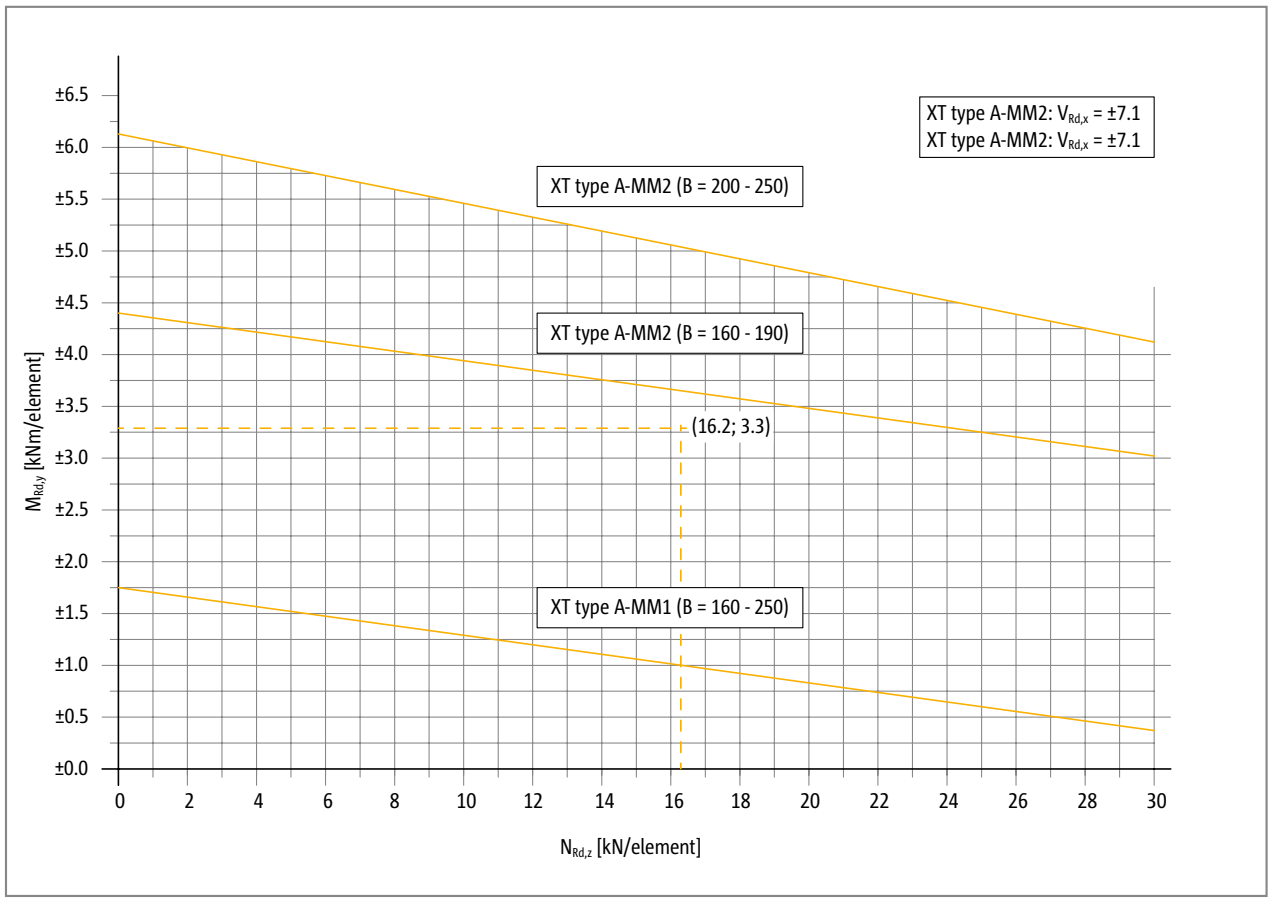
Given:	Concrete floor	C25/30,
	Concrete parapet	C25/30
Parapet	B = 200 mm	
	h_B = 1.00 m	
Loading:		
Self-weight and extension	g_k = 6 kN/m	
Wind	w_k = 0.8 kN/m²	
Beam load	q_k = 1.0 kN/m	
Selected:	Schöck Isokorb® XT type A-MM2 B = 200 mm	
	Spacing a_{prov} = 2.00 m	
Impact per Schöck Isokorb®		
	$N_{Ed,z}$ = $\gamma_G \cdot g_k \cdot a_{prov}$	
	$N_{Ed,z}$ = 1.35 • 6 kN/m • 2.00 m = 16.2 kN	
	$V_{Ed,x}$ = - ($\gamma_Q \cdot w_k \cdot h_B + \gamma_Q \cdot \psi_0 \cdot q_k$) • a_{prov}	
	$V_{Ed,x}$ = - (1.5 • 0.8 kN/m² •1.00 m + 1.5 • 0.7 • 1.0 kN/m) • 2.0 m = - 4.5 kN	
	$M_{Ed,y}$ = ($\gamma_Q \cdot w_k \cdot h^2_B/2 + \gamma_Q \cdot \psi_0 \cdot q_k \cdot h_B$) • a_{prov}	
	$M_{Ed,y}$ = (1.5 • 0.8 kN/m² • 1.0 m²/2 + 1.5 • 0.7 • 1.0 kN/m • 1.0 m) • 2.0 m = 3.3 kNm	
Note:	For the verification with selected or 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	$M_{Rd,y}$	≤ 6.13 - 0.066 • $N_{Ed,z}$
	$M_{Rd,y}$	≤ 6.13 - 0.066 • 16.2 kN = 5.1 kNm
	⇒	$M_{Ed,y}$ = 3.3 kNm ≤ $M_{Rd,y}$ = 5.1 kNm → NW o.k. ✓
Shear force load-bearing capacity		$V_{Rd,x}$ = - 7.1 kN
	⇒	$V_{Ed,x}$ = -4.5 kN ≤ $V_{Rd,x}$ = - 7.1 kN → NW o.k. ✓
Note:	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

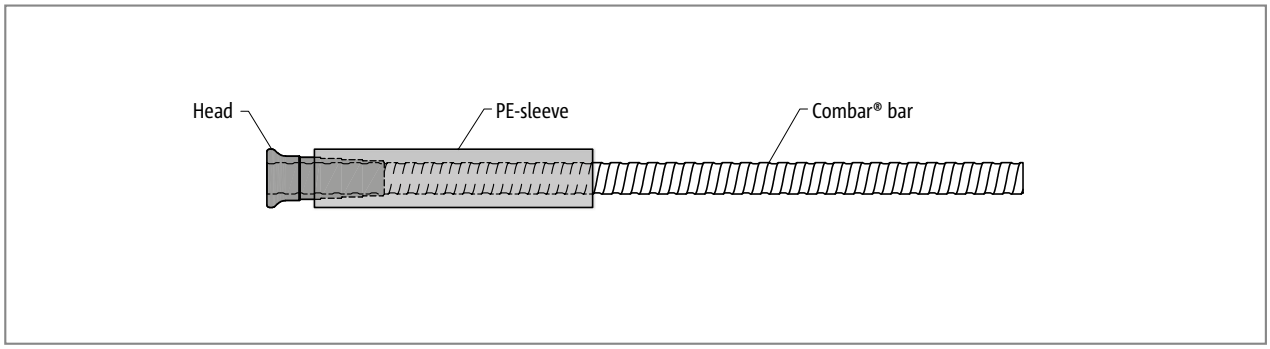


Fig. 228: Schöck Combar® FT erection support: Combar® single-headed bar with sleeve

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

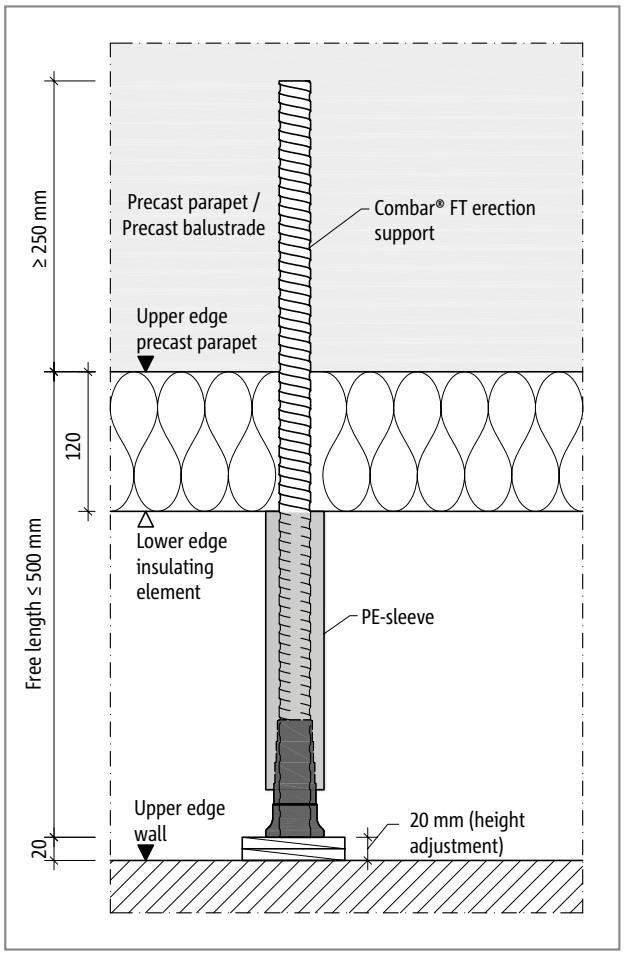


Fig. 229: Schöck Combar® FT erection support: planning dimensions

Schöck Combar® FT erection support

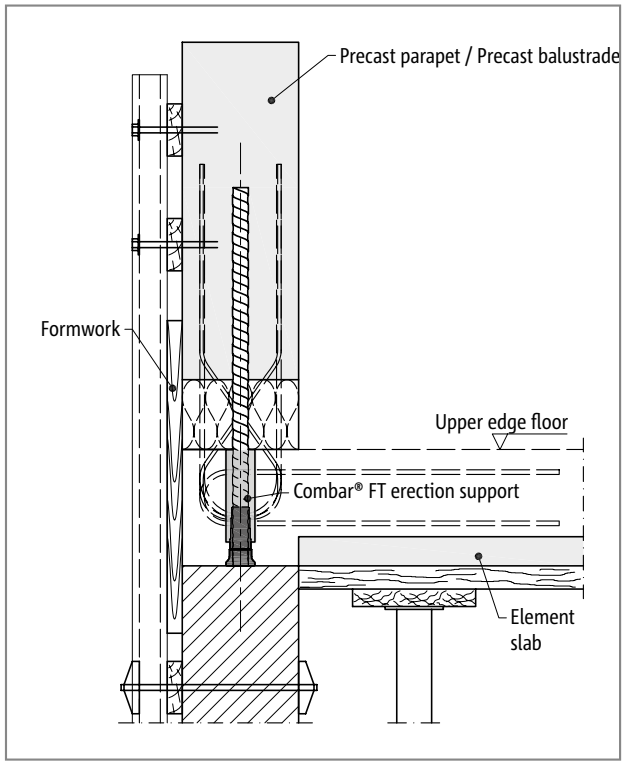


Fig. 230: Schöck Combar® FT erection support: Installation in a precast concrete parapet; section

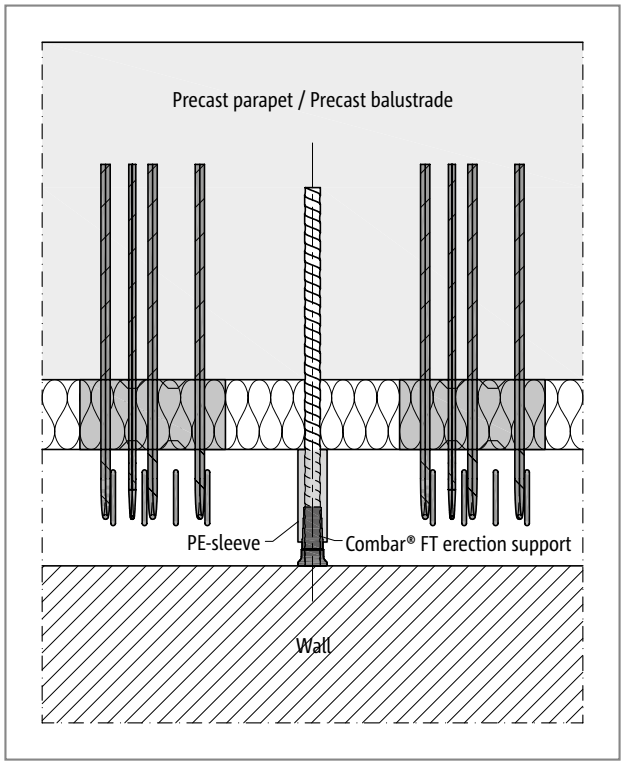


Fig. 231: Schöck Combar® FT erection support: Installation in a precast concrete parapet; view

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

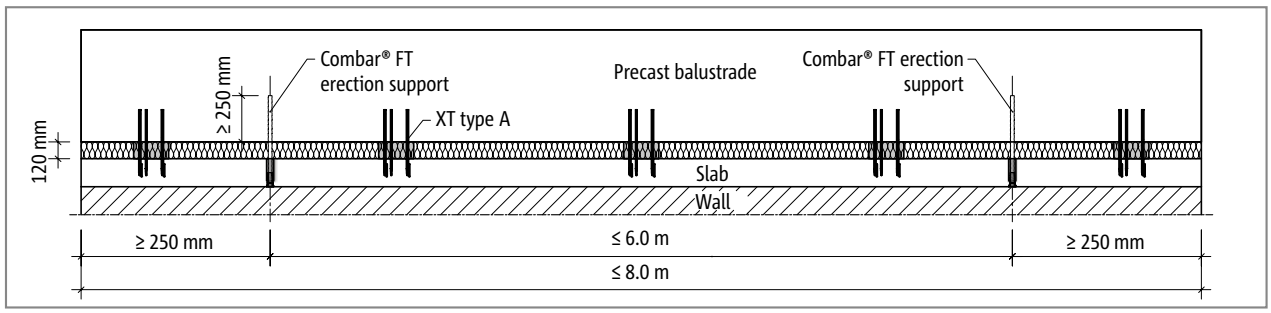


Fig. 232: Schöck Isokorb® XT type A with Combar® FT erection support: Edge distance and minimum bond length in the prefabricated parapet

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

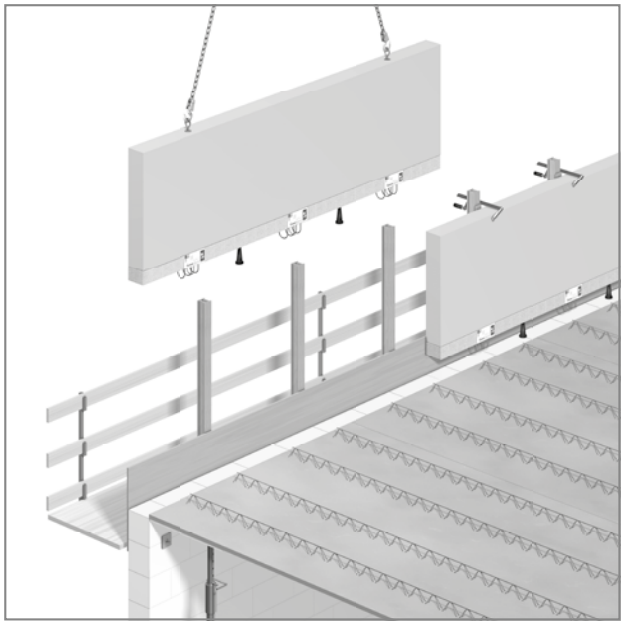


Fig. 233: Schöck Isokorb® XT type A with Combar® FT erection support: Hoisting of the prefabricated attic

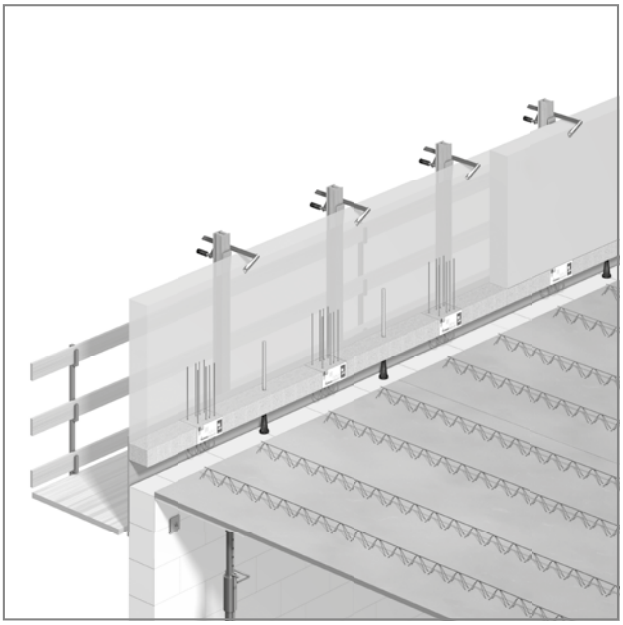


Fig. 234: Schöck Isokorb® XT type A with Combar® FT erection support: Securing of the aligned precast concrete parapet

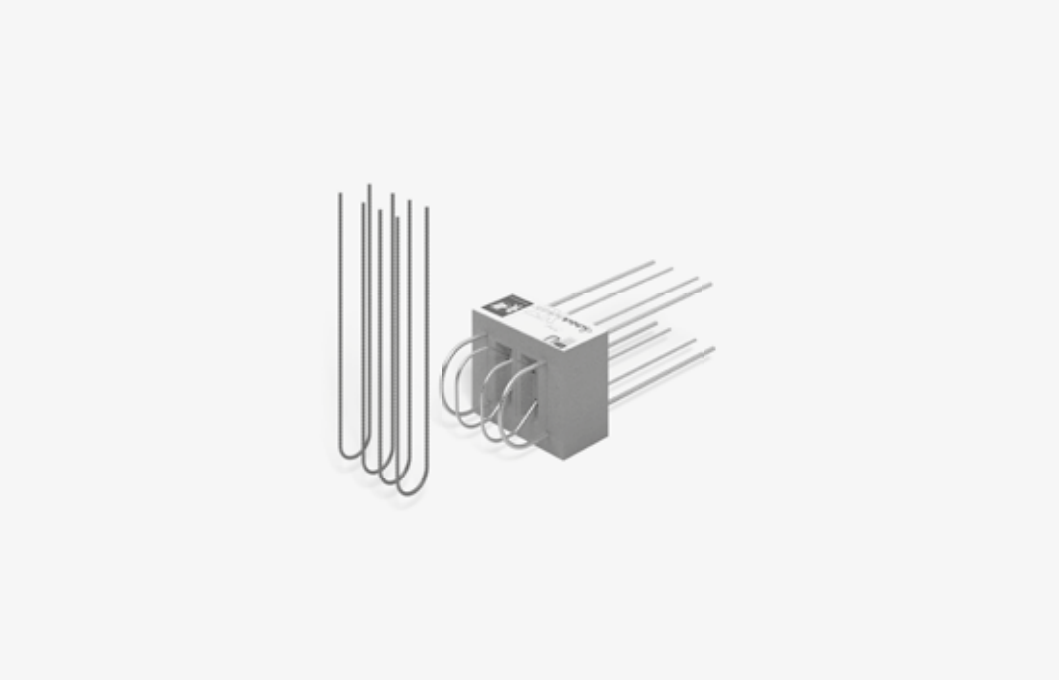
Installation

- 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?

Schöck Isokorb® XT type F



Schöck Isokorb® XT type F
Suitable for frontally attached balustrades. It transfers normal forces, positive and negative moments and shear forces.

Element arrangement | Installation cross sections

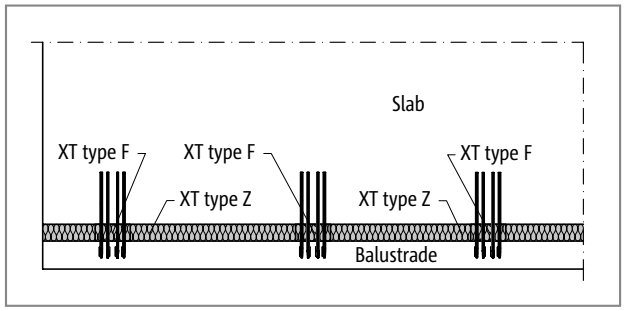


Fig. 235: Schöck Isokorb® XT type F, Z: Frontally attached balustrades

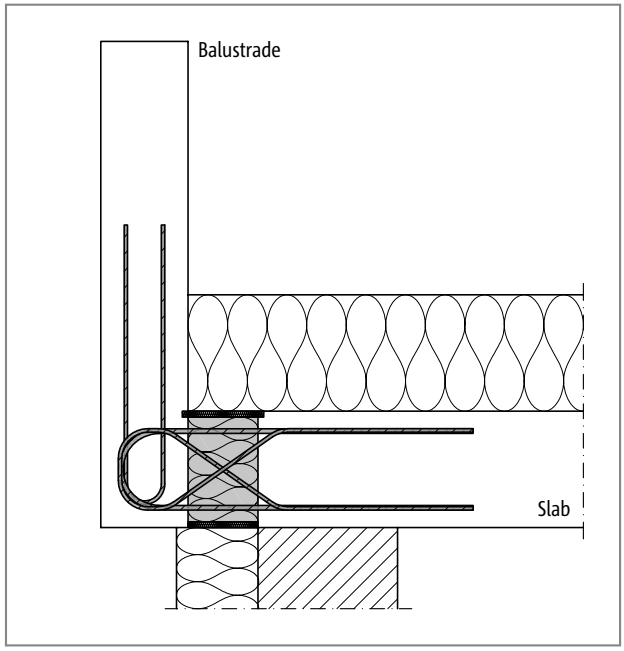


Fig. 236: Schöck Isokorb® XT type F: Connection of a frontally attached balustrade with thermal insulation composite system (TICS))

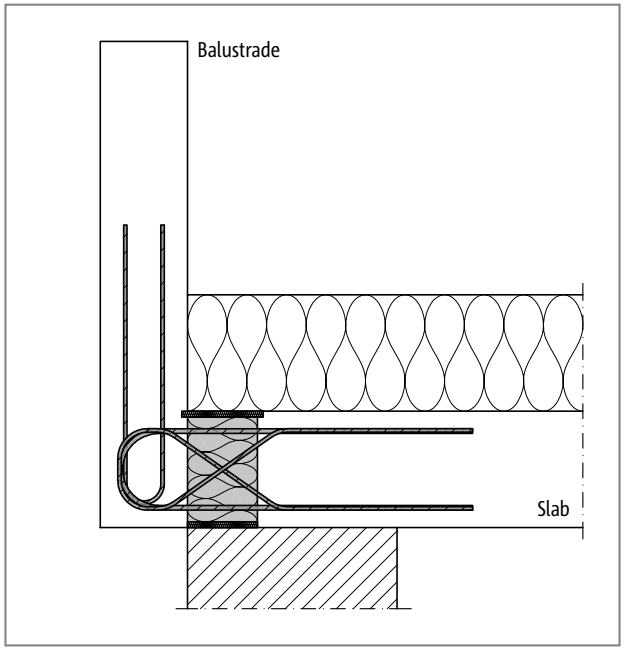


Fig. 237: Schöck Isokorb® XT type F: Connection of a frontally attached balustrade with thermal insulating masonry

Element arangement/installation cross-section

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

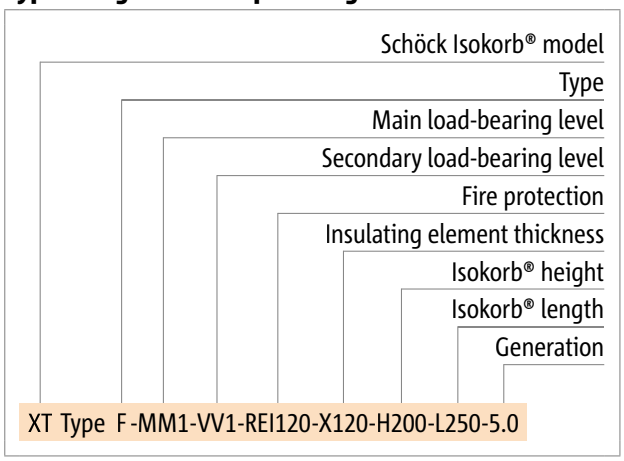
Product selection | Type designations | Special designs

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 - 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.

Design force direction

Direction of forces

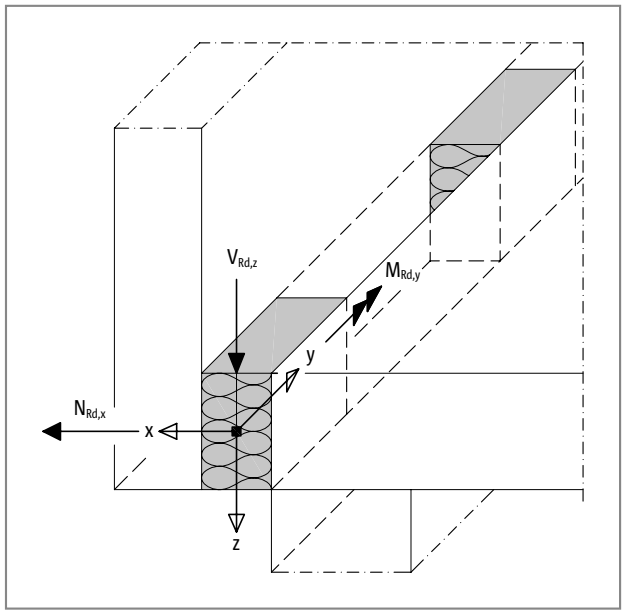


Fig. 238: Schöck Isokorb® XT type F: Sign convention for the design

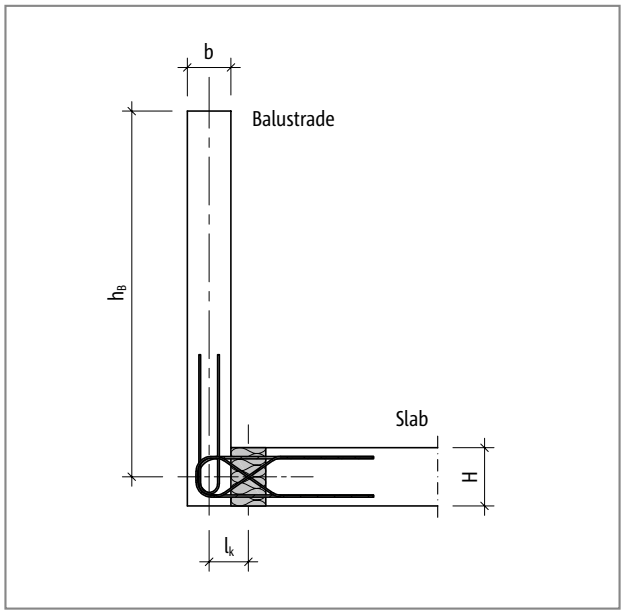


Fig. 239: Schöck Isokorb® XT type F: Static system

Determination of spacing

Determination of the maximum centre-to-centre distance

The maximum spacing a_{max} of several Schöck Isokorb® XT type F depends on the imoments $m_{Ed,y}$, normal forces $n_{Ed,x}$ and shear forces vEd,z. It can be determined with the aid of the following described procedure.
Verification is achieved if the selected separation a_{prov} is ≤ a_{max} = min ($a_{max,1}$; $a_{max,2}$). Then there is no further verification necessary.

Procedure:

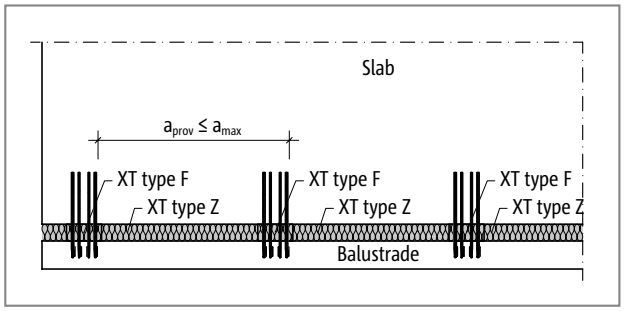
Determination of $a_{max,1}$ (diagram)

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

- Determination of the impacting moments $m_{Ed,y}$ and normal forces $n_{Ed,x}$
- Calculation of the ration $n_{Ed,x}/m_{Ed,y}$
- Read up the righthand axisfor n/musing the calculated ratio ①(with negative normal force left, with positive normal force right)
- Draw horizontal line up to intersection point using the graphs (Take note of Schöck Isokorb® type and height)
- Draw vertical line in the intersection point and read $N_{Rd,x}$ (intersection 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 spacing $a_{max,2}$ of several Schöck Isokorb® XT type F depending on the impacting shear force is determined through the ratio $a_{max,2} = V_{Rd,z}/v_{Ed,z}$.



Determination of spacing

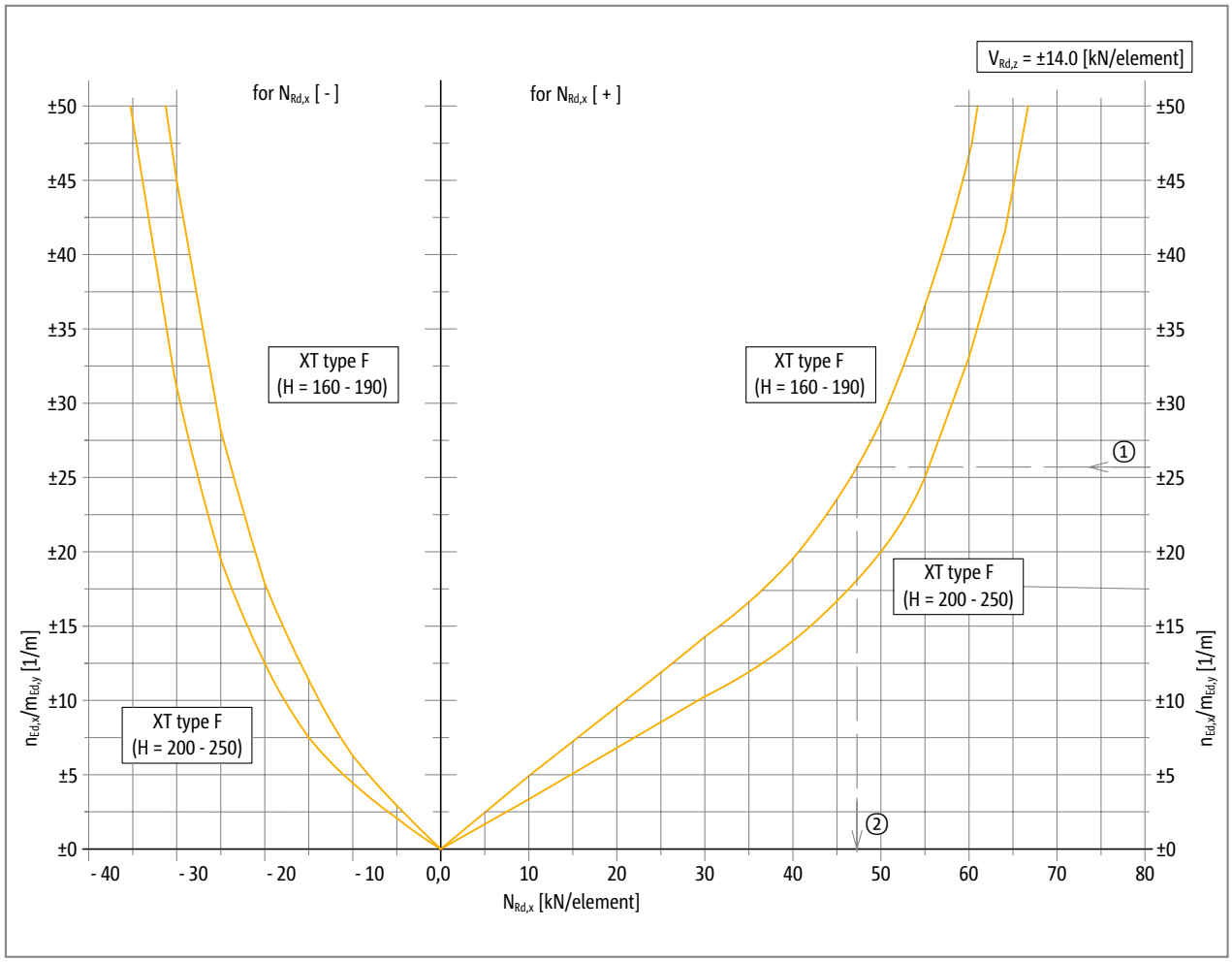
- For $n_{ed,z}$ = 0 or $m_{ed,y}$ = 0, use design variants A, B, or C.

Design example

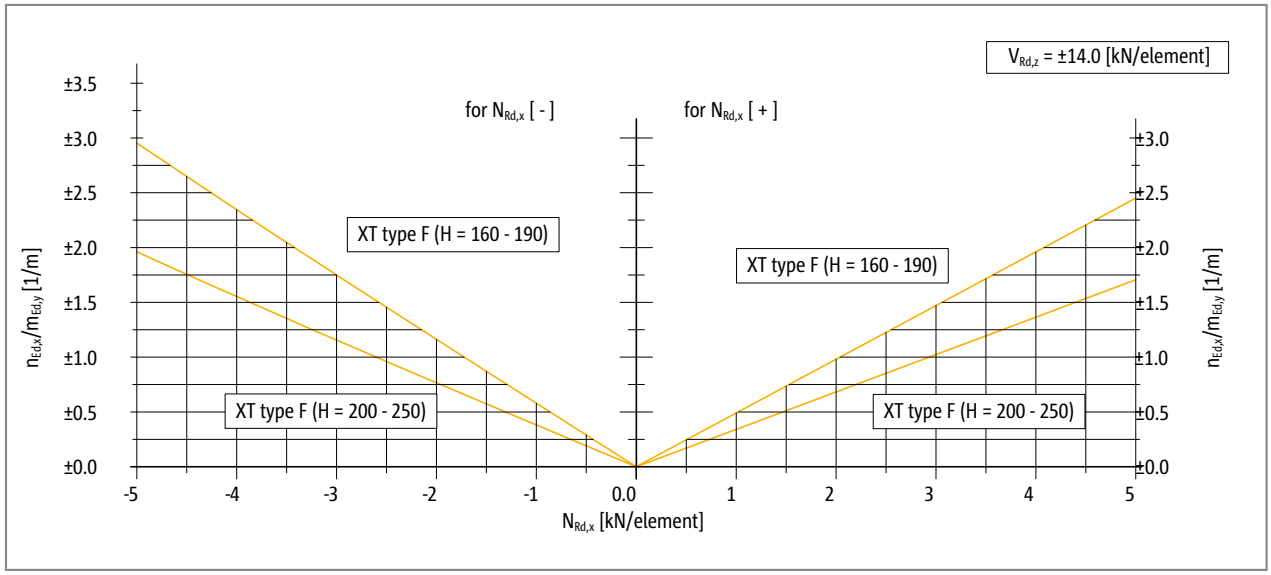
- Numerical example for the determination of the spacing see XT type A page 156.

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].

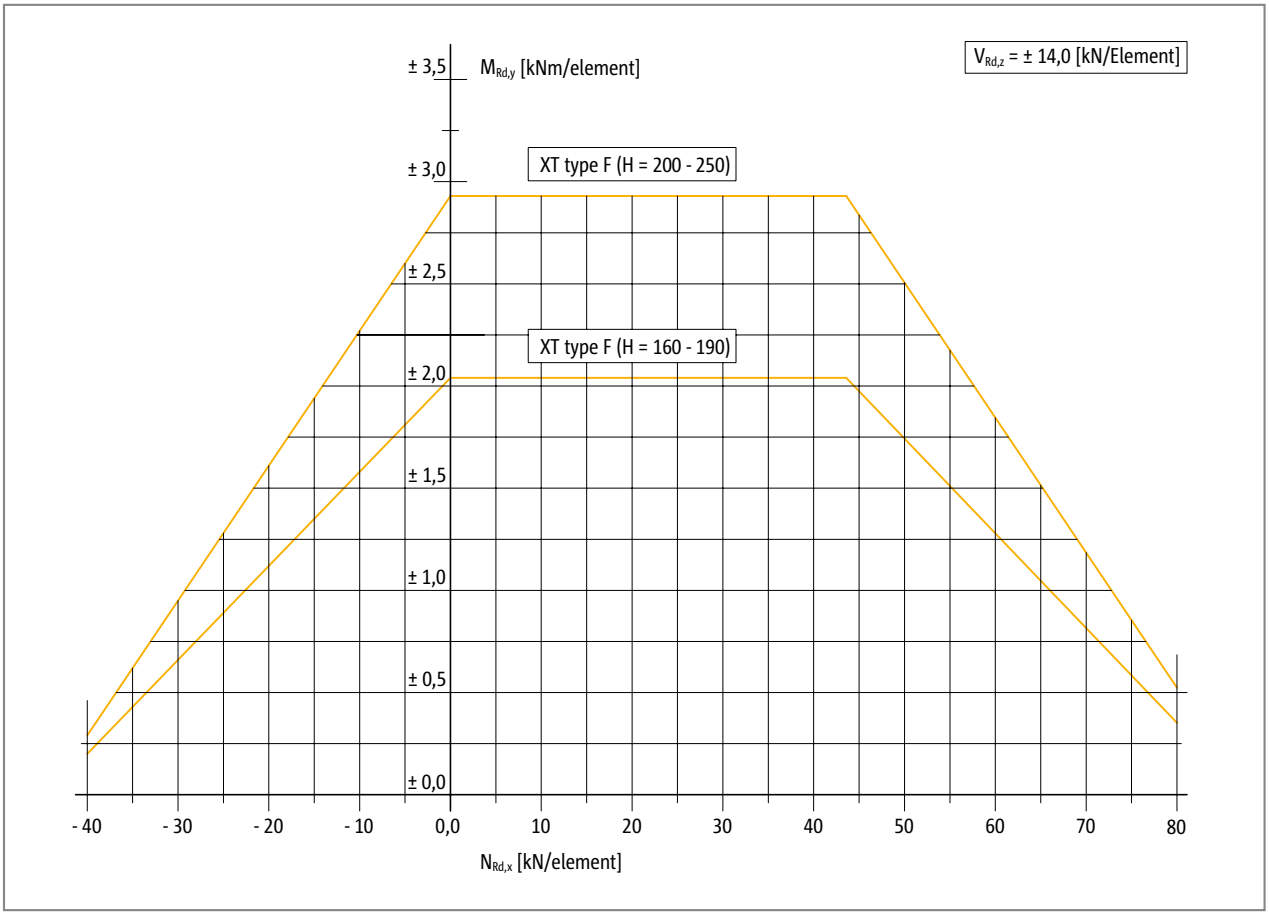
Design variant A: Design table

Schöck Isokorb® XT type F		MM1	
Design values with		Floor (XC1) concrete strength class ≥ C25/30 Balustrade (XC4) 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]	
	160 - 250	±14.0	

Schöck Isokorb® XT type F	MM1
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		Floor (XC1) concrete strength class ≥ C25/30 Balustrade (XC4) 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 156.

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 Dorn.

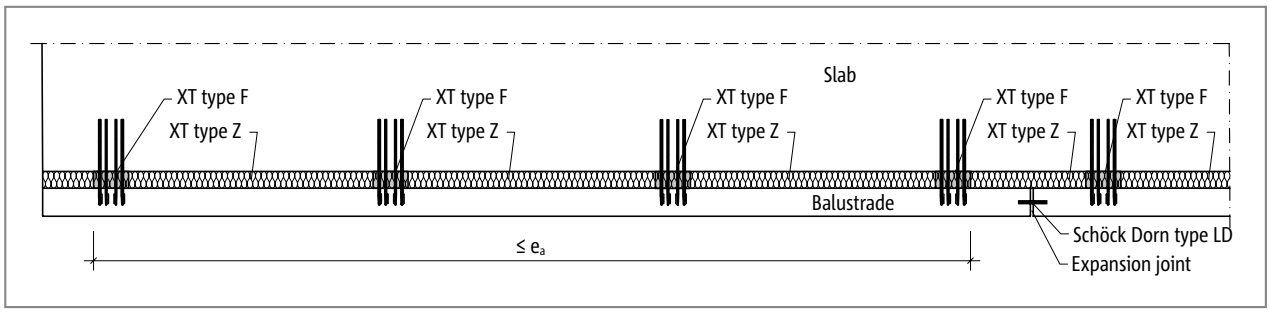


Fig. 240: Schöck Isokorb® XT type F: Expansion joint arrangement

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

Edge distances

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

- For the distance of the insulation member from the edge of the 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: $e_R \geq 75$ 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.

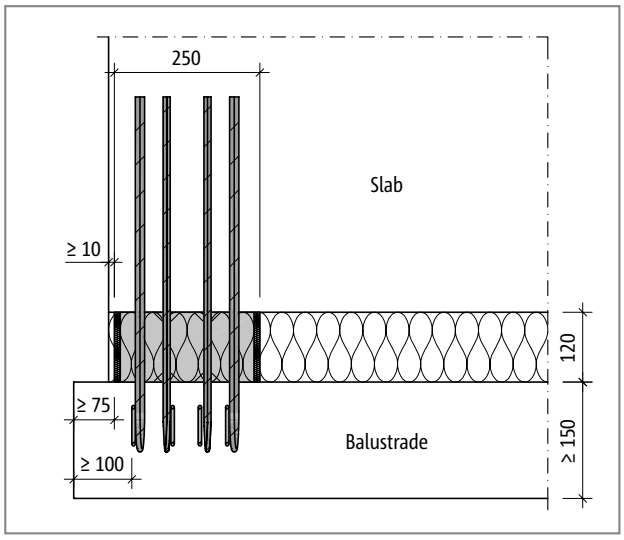


Fig. 241: Schöck Isokorb® XT type F: Top view edge distances

Product description | Concrete cover

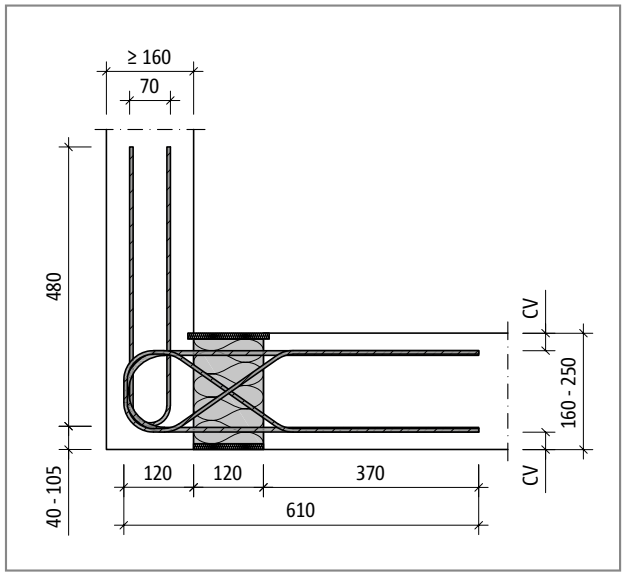


Fig. 242: Schöck Isokorb® XT type F: Product section

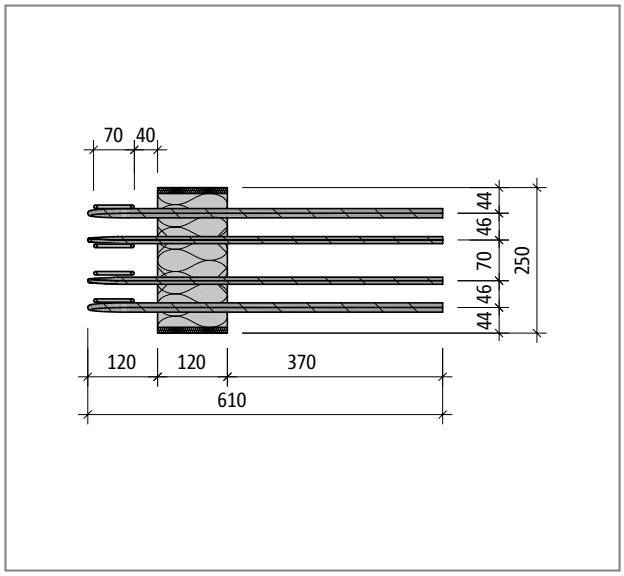


Fig. 243: Schöck Isokorb® XT type F: Product plan view

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 www.schoeck.co.uk/download

Concrete cover

The concrete cover CV of the Schöck Isokorb® XT type F varies depending on the floor height. As only stainless, ribbed reinforcing steels are used for the reinforcement of the parapet/balustrade in the area of the Schöck Isokorb® there is no risk of corrosion. Therefore, even 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 the reinforcing steel connection stirrups supplied ex works, the concrete cover c_v in the floor slab is to be selected dependent 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

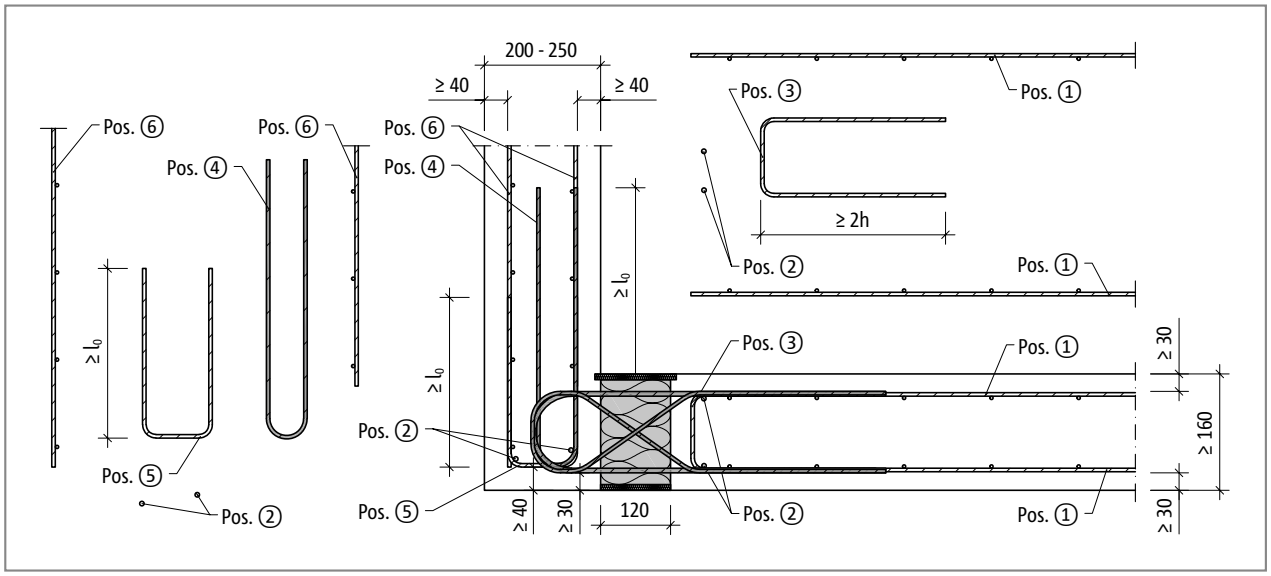


Fig. 244: Schöck Isokorb® XT type F: On-site reinforcement with parapet/balustrade width b = 200 - 250; on-site reinforcement b = 160 - 190 such as b = 200 - 250 without Pos. 5

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

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 F		MM1
On-site reinforcement	Location	Concrete strength class ≥ C25/30
Pos. 1 Lapping reinforcement		
Pos. 1 [mm²/Element]	Floor side	100
Lap length l_0 [mm]	Floor side	332
Pos. 2 Steel bars along the insulation joint		
Pos. 2	floor side/balustrade side	4 • H8
Pos. 5 Stirrup as suspension reinforcement		
Pos. 3	Floor side	H8@250
Pos. 3 Factory supplied connection stirrup		
Pos. 4	balustrade side	4 • H8
Pos. 5 Structural edging (dispensed with for b = 160 - 190 mm)		
Pos. 5	balustrade side	H8@200
Lap length l_0 [mm]	balustrade side	340
Pos. 6 Lapping reinforcement		
Pos. 6 [mm²/Element]	balustrade side	113
Lap length l_0 [mm]	balustrade side	340

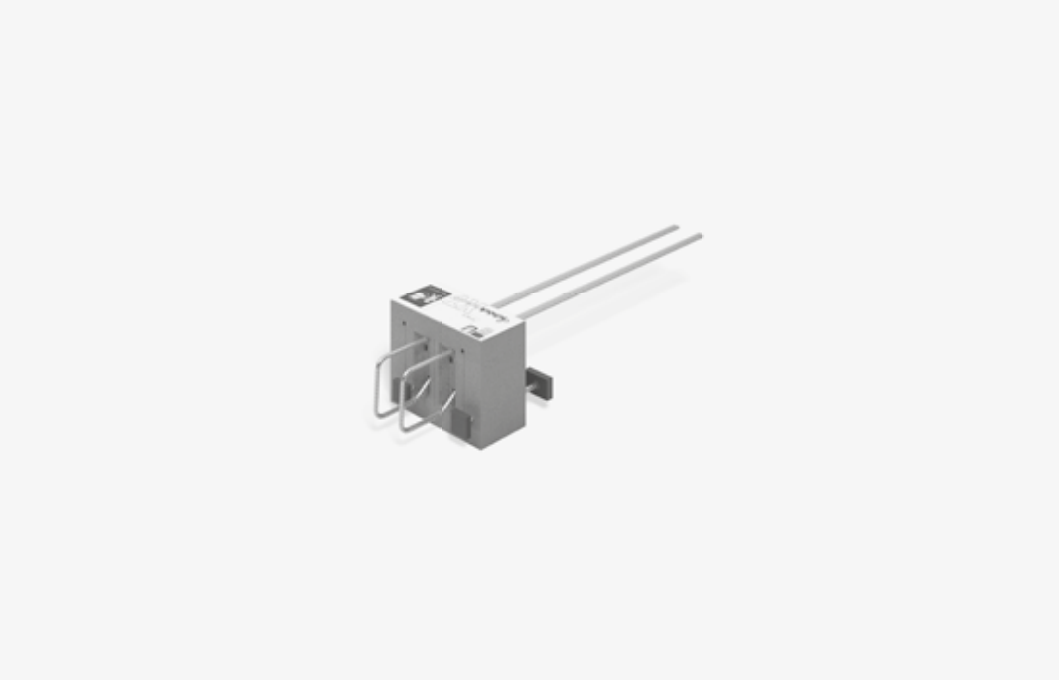
Information about on-site reinforcement

- 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.
- 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.

Check list

- ☐ Have the loads on the Schöck Isokorb® connection been specified at design level?
- ☐ Have the concrete cover and the appropriate concrete grade been taken into consideration according to the building regulations?
- ☐ 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?

Schöck Isokorb® XT type O



Schöck Isokorb® XT type O
Suitable for corbels. It transmits positive shear forces and normal forces.

Element arrangement | Installation cross sections

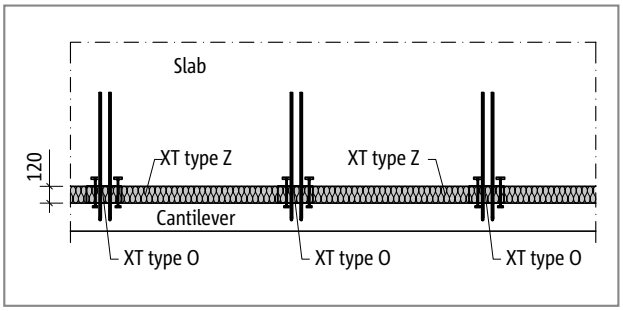


Fig. 245: Schöck Isokorb® XT type O, Z: Corbel

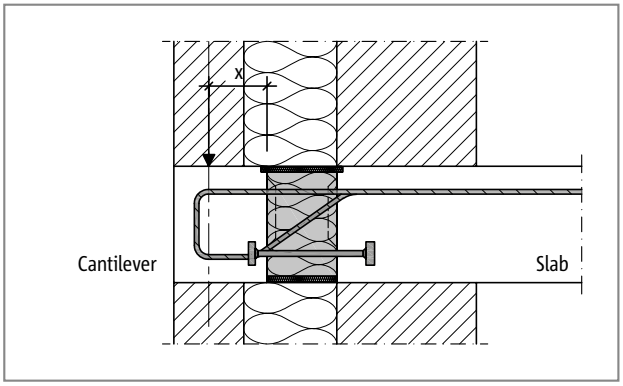


Fig. 246: Schöck Isokorb® XT type O: Corbel with faced masonry

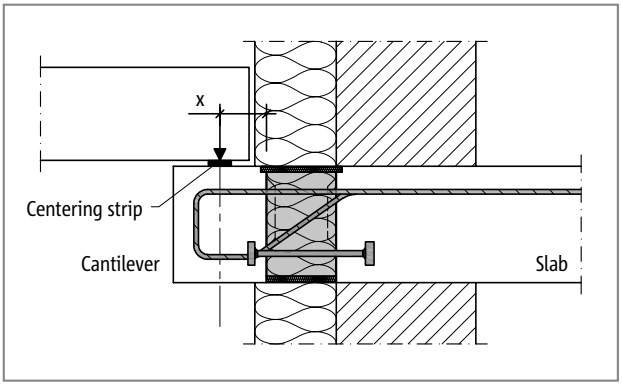


Fig. 247: Schöck Isokorb® XT type O: Connection of a console as floor support; centring battens prevent a displacement of the load application point

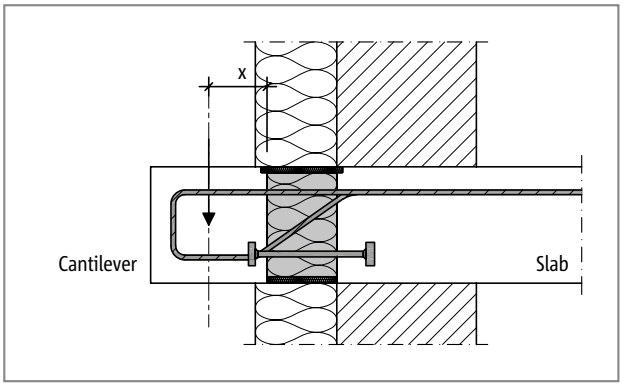


Fig. 248: Schöck Isokorb® XT type O: circumferential cornice

Element arangement/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.
- For surrounding cornices larger cantilever depths are also available to maintain the specific edge conditions.

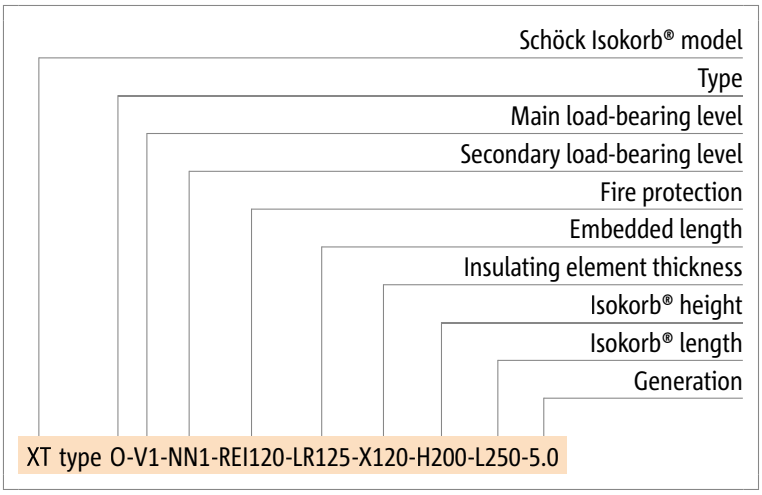
Product selection | Type designations | Special designs

Schöck Isokorb® XT type O variants

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

- Corbele depths:
  LR125: Corbel depth 160 mm (CV35) and 155 mm (CV30)
  LR165: Corbel depth 200 mm (CV35) and 195 mm (CV30)
- Main load-bearing level:
  V1
- Secondary load-bearing level:
  NN1
- Fire resistance class:
  REI120 (standard): Top and bottom fire protection projecting by 10mm on both sides
- Bond length: LR
- Insulating element depth:
  X120 = 120 mm
- Isokorb® height:
  H = 180 - 250 mm
- Isokorb® height:
  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.

C25/30 design

Schöck Isokorb® XT type O		LR125	LR165
Design values with		Balcony-side concrete strength class ≥ C25/30 Floor-side concrete strength class ≥ C25/30	
		$V_{Rd,z}$ [kN/element]	
Position of the load application point [mm]	60 - 75	25.1	25.1
	85	24.2	24.2
	95	23.1	23.1
	105	22.2	22.2
	115		21.3
	125		20.5
	135		19.8
	145		19.1
		$N_{Rd,x}$ [kN/Element]	
		≤ ±1/10 $V_{Ed,z}$	≤ ±1/10 $V_{Ed,z}$

Schöck Isokorb® XT type O	LR125	LR165
Isokorb® length [mm]	250	250
Tension/compression bars	2 ⌀ 8	2 ⌀ 8
Pressure bearing (piece)	2 ⌀ 10	2 ⌀ 10
Maximum distance x_{max} [mm]	105	145
Minimum height floor H_{min} [mm]	180	180

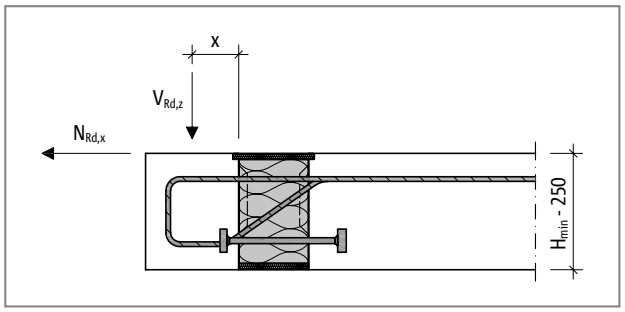


Fig. 249: Schöck Isokorb® XT type O: Distance of the load application point x (load distance point)

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).
- The allowable normal force $N_{Rd,x}$ is dependent on the actual effective shear force $V_{Ed,z}$
- The indicative minimum concrete strength class of the external structural component is C32/40.

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 Dorn.

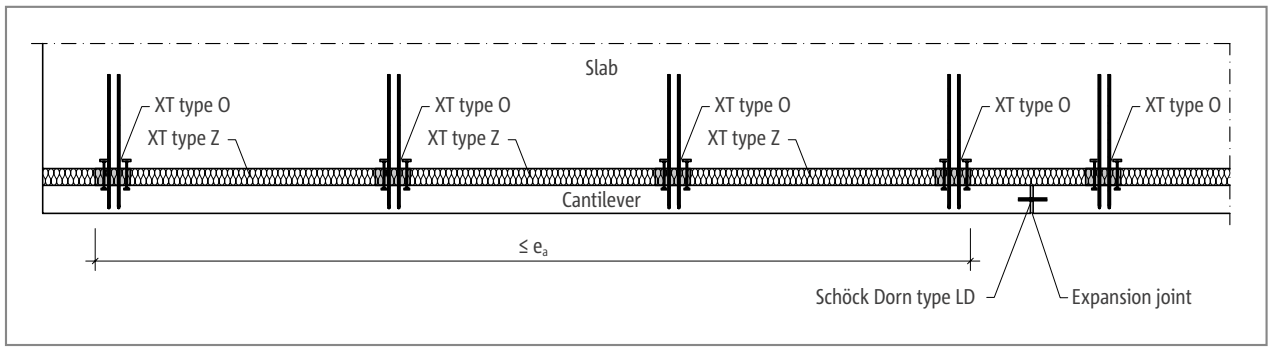


Fig. 250: Schöck Isokorb® XT type O: Expansion joint arrangement

Schöck Isokorb® XT type O		LR125, LR165
Spacing		e_a [m]
Insulating element thickness [mm]	120	21.7

Edge distances

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

- The distance of the insulation member from the edge of the structural component or of the expansion joint: $e_R \geq 30$ mm applies.

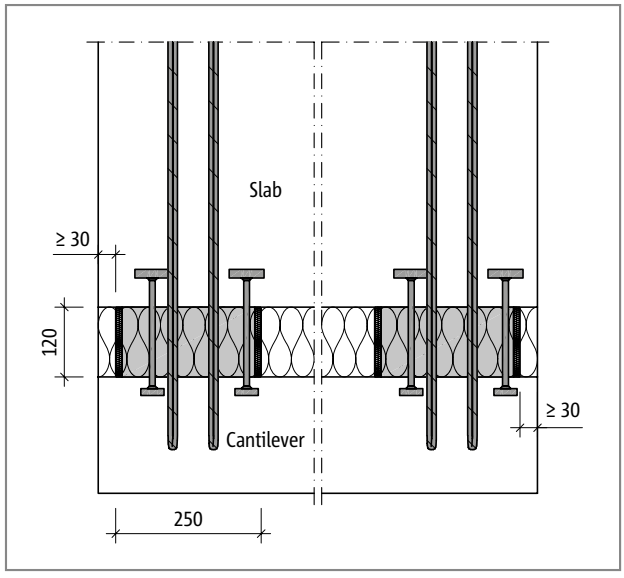


Fig. 251: Schöck Isokorb® XT type O: Edge distances to be observed

Product description | Concrete cover

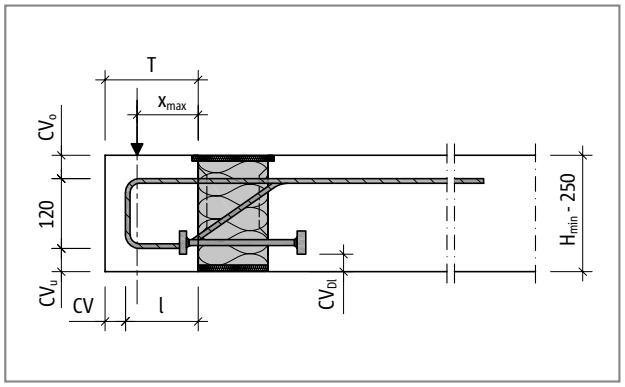


Fig. 252: Schöck Isokorb® XT type O: Product section

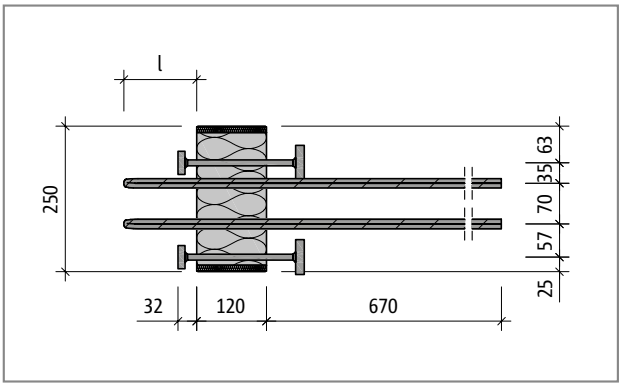


Fig. 253: Schöck Isokorb® XT type O: Product plan view

Schöck Isokorb® XT type O	LR125	LR165
Isokorb® length [mm]	250	250
Loop length l [mm]	125	165
Maximum distance x_{max} [mm]	105	145
Cantilever depth T (CV30) [mm]	155	195
Cantilever depth T (CV35) [mm]	160	200
Minimum height floor H_{min} [mm]	180	180

Concrete cover

The concrete cover CV_o, CV_u and CV_{Dl} of the Schöck Isokorb® XT type O vary depending on the floor height. As only stainless, ribbed reinforcing steels are used for the reinforcement of the crbel in the area of the Schöck Isokorb®, there is no risk of corrosion. Therefore, even with an exposure class XC4 a concrete cover in the area of the Schöck Isokorb® XT type O of CV = 30 mm is sufficient.

Schöck Isokorb® XT type O		LR125, LR165		
Concrete cover with		CV_o	CV_u	CV_{Dl}
Isokorb® height H [mm]	180	30	30	30
	190	35	35	35
	200	40	40	30
	210	45	45	35
	220	50	50	40
	230	50	60	50
	240	50	70	60
	250	50	80	70

Product information

- Download further product plan views and cross-sections at www.schoeck.co.uk/download

On-site reinforcement

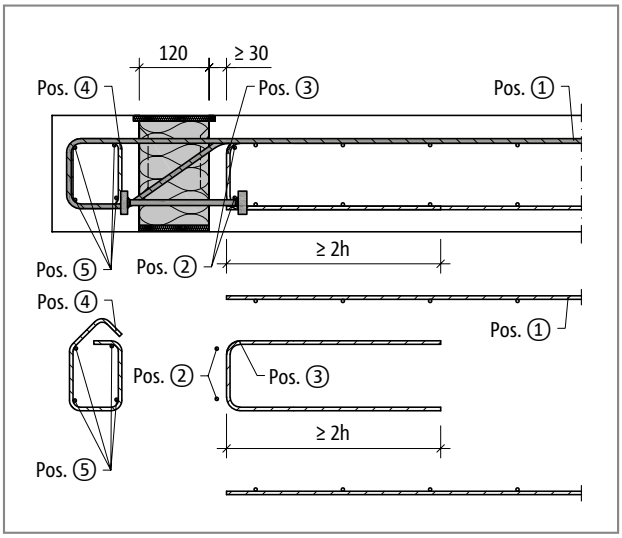


Fig. 254: Schöck Isokorb® XT type O: On-site reinforcement

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.

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 O		LR125, LR165
On-site reinforcement	Location	Concrete strength class ≥ C25/30
Pos. 1 Lapping reinforcement		
Pos. 1 [mm²/Element]	Floor side	200
Lap length l_0 [mm]	Floor side	640
Pos. 2 Steel bars along the insulation joint		
Pos. 2	Floor side	2 • H8
Pos. 5 Stirrup as suspension reinforcement		
Pos. 3	Floor side	H8@250
Pos. 4 Stirrup		
Pos. 4	Cantilever side	5 • H8
Pos. 5 Steel bar along the insulation joint		
Pos. 5	Cantilever side	4 • H8 or acc. to static requirements

Information about on-site reinforcement

- Alternative connection reinforcements are possible. The rules according to 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 V_{Ed}/V_{Rd} is permitted.
- The indicative minimum concrete strength class of the external structural component is C32/40.

Design example

Wall structure design example

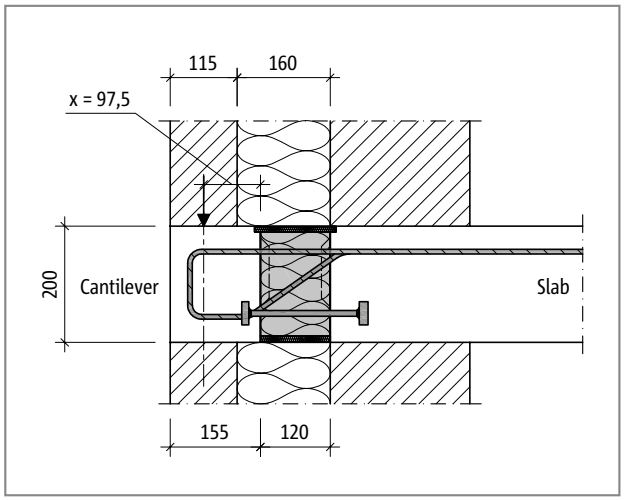


Fig. 255: Schöck Isokorb® XT type O: Wall construction for design example

Design example

Given:	Console side concrete	C25/30
	Floor side concrete	C25/30
	Total length of the console	l = 15.00 m
	Height of the outer masonry shell: h_{MW} = 2.50 m	
	Thickness of the outer masonry shell: d_{MW} = 11.5 cm	
	Thickness of the insulation material: d_D = 16 cm	
	Height of the console resp. thickness of floor: $h_{Concrete}$ = 20 cm	
	Wind load	$n_{Ed,x}$ = 1.0 kN/m²
	(height to be taken into account for the wind load: h_{Wind} = 0.60 m)	
	Specific weight concrete	$\gamma_{Concrete}$ = 25.00 kN/m³,
	Specific weight masonry	γ_{MW} = 22.00 kN/m³

Sought: Required number Schöck Isokorb® XT type O related to the overall length of the console.

Shear force:

$V_{Ed,z,ges.} = \gamma_G \cdot l \cdot (\gamma_{MW} \cdot h_{MW} \cdot d_{MW} + \gamma_{Concrete} \cdot h_{Concrete} \cdot T_{Consol})$
$= 1.35 \cdot 15.00\ m \cdot (22.00\ [kN/m^3] \cdot 2.50\ m \cdot 0.115\ m + 25.00\ [kN/m^3] \cdot 0.20\ m \cdot 0.155\ m)$
$= 143.8\ kN$

$N_{Ed,x,ges.} = \gamma_Q \cdot l \cdot n_{Ed,x} \cdot h_{Wind} = 1.5 \cdot 15.00\ m \cdot 1.0\ [kN/m^2] \cdot 0.60\ m = 13.5\ kN$

Note: XT type O-LR165 is selected, based on the console depth T.

Design table:

$x = 160\ mm + 115\ mm/2 - 120\ mm = 97.5\ mm$, d.h. $x < 105\ mm$.

$V_{Rd,z} = 22.2$ [kN/element]

$V_{Ed,z,ges.}/V_{Rd,z} = 143.8\ kN/22.2$ [kN/element] = 6.5 · element,

⇒ 7 Schöck Isokorb® XT type O required, spacing ≤ 15.00 m/7 = 2.14 m

$V_{Ed,z} = V_{Ed,z,ges.}/7 = 143.8\ kN/7 = 20.5$ [kN/element] ≤ $V_{Rd,z}$ = 22.2 kN → NW o.k.✓

Normal force:

$N_{Rd,x} = 1/10 \cdot V_{Ed,z} = 1/10 \cdot 20.5$ [kN/element] = 2.05 [kN/element]

$N_{Rd,x,ges.}/7 = 13.5\ kN/7 = 1.9$ [kN/element] < 2.05 [kN/element] → NW o.k.✓

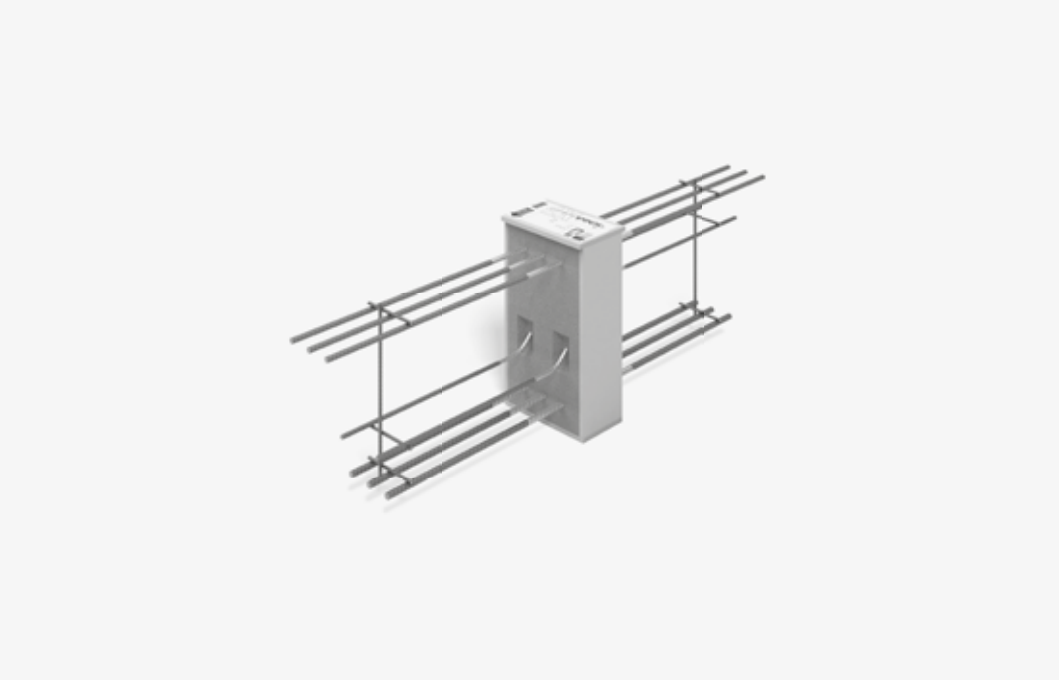
Note: The required number of Schöck Isokorb® XT type O is determined by the shear force acceptance capacity $V_{Rd,z}$. The acceptable normal force $N_{Rd,x}$ results dependant on the actual impacting shear force $V_{Ed,z}$.

Selected: 10 Elements of the Schöck Isokorb® XT type O-LR165-H200 which, taking into account the required expansion joint, are arranged respectively at the ends of the console and in between distributed evenly over the length l. Using 10 Schöck Isokorb® XT type O the position of the expansion joint varies with simultaneous observation of sensible edge distances of the Isokorbs. Through this the sagging of the console can in any case be minimised.

Check list

- ☐ Have the loads on the Schöck Isokorb® connection been specified at design level?
- ☐ Have the concrete cover and the appropriate concrete grade been taken into consideration according to the building regulations?
- ☐ 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?

Schöck Isokorb® XT type B



Schöck Isokorb® XT type B
Suitable for cantilevered downstand beams and reinforced concrete beams. It transmits negative moments and positive shear forces.

Element arrangement | Installation cross sections

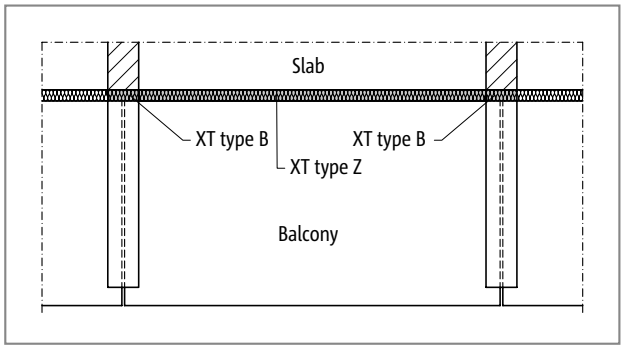


Fig. 256: Schöck Isokorb® XT type B: Balcony construction with freely cantilevered downstand beams (prefabricated balcony)

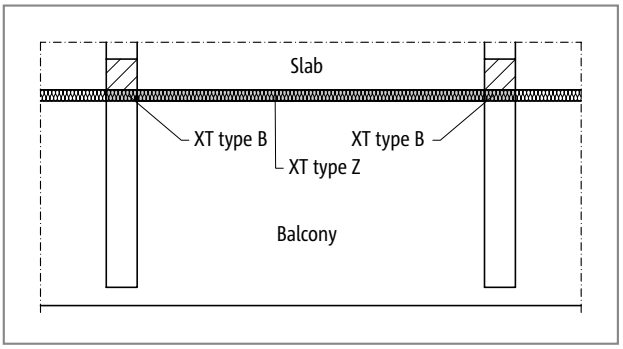


Fig. 257: Schöck Isokorb® XT type B: Balcony construction with freely cantilevered downstand beams

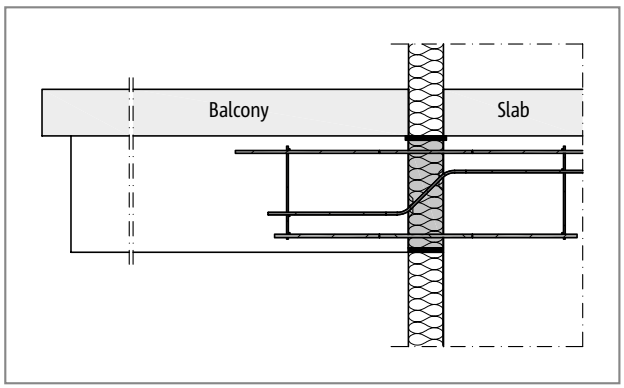


Fig. 258: Schöck Isokorb® XT type B: Balcony construction with freely cantilevered downstand beams (prefabricated balcony)

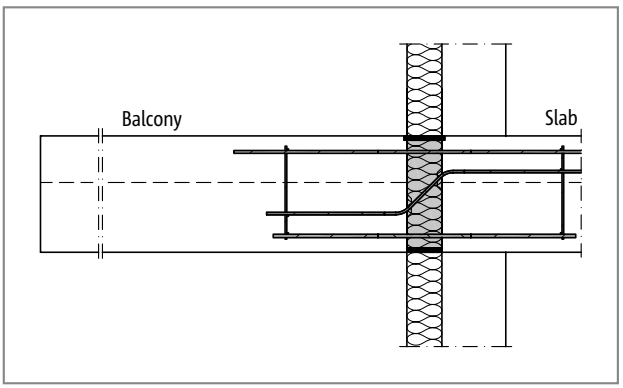


Fig. 259: Schöck Isokorb® XT type B: Balcony construction with freely cantilevered downstand beams

Product selection | Type designations | Special designs

Schöck Isokorb® XT type B variants

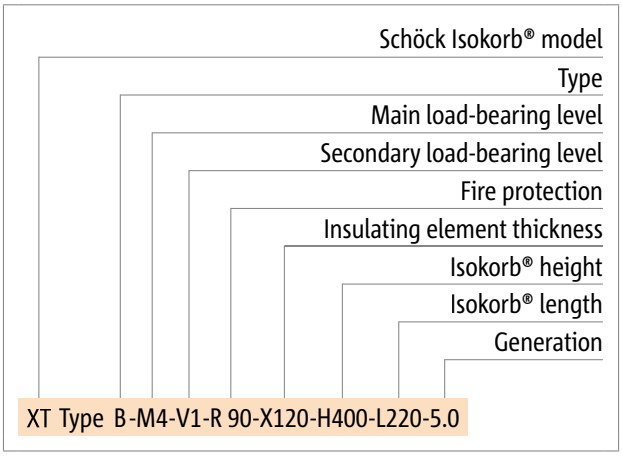
The configuration of the Schöck Isokorb® XT type B can vary as follows:

- Main load-bearing level:
  M1 to M4
- Secondary load-bearing level:
  V1
- Fire resistance class:
  R90 (standard): Top fire protection board, projecting on both sides by both 10 mm
- Insulation element thickness:
  X120 = 120 mm
- Isokorb® height:
  H = 400 mm
- Isokorb® length:
  L = 220 mm
- Generation:
  5.0
- Bonding range:
  VB2 medium bonding (Bonding range II)

Variants

- State desired dimensions on ordering.

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).

C25/30 design

Schöck Isokorb® XT type B		M1	M2	M3	M4
Design values with		Concrete strength class ≥ C25/30			
		$M_{Rd,y}$ [kNm/element]			
Isokorb® height H [mm]	400	-29.6	-35.4	-47.7	-71.1
		$V_{Rd,z}$ [kN/element]			
	400	30.9	48.3	69.5	94.7

Schöck Isokorb® XT type B	M1	M2	M3	M4
Isokorb® height H [mm]	400	400	400	400
Isokorb® length [mm]	220	220	220	220
Tension bars	3 ⌀ 10	3 ⌀ 12	3 ⌀ 14	3 ⌀ 16
Tension bars VB2 (poor)	835	1000	1160	1870
Shear force bars	2 ⌀ 8	2 ⌀ 10	2 ⌀ 12	2 ⌀ 14
Compression bars	3 ⌀ 12	3 ⌀ 14	3 ⌀ 16	3 ⌀ 20
Compression bar length	460	535	675	820

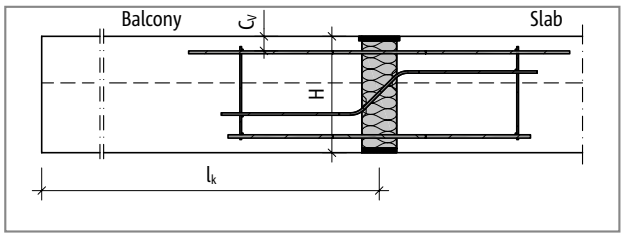


Fig. 260: Schöck Isokorb® XT type B: Static system

Notes on design

- Poor bonding conditions (bonding range II) are the basis for the determination of the compression member anchoring lengths.
- The indicative minimum concrete strength class of the external structural component is C32/40.

Expansion joint spacing

Maximum expansion joint spacing

If the structural component length exceeds the maximum expansion joint spacing e, expansion joints must be installed in the exterior concrete structural components at right angles to the insulation plane, in order to limit the effect as a result of temperature changes.

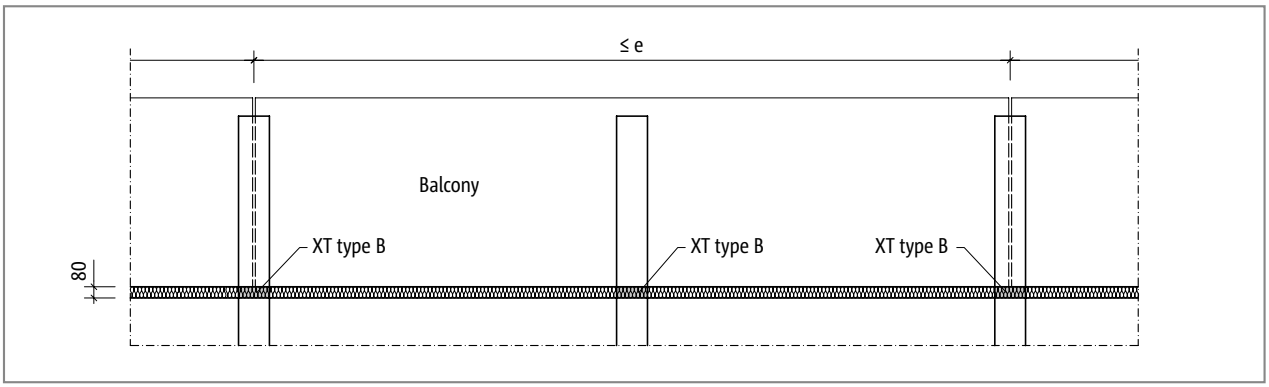


Fig. 261: Schöck Isokorb® XT type B: Expansion joint arrangement

Schöck Isokorb® XT type B		M1	M2	M3	M4
Maximum expansion joint spacing e		e [m]			
Insulating element thickness [mm]	120	19.8	17.0	15.5	13.5

Expansion joints

- The expansion joint spacings can be enlarged, if there is no fixed connection between balcony slabs and downstand beams, e. g. through laying of a sliding foil.

Product description

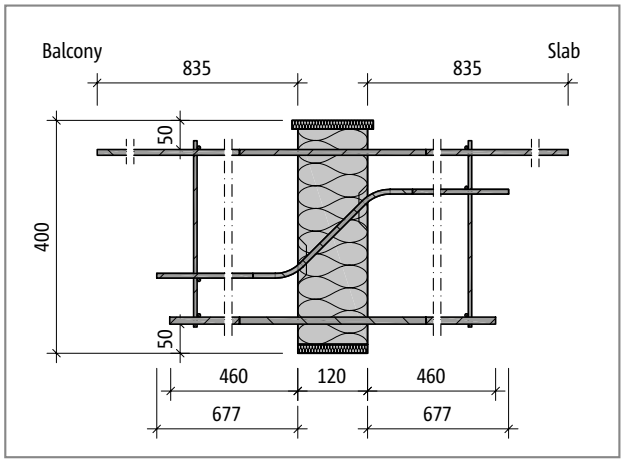


Fig. 262: Schöck Isokorb® XT type B: Product section

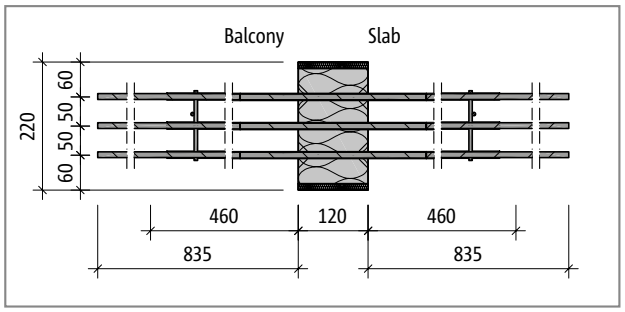


Fig. 263: Schöck Isokorb® XT type B: Product plan view

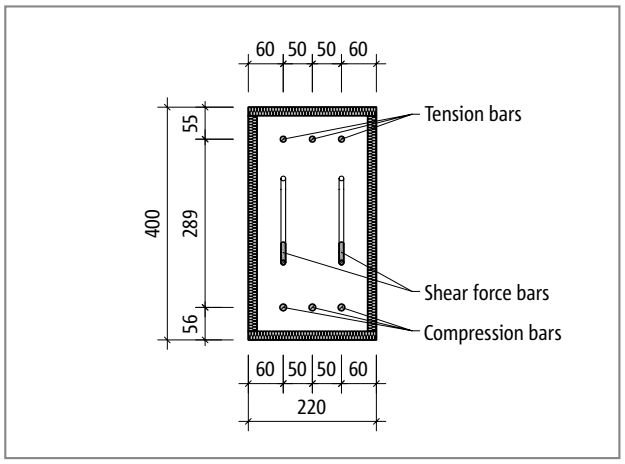


Fig. 264: Schöck Isokorb® XT type B: Product view

Product information

- Download further product plan views and cross-sections at www.schoeck.co.uk/download

On-site reinforcement

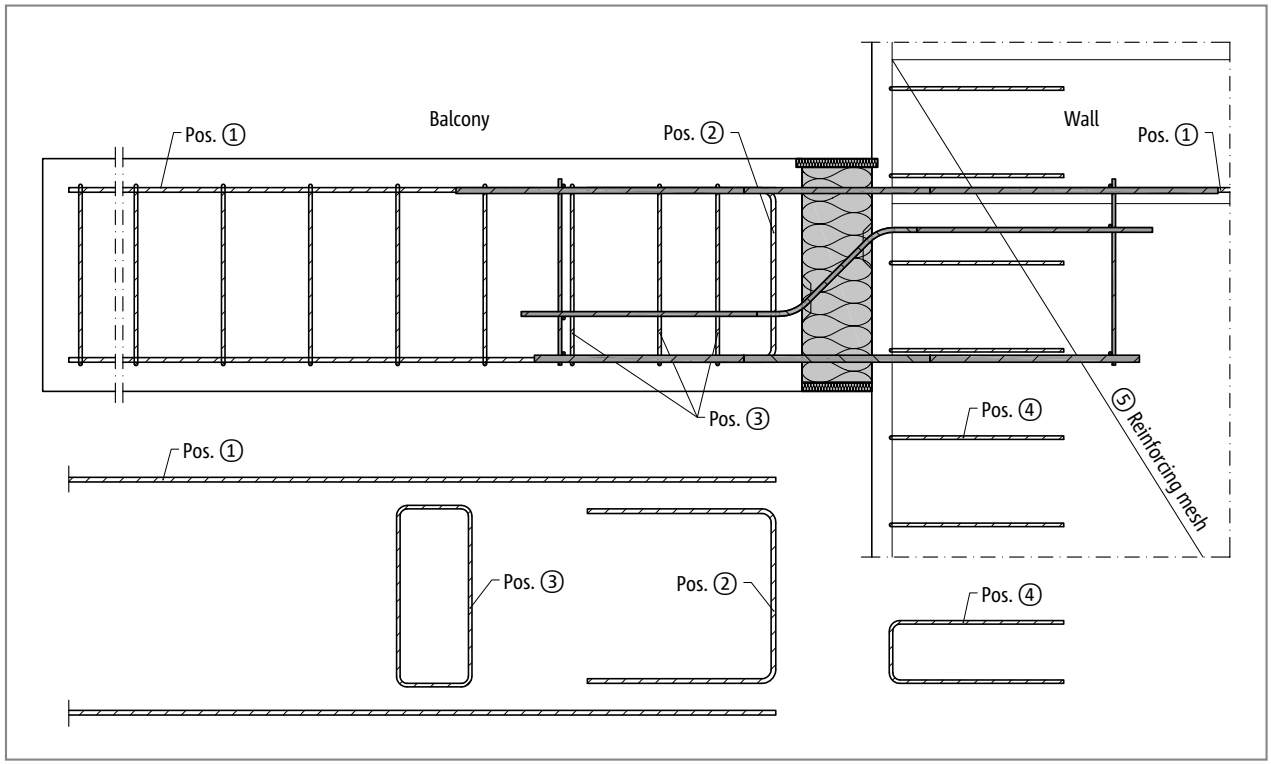


Fig. 265: Schöck Isokorb® XT type B: On-site reinforcement

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 B	M1	M2	M3	M4
On-site reinforcement	**Concrete strength class ≥ C25/30**			
Pos. 1 Lapping reinforcement				
Pos. 1	3 • H10	3 • H12	3 • H16	3 • H16
Lap length VB2 (poor)	805	966	1127	1770
Pos. 2 Suspension reinforcement				
Pos. 2 [mm²]	71	111	160	218
Pos. 3 Stirrup				
Pos. 3	acc. to the specifications of the structural engineer			
Pos. 4 Side reinforcement at the free edge				
Pos. 4	according to BS EN 1992-1-1 (EC2), 9.3.1.4			
Pos. 5 Wall reinforcement and lapping reinforcement shear force bar				
Pos. 5	acc. to the specifications of the structural engineer			

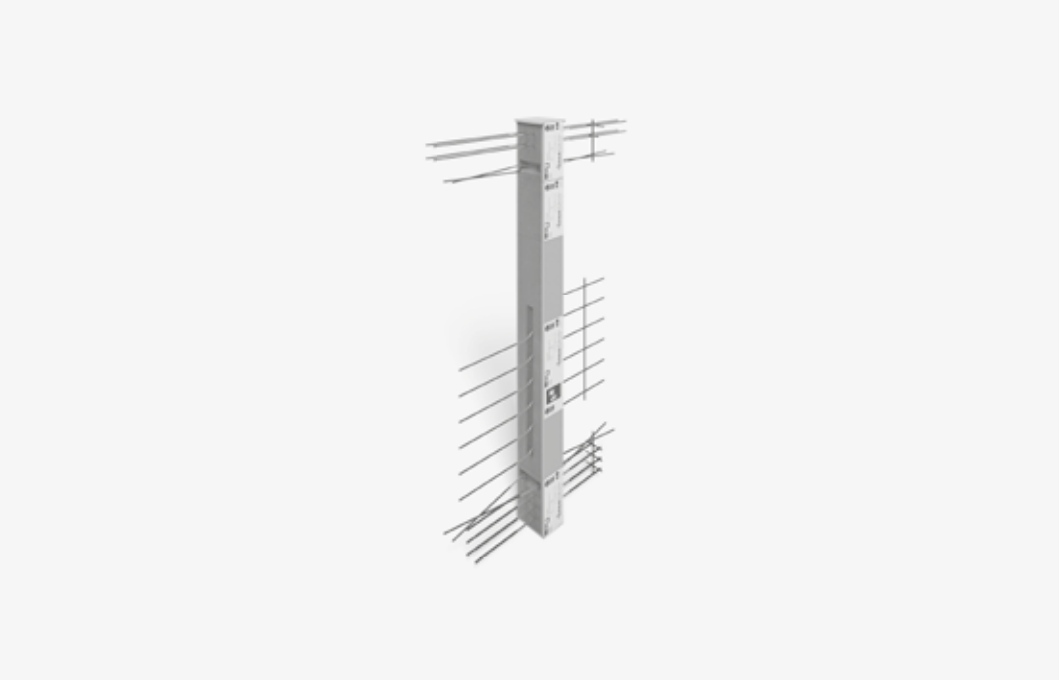
Information about on-site reinforcement

- 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.
- The indicative minimum concrete strength class of the external structural component is C32/40.

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?
- ☐ With the selection of the design table is the relevant concrete strength class taken into account?
- ☐ Are the maximum allowable expansion joint spacings taken into account?
- ☐ 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 requirements for on-site reinforcement of connections been defined in each case?

Schöck Isokorb® XT type W



Schöck Isokorb® XT type W
Suitable for cantilevered sheared walls. It transmits negative moments and positive shear forces. In addition horizontal shear forces are transmitted.

Element arrangement | Installation cross section

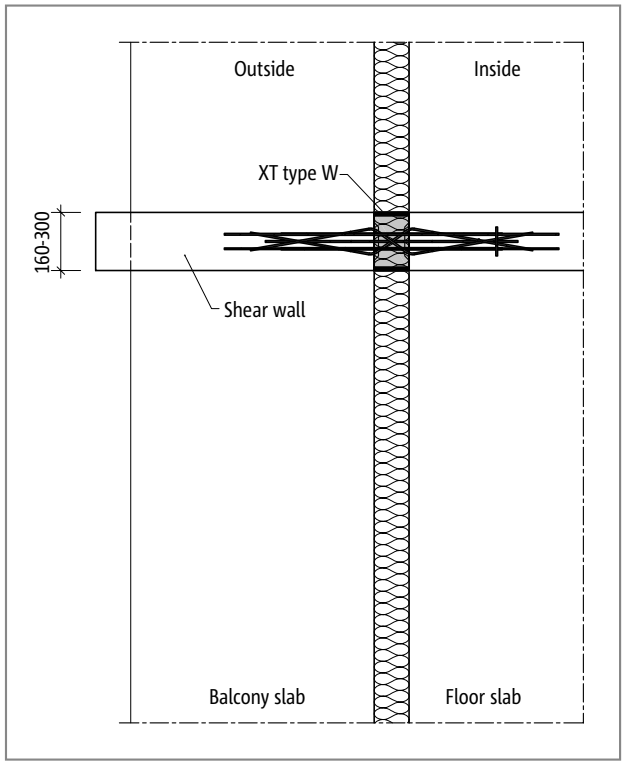


Fig. 266: Schöck Isokorb® XT type W: Plan view; balcony construction with thermally insulated load-bearing shear walls

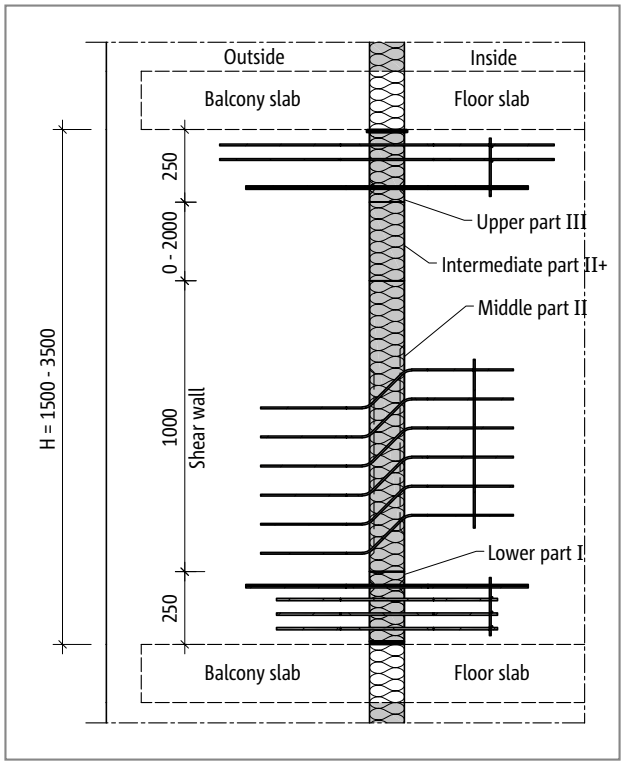


Fig. 267: Schöck Isokorb® XT type W: Balcony construction with thermally insulated load-bearing shear walls

Element arrangement

- The Schöck Isokorb® XT type W consists of at least 3 parts: Lower part I, Middle part II, Upper part III. Depending on the height an insulating Intermediate part II+ is required.

Product selection | Type designations | Special designs

Schöck Isokorb® XT type W variants

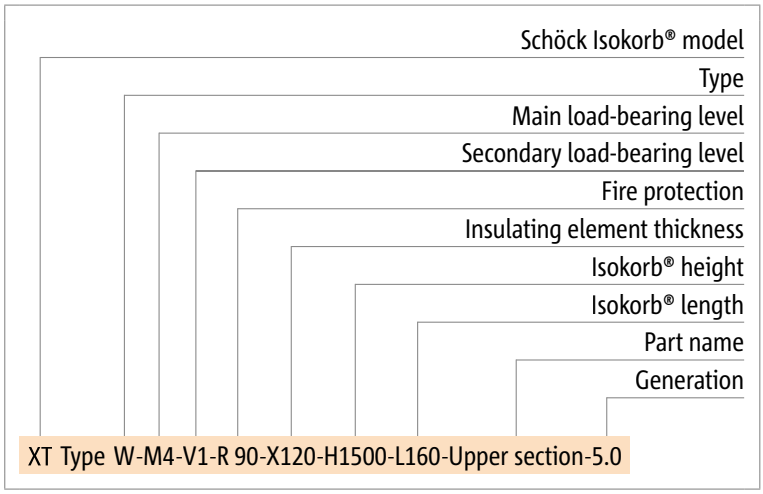
The configuration of the Schöck Isokorb® XT type W can be varied as follows:

- Main load-bearing level: M1 to M4
- Secondary load-bearing level: V1
- Fire resistance class:
  R90 (standard): Top fire protection board, projecting on both sides by both 10 mm
- Insulation element thickness:
  X120 = 120 mm
- Isokorb® height:
  H = 1500 - 3500 mm
- Isokorb® length:
  L = 150 - 300 mm with R0
  L = 160 - 300 mm with R90
- Part designation: Upper part
- Generation:
  5.0

Variants

- Please specify the required dimensions when ordering.

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).

C25/30 design

Schöck Isokorb® XT type W		M1	M2	M3	M4
Design values with		Concrete strength class ≥ C25/30			
		$M_{Rd,y}$ [kNm/element]			
H [mm]	1500 - 2490	-58.6	-101.4	-154.9	-113.6
	2000 - 2490	-80.8	-140.0	-213.9	-156.9
	2500 - 3500	-103.0	-178.5	-272.8	-200.2
H [mm]		$V_{Rd,z}$ [kN/element]			
	1500 - 3500	52.2	92.7	144.9	208.6
		$V_{Rd,y}$ [kN/element]			
	1500 - 3500	±13.4	±13.4	±13.4	±13.4

Schöck Isokorb® XT type W	M1	M2	M3	M4
Tension bars	4 ⌀ 6	4 ⌀ 8	4 ⌀ 10	4 ⌀ 12
Compression bars	6 ⌀ 8	6 ⌀ 10	6 ⌀ 12	6 ⌀ 14
Shear force bars vertical	6 ⌀ 6	6 ⌀ 8	6 ⌀ 10	6 ⌀ 12
Shear force bars horizontal	2 × 2 ⌀ 6	2 × 2 ⌀ 6	2 × 2 ⌀ 6	2 × 2 ⌀ 6
B_{min} with R0 [mm]	150	150	150	150
B_{min} with R90 [mm]	160	160	160	160

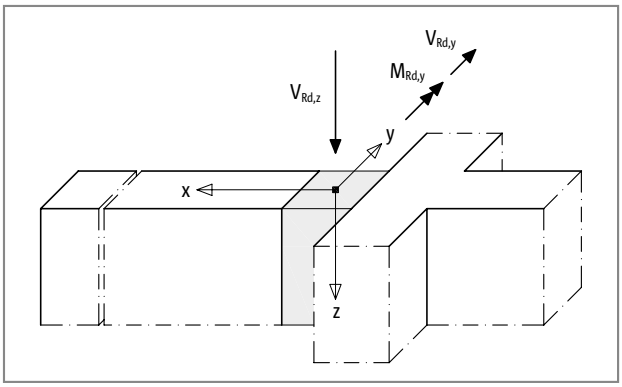


Fig. 268: Schöck Isokorb® XT type W: Sign rule for the design

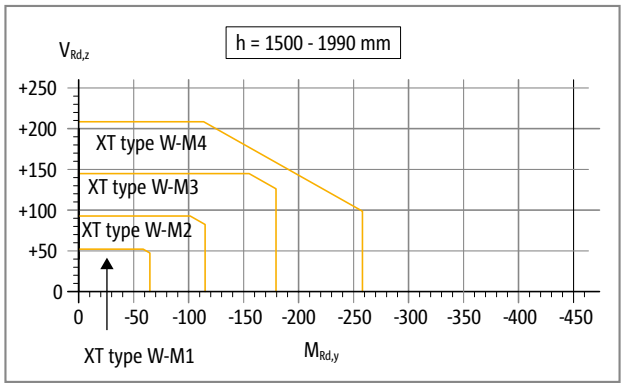


Fig. 269: Schöck Isokorb® XT type W: Interaction diagram

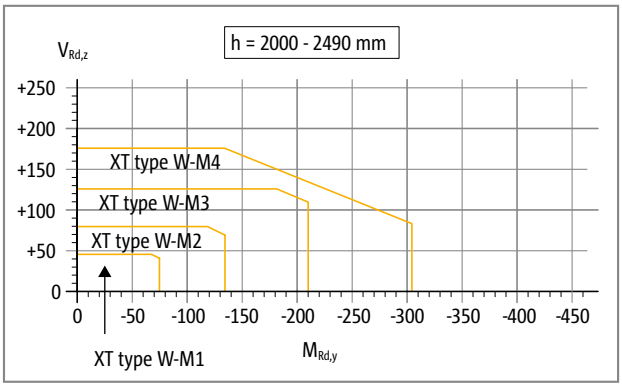


Fig. 270: Schöck Isokorb® XT type W: Interaction diagram

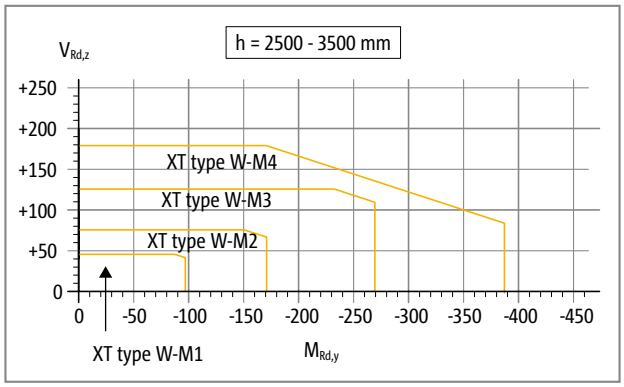


Fig. 271: Schöck Isokorb® XT type W: Interaction diagram

Notes on design

- Moments from wind loading are to be accepted by the stiffening effect of the balcony slab. If this is not possible then M_{Edz} can be transmitted by the additional arrangement of a Schöck Isokorb® XT type D. The XT type D in this case is installed in a vertical position in place of the insulating intermediate part.
- Poor bonding conditions (bonding range II) are the basis for the determination of the tension bar anchoring lengths.
- The indicative minimum concrete strength class of the external structural component is C32/40.

Expansion joint spacing

Maximum expansion joint spacing

If the structural component length exceeds the maximum expansion joint spacing e, expansion joints must be installed in the exterior concrete structural components at right angles to the insulation plane, in order to limit the effect as a result of temperature changes.

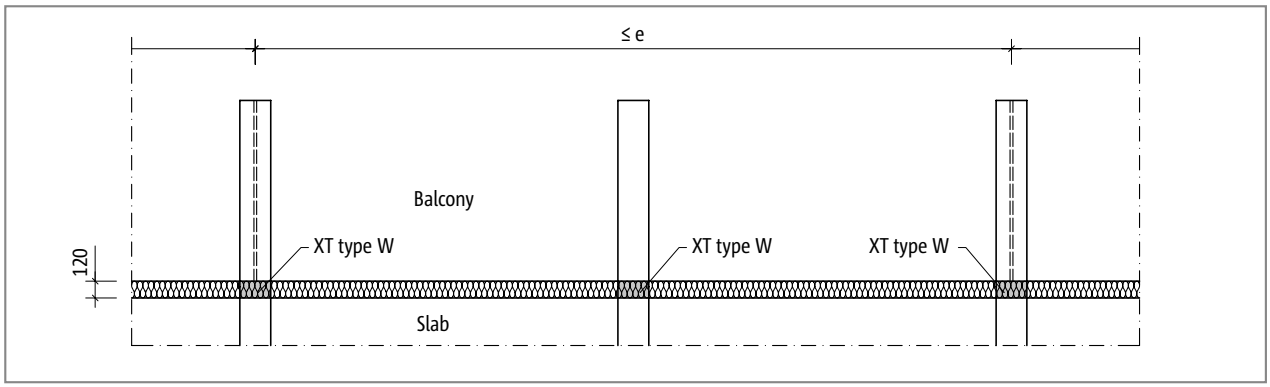


Fig. 272: Schöck Isokorb® XT type W: Expansion joint arrangement

Schöck Isokorb® XT type W		M1	M2	M3	M4
Maximum expansion joint spacing e		e [m]			
Insulating element thickness [mm]	120	23.0	21.7	19.8	17.0

Expansion joints

- The expansion joint spacings can be enlarged, if there is no fixed connection between balcony slabs and shear walls, e. g. through laying of a sliding foil.

Product description

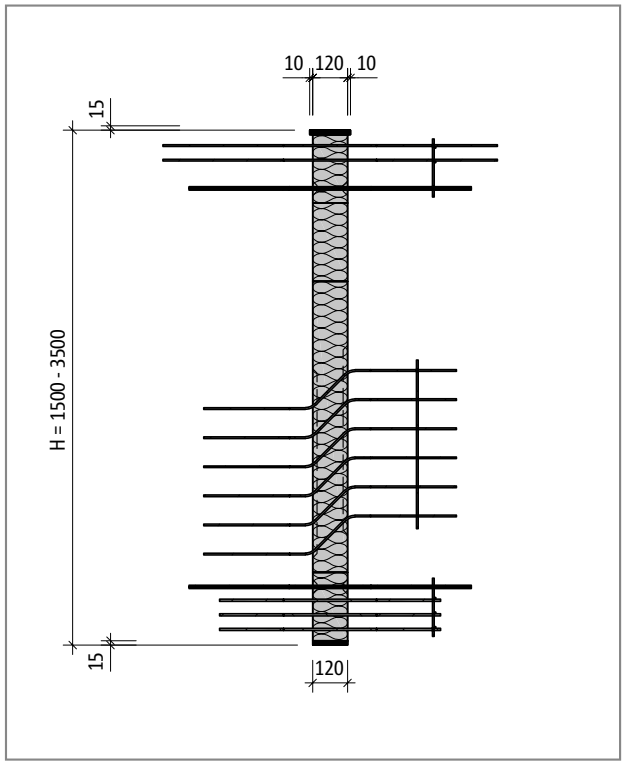


Fig. 273: Schöck Isokorb® XT type W-M1: Product section

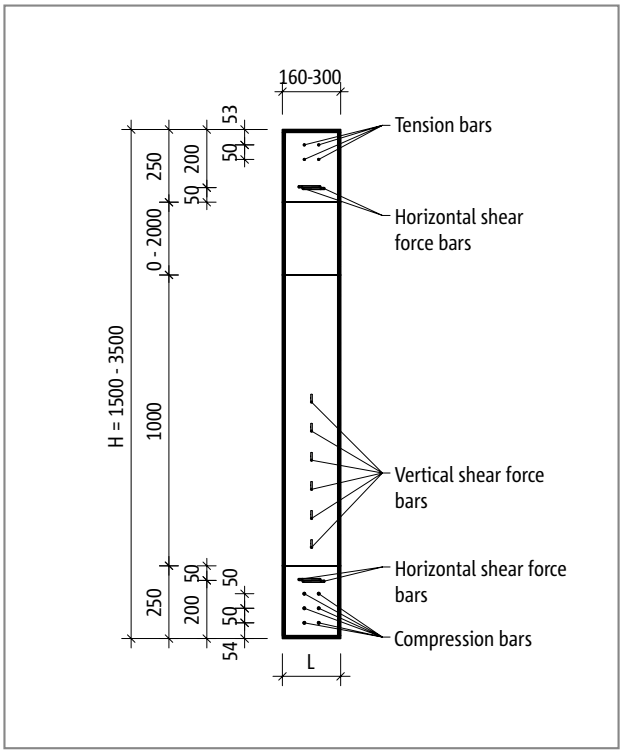


Fig. 274: Schöck Isokorb® XT type W-M1: Product view

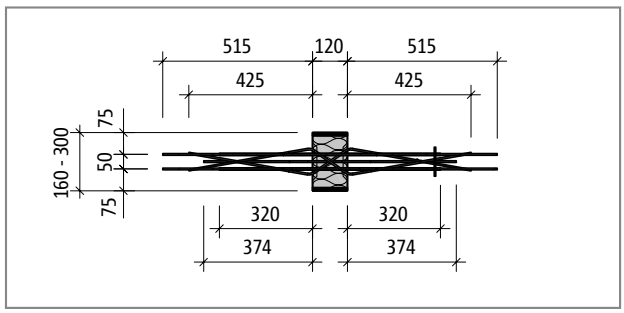


Fig. 275: Schöck Isokorb® XT type W-M1: Product plan view

Product information

- Download further product plan views and cross-sections at www.schoeck.co.uk/download

On-site reinforcement

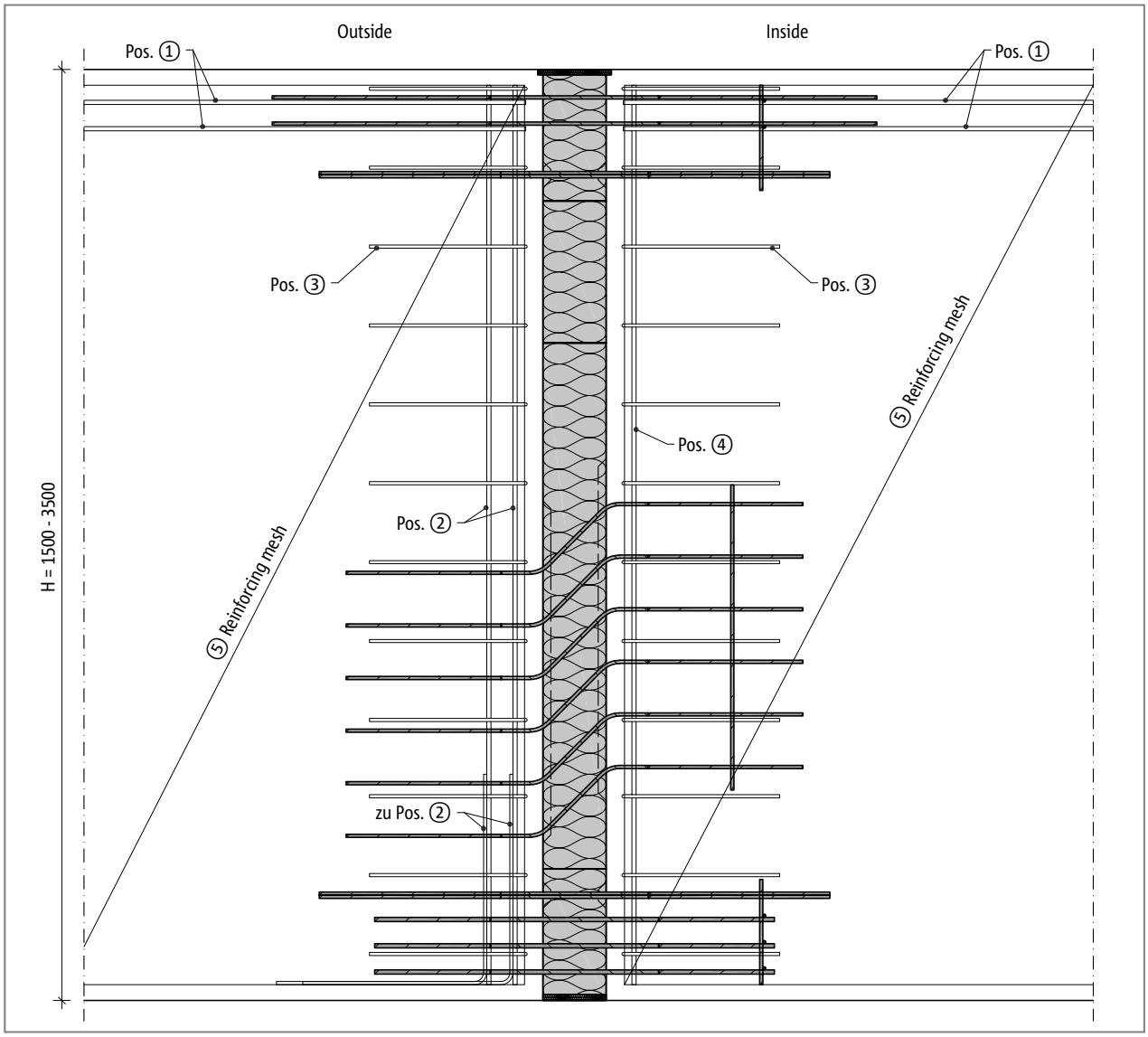


Fig. 276: Schöck Isokorb® XT type W: On-site reinforcement; section

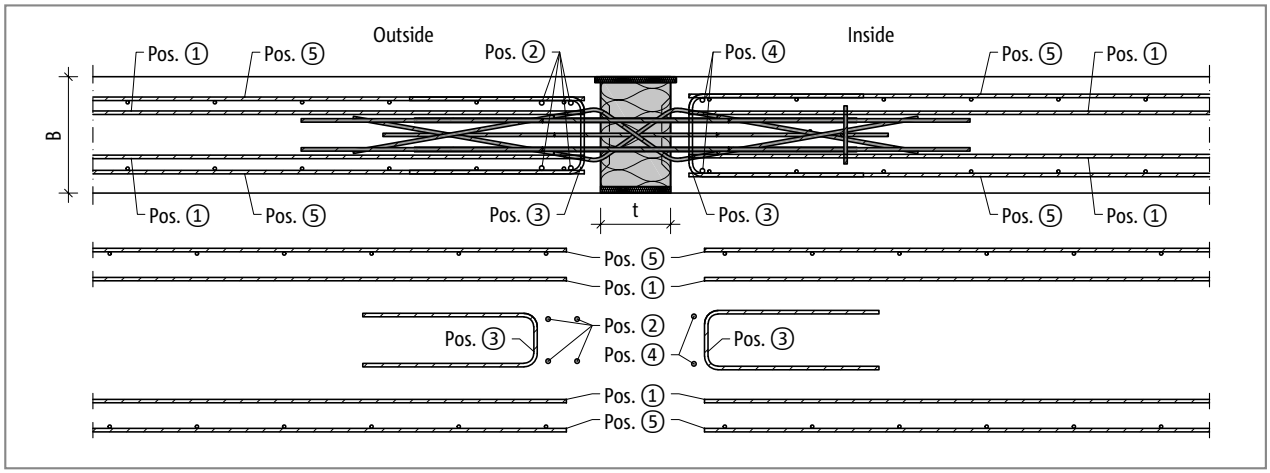


Fig. 277: Schöck Isokorb® XT type W: On-site reinforcement; plan views

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 W	M1	M2	M3	M4
On-site reinforcement	Concrete strength class ≥ C25/30			
Pos. 1 Lapping reinforcement				
Pos. 1	4 • H8	4 • H8	4 • H10	4 • H12
Lap length l0 [mm]	483	644	805	966
Pos. 2 Suspension reinforcement (anchoring with stirrup or L)				
Pos. 2	4 • H8	4 • H10	4 • H12	4 • H16
Pos. 3 and Pos. 4 Side reinforcement				
Pos. 3 and 4	acc. to the specifications of the structural engineer			
Pos. 5 Wall reinforcement and lapping reinforcement shear force bar				
Pos. 5	acc. to the specifications of the structural engineer			

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.
- The indicative minimum concrete strength class of the external structural component is C32/40.

Installation

Installation

The Schöck Isokorb® XT type W is supplied in various components (lower part, middle part, intermediate part, top part).

- Depending on the quantity ordered, same components on one pallet, with a view to transport safety.

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?
- ☐ With the selection of the design table is the relevant concrete strength class taken into account?
- ☐ Are the maximum allowable expansion joint spacings taken into account?
- ☐ 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 requirements for on-site reinforcement of connections been defined in each case?

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