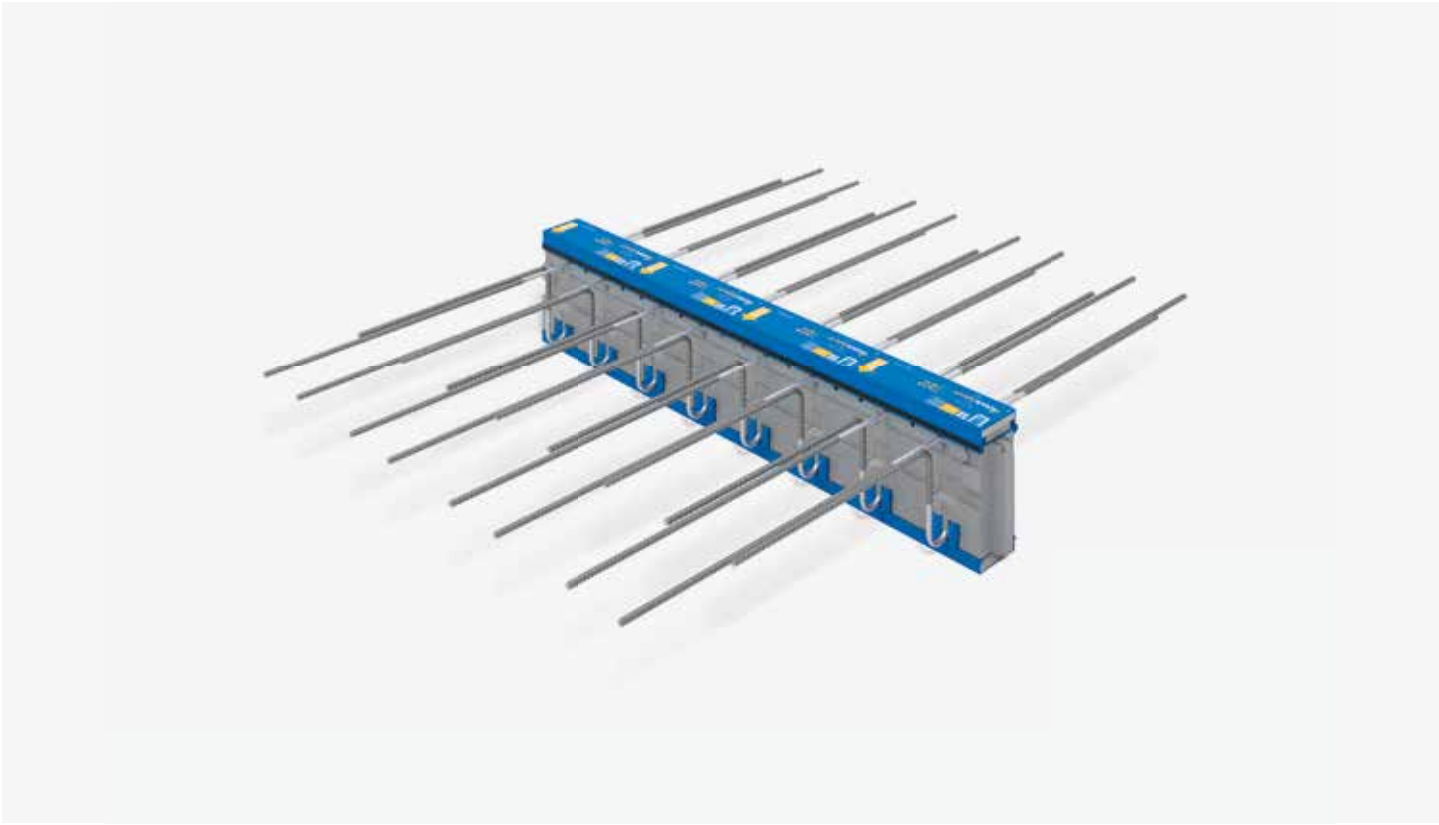
Schöck Isokorb®



Technical Information

Schöck Isokorb® T for reinforced concrete structures

February 2020

Telephone hotline for design support services
Telefon: +45 86 22 93 93
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Planning tools – downloads and requests
info@haucon.dk
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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:

HauCon A/S
Lægårdsvej 30
DK-8520 Lystrup

Design support services at HauCon

Tel.: +45 86 22 93 93
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Notes | Symbols

Technical Information

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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 conjuction with the design.

Check list

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

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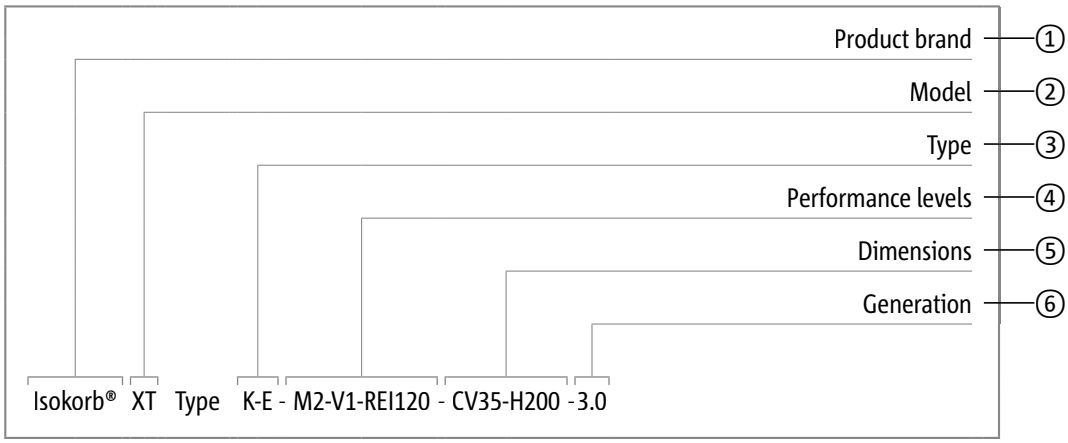
Explanation of the naming of Schöck Isokorb® types

The naming system 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 order of the name components always remains the same.



Every Schöck Isokorb® only receives the name components that are relevant for the respective product.

① Product brand

Schöck Isokorb®

② Model

In the future, the model name will be an integral part of the name of every Isokorb®. It stands for a core property of the product. The corresponding abbreviation is always placed before the word type.

Model	Core characteristics of the products	Connection	Components
XT	For eXtra thermal insulation	Reinforced concrete – reinforced concrete, Steel – reinforced concrete, Timber – reinforced concrete	Balcony, passageway walk, canopy, floor slab, parapet, balustrade, corbel, beam, girder, wall
CXT	With Combar® for eXtra thermal insulation	Reinforced concrete – Reinforced concrete	Balcony, passageway walk, canopy
T	For thermal break	Reinforced concrete – reinforced concrete, Steel – reinforced concrete, Timber – reinforced concrete, Steel – steel	Balcony, passageway walk, canopy, floor slab, parapet, balustrade, corbel, beam, girder, wall
RT	For reconstruction of components with a thermal break	Reinforced concrete – reinforced concrete, Steel – reinforced concrete, Timber – reinforced concrete	Balcony, passageway walk, canopy, beam, girder

③ Type

The type is a combination of the following name components:

- Basic type
- Configuration variation
- Static connection variation
- Geometric connection variation

Basic type					
K	Balcony, canopy – cantilevered	A	Parapet, balustrade	SK	Steel balcony – cantilevered
Q	Balcony, canopy – supported (shear force)	F	Parapet, balustrade – attached	SQ	Steel balcony – supported (shear force)
H	Balcony with horizontal loads	O	Corbel	S	Steel structure
Z	Balcony with intermediate insulation	B	Beam, inner slab joist		
D	Floor – continuous (indirect support)	W	Shear wall		

Configuration variant	
T	Available in lengths L1000 and L500
E	Available in lengths L1000, L500 and L250; can be used with Schöck IDock®

Static connection variation	
Z	Free of constraint forces
P	Intermittent
V	Shear force
N	Normal force

Geometric connection variation	
W	Shear force bar on floor side bent

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 capacity. 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 influence of fire
R0	No fire protection

⑤ Dimensions

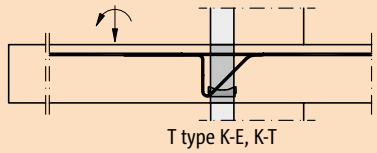
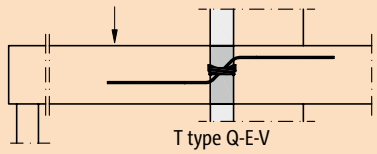
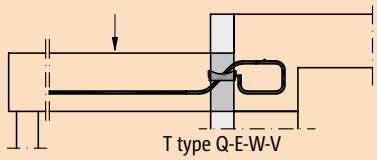
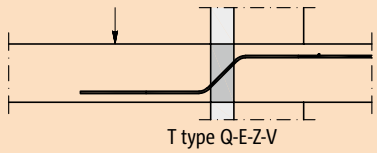
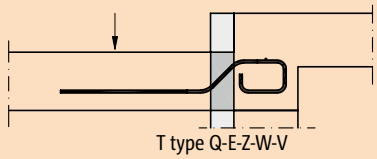
The following name components are part of the dimensions:

- Concrete cover CV
- Bond length LR
- Bond height HR
- Isokorb® height H
- Isokorb® length L
- Isokorb® width B
- Diameter of thread D

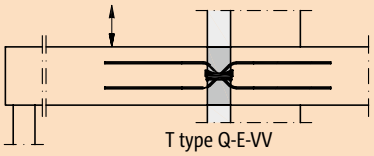
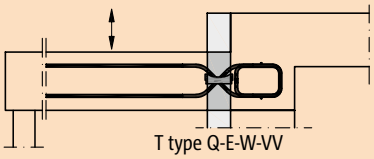
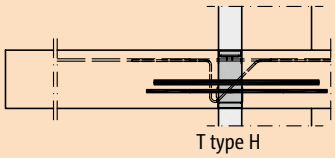
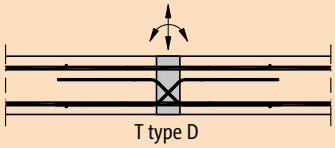
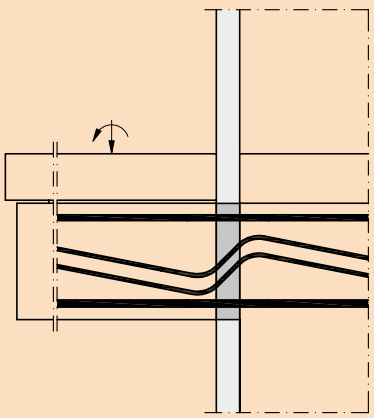
⑥ Generation

Each type designation ends with the generation number.

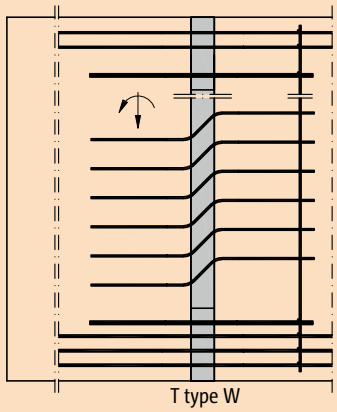
Summary of types

Application	Production type	Schöck Isokorb® type
Free cantilevered balconies  T type K-E, K-T	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**T type K-E, K-T** Page 33
Supported balconies  T type Q-E-V	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**T type Q-E-V** Page 61
Supported balconies with height offset  T type Q-E-W-V	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**T type Q-E-W-V** Page 61
Zero-stress shear force connection  T type Q-E-Z-V	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**T type Q-E-Z-V** Page 61
Shear force connection with height offset free of constraint force  T type Q-E-Z-W-V	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**T type Q-E-Z-W-V** Page 61

Summary of types

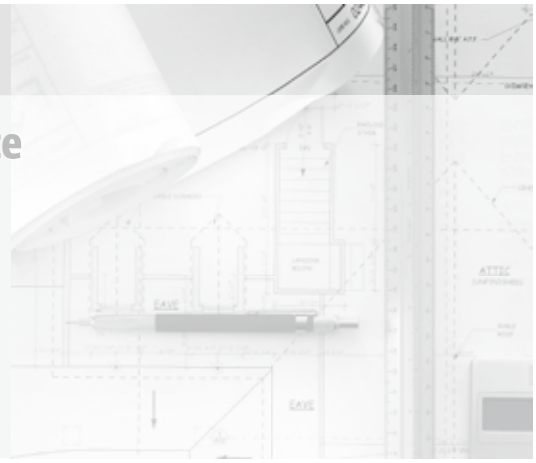
Application	Production type	Schöck Isokorb® type
Supported balconies with positive and negative shear force		
 T type Q-E-VV	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**T type Q-E-VV** Page 87
Supported balconies with positive and negative shear force and height offset		
 T type Q-E-W-VV	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**T type Q-E-W-VV** Page 87
Addition for horizontal loads		
 T type H	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**T type H** Page 107
Continuous floors with bending momemts and shear forces		
 T type D	**Building site** In-situ concrete balconies **Precast concrete work** Completely prefabricated balconies Prefabricated component balconies	**T type D** Page 117
Free cantilevered downstand beams and reinforced concrete beams		
 T type B	**Building site** In-situ concrete **Precast concrete work** Completely prefabricated part	**T type B** Page 131

Summary of types

Application	Production type	Schöck Isokorb® type
Free cantilevered shear walls  T type W	**Building site** In-situ concrete **Precast concrete work** Completely prefabricated part	**T type W** Page 143

Building physics

Reinforced concrete – reinforced concrete



Fire protection

Fire protection configuration

Fire protection configuration Schöck Isokorb® reinforced concrete – reinforced concrete

The Schöck Isokorb® T comes standard with a fire protection configuration (REI120 and/or R90). If a configuration without fire protection is desired , then this must be explicitly indicated with (R0).

- With fire protection, e.g. T type K-E-M4-V1-REI120-CV30-H180
- Without fire protection, e.g. T type K-E-M4-V1-R0-CV30-H180

The fire protection designation specially for T type B and T type W is R90. The fire protection designation for T type K, Q-E, H and D is REI120.

For this purpose, fire protection boards are attached to the Schöck Isokorb® (see figure). Prerequisite for the fire resistance 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 DS/EN 1992-1-1 and DS/EN 1992-1-2 (EC2) If, in addition to the load-bearing capacity (R), integrity (E) and insulation (I) are also required in case of fire, then the block-outs between the Schöck Isokorb® are to be closed, e.g. using the Schöck Isokorb® T type Z fire protection configuration.

The Schöck Isokorb® T has been tested in room closure configuration on the basis of floors according to DS/EN 1365-2 According to DS/EN 13501-2, only the requirement R (load-bearing capacity in the case of fire) is required. The basis for this test is DS/EN 1365-5. The fire protection of the Schöck Isokorb® is additionally further tested on the basis of floors according to DS/EN 1365-2. From this results the classifcation REI. (R - load-bearing capacity, E - integrity, I - insulation under the infuence of fire.) The requirement from the fire tests with Schöck Isokorb® with 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).
The fire protection configuration of the respective Schöck Isokorb® type is presented in the Product chapter subject: Fire Protection Configuration.

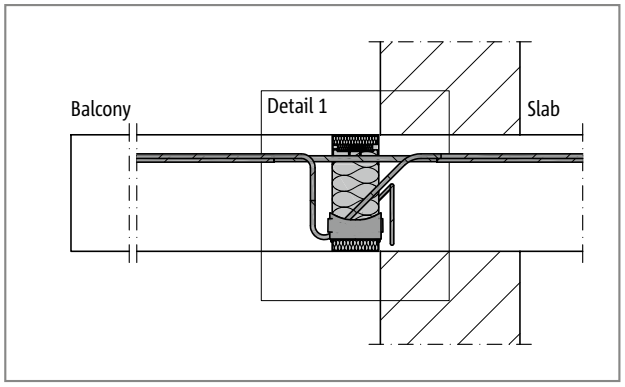


Fig. 1: Schöck Isokorb® T type K-E, K-T for REI120: Fire protection board top and bottom; lateral integrated fire protection bands

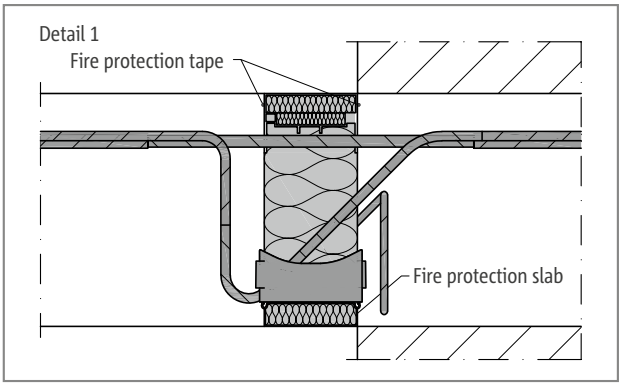


Fig. 2: Schöck Isokorb® T type K-E, K-T for REI120: Detail 1

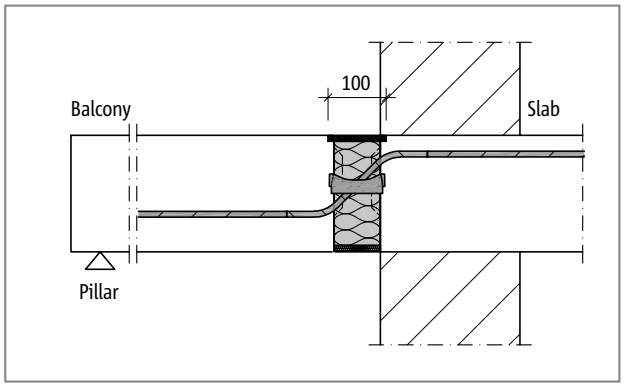


Fig. 3: Schöck Isokorb® T type Q-E-V for REI120: Fire protection board top, projecting laterally

Fire protection classes | Fire protection configuration for passageway walks

Fire protection classes REI120, R120, R90

The reaction to fire of structural components is classified on the basis of the European Standard DS/EN 13501-2 The European classification system is on par along side the previous classification system as per DIN 4102.
Users have the option for verification of reaction to fire or fire resistance based either on DIN 4102 or on DS/EN 13501-1 (reaction to fire) and/or DS/EN 13501-2 (fire resistance).

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

Schöck Isokorb® T type	Q-E, K-E, K-T, H, D	B, W
Fire protection class	REI120	R90

Fire protection

- If the fire protection designation (R0) is left out when ordering, then fire protection configuration (REI120) is delivered by default.

Fire protection configuration REI120/REI90

For a passageway walk, room closure means that the design of the gap between the slab and wall is sufficient for fire protection requirements.

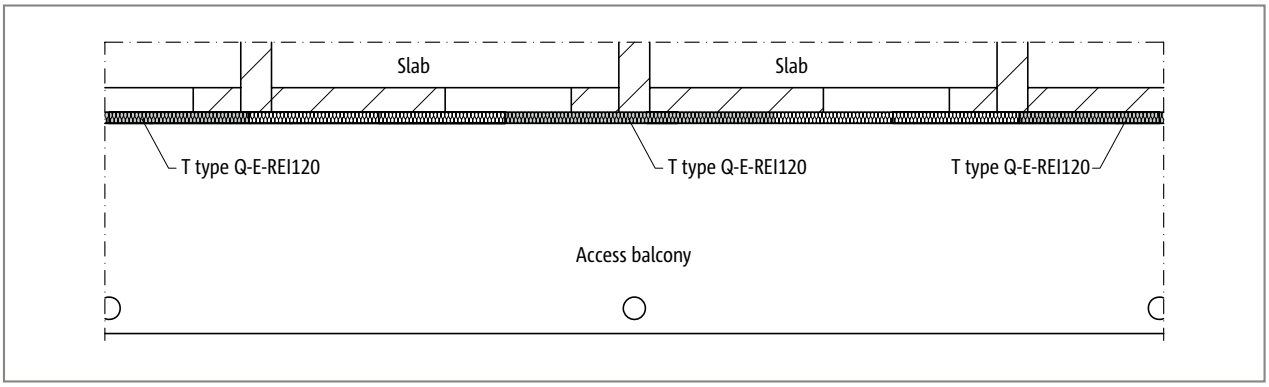


Fig. 4: Schöck Isokorb® T type Q-E-REI120: Room-closing passageway walk

Even the Schöck Isokorb® T type B can achieve the REI90 classification. The Schöck Isokorb® T type B is classified with R90 because it only selectively penetrates the gap. The insulated gap with the EI90 classification represents a linear room closing connection of fire protection class REI 90 in combination with the Schöck Isokorb® T type B-R90.

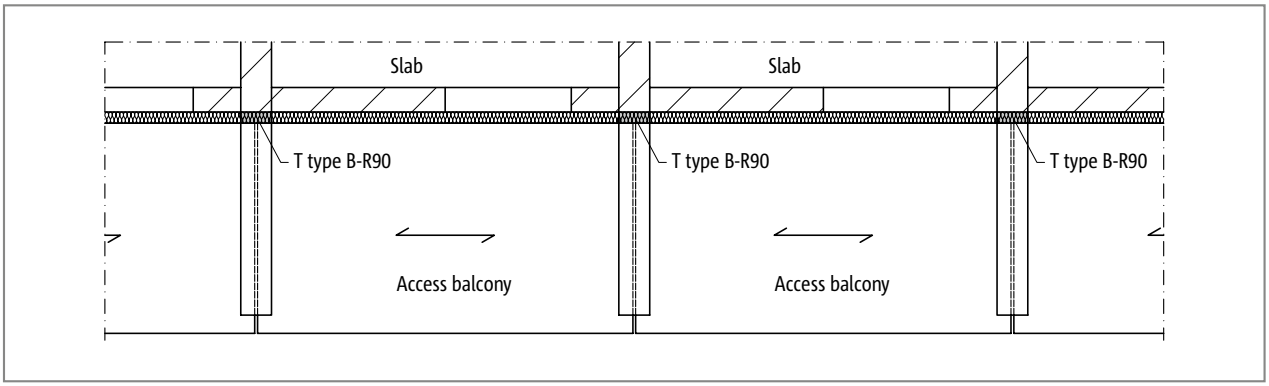


Fig. 5: Schöck Isokorb® T type B-R90: Room-closing passageway walk

Fire protection retrofitting

Schöck Isokorb® fire protection retrofitting

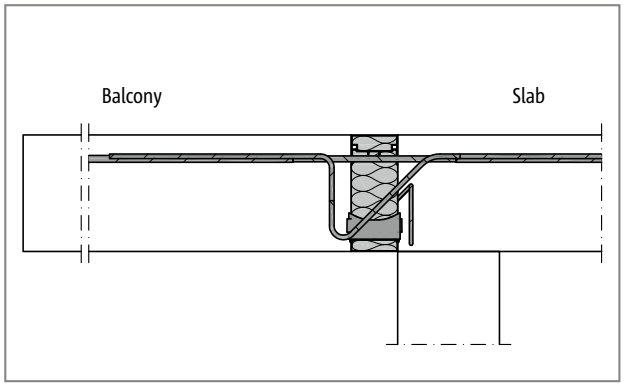


Fig. 6: Schöck Isokorb® T type K-E, K-T for R0 without fire protection

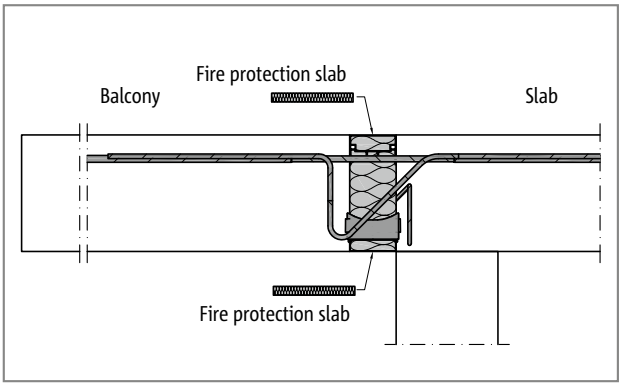


Fig. 7: Schöck Isokorb® T type K-E, K-T for R0: retrofitting with fire protection boards

Fire protection retrofitting

It is possible to retrofit the Schöck Isokorb® with fire protection boards later on.

Thermal protection

Effective heat insulation of thermal bridges

Definition of thermal bridges

Thermal bridges are local component areas in the building shell, in which heat loss occurs. The increased heat loss results in that the component area deviates from the even shape ("geometric thermal bridge") or in that the component area concerned, local materials with increased thermal conductivity are present ("material-conditioned thermal bridge").

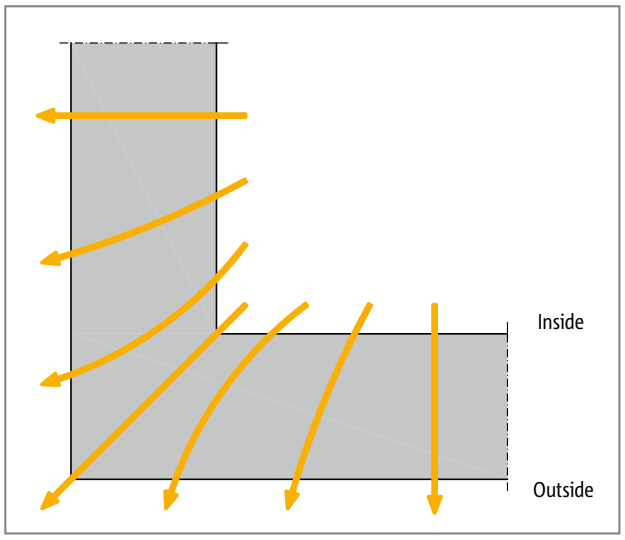


Fig. 8: Geometric thermal bridges

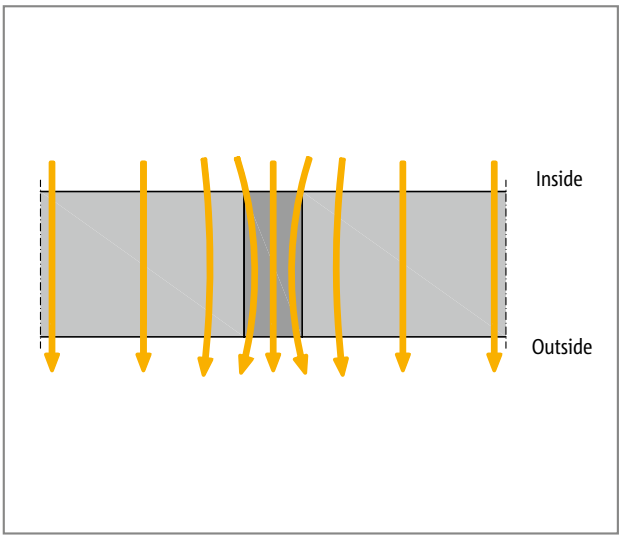


Fig. 9: Material-conditioned thermal bridges

Effects of thermal bridges

In the area of the thermal bridge the locally increased heat loss leads to a lowering of the inner surface temperatures. As soon as the surface temperature falls below the so-called "mildew temperature" θ_S, mould forms. What is more, if the surface temperature falls below the dew-point temperature θ_τ, then the moisture in the ambient air condenses on the cold surfaces in the form of condensate.

If mould has formed in the area of a thermal bridge, then considerable impairments can occur to health for the resident due to the emitted mould spores in the room. Mould spores cause allergies and can therefore provoke allergic reactions in people, such-as, for example, sinusitis, rhinitis and asthma. Through the general long-lasting daily exposure in dwellings there is a high risk that the allergic reactionswill become chronic.

Summarised, the effects of thermal bridges are thus:

- Danger of the formation of mould
- Danger of impairments to health (allergies etc.)
- Danger of occurrence of condensation
- Increased thermal energy loss

Uninsulated cantilevered structural components

With uninsulated cantilevered structural components such as, for example, reinforced concrete balconies or steel girders, the co-action of the geometric thermal bridge (cooling fin effect of the cantilever) as well as of the material-conditioned thermal bridge (breaching of the heat insulating layer with reinforced concrete or steel), there is a strong heat drainage. With this, cantilevers are among the most critical thermal bridges of the building shell. The results of uninsulated cantilevers are considerable heat losses and a significant lowering of the surface temperature. This leads to a marked increase in heating costs and a very high risk of mould in the area of the connection of the cantilever.

For this reason, it is important to observe the requirements relating to protection against moisture and thermal insulation. The use of a load bearing thermal break element for balconies and passageway walks is a standard recognised method and thus reduces thermal losses to a minimum.

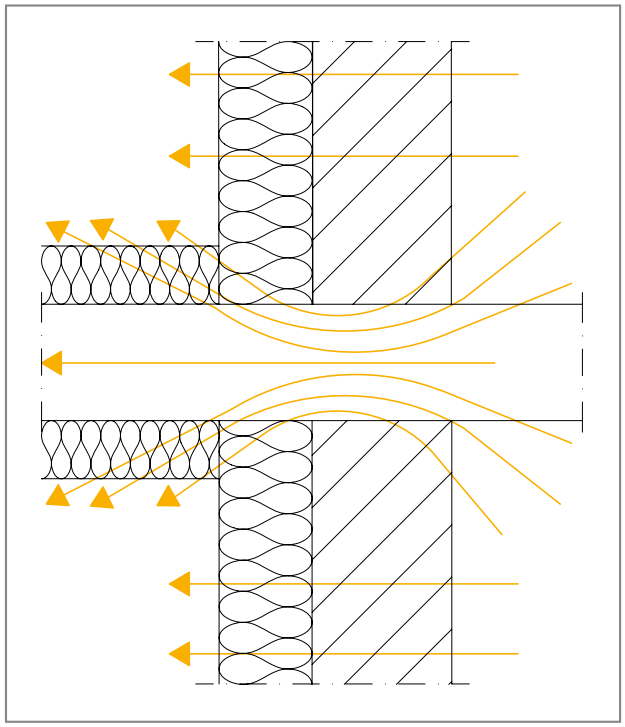


Fig. 10: Increased thermal loss for balconies or passageway walks wrapped in insulation

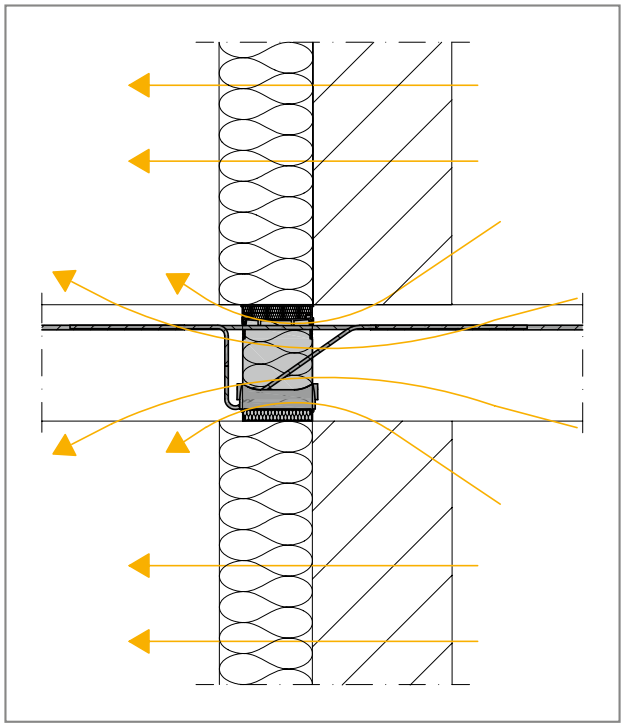


Fig. 11: Minimal thermal loss for balconies or passageway walks with a load bearing thermal break element

Characteristic building-physical values

Characteristic building-physical values of cantilevered components

Several characteristic values exist for describing the effects of a thermal bridge. The property of a Schöck Isokorb® for preventing heat transfer is described by the equivalent thermal conductivity λ_{eq}. Thus it constitutes a product characteristic value. This is just like the equivalent thermal transmission resistance R_{eq} that is derived from it, which also takes into account the insulation thickness of a Schöck Isokorb®. It can be used to compare products with different insulating element thicknesses.

Product characteristics	Characteristic value	Type of thermal bridge
Equivalent thermal conductivity	λ_{eq}	Cantilevered components such as balconies and parapets with Schöck Isokorb® design
Equivalent resistance to heat transmission	R_{eq}	

In addition, there are also characteristic values to describe the requirements relating to moisture proofing: $\Theta_{si,min}$ and f_{Rsi} are requirements relating to the temperature of the interior surfaces of a building to rule out condensation and mould formation. There are also requirements relating to the energy loss through the thermal bridge. For linear thermal bridges, these are described with the ψ value, the linear thermal transmission coefficient, and for point thermal bridges, with the χ value, the point thermal transmission coefficient.

Thermal effects	Characteristic value	Type of thermal bridge
Moisture proofing		
Condensation result, mould formation	f_{Rsi} $\Theta_{si,min}$	All
Thermal protection for thermal bridges		
Energy loss	ψ	Linear-shaped
	χ	Intermittent

Info

ψ, χ, $\Theta_{si,min}$ and f_{Rsi} are also calculated for a specific thermal bridge – a specific construction in which a specific Isokorb® is embedded. Therefore, these values always depend on the construction. Whereas λ_{eq} and R_{eq} only describe the thermal insulation effect of a Schöck Isokorb®. So if the properties of the construction such as the Isokorb® type or insulation thickness of the wall insulation are changed, then this also changes the thermal insulation effect on the thermal bridge.

The application of λ_{eq} and the calculation of ψ, χ, $\Theta_{si,min}$ and f_{Rsi} are explained in thedDetailed thermal bridge calculation section.

Equivalent thermal conductivity λ_{eq}

The equivalent thermal conductivity λ_{eq} is the overall thermal conductivity of all components of the Schöck Isokorb® and is - at the same insulating element thickness - a measure for the thermal insulating effect of the connection. The smaller λ_{eq}, the higher the thermal insulation of the balcony connection. λ_{eq} values are determined through detailed thermal bridge calculations. Since each product has an individual geometry and placement specification, each Schöck Isokorb® has an individual number.

The calculation methodology to determine λ_{eq} was validated based on the European Assessment Document – EAD for load bearing thermal insulating elements and - based on this - for Schöck Isokorb® in a European Technical Assessment – ETA.

It is possible to do the calculations using commercially available thermal bridge software by means of the thermal boundary conditions according to DS/EN ISO 6946. In doing so, surface temperatures Θ_{si} and the resulting temperature factor f_{Rsi} can be calculated in addition to the heat loss through the thermal bridge (ψ value).

Detailed thermal bridge calculation

Where a detailed thermal bridge calculation is to be provided for the determination of ψ or f_{Rsi} values, the λ_{eq} value can be used in modelling of the connection details. For this purpose, a homogenous rectangle of the same dimensions of the Schöck Isokorb® insulating element is placed into the model in its position and the equivalent thermal conductivity λ_{eq} assigned. Refer to figure. In this way, the building physics characteristic values of a design can be simply calculated.

The individual λ_{eq} values can be found online at:
www.schoeck.dk

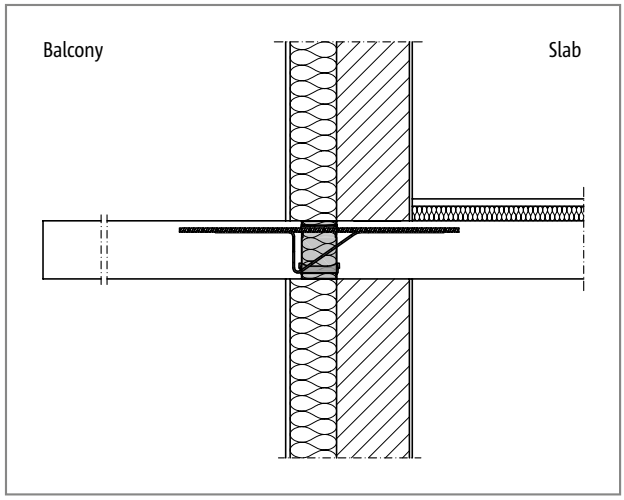


Fig. 12: Representation of a sectional drawing with detailed Schöck Isokorb® model

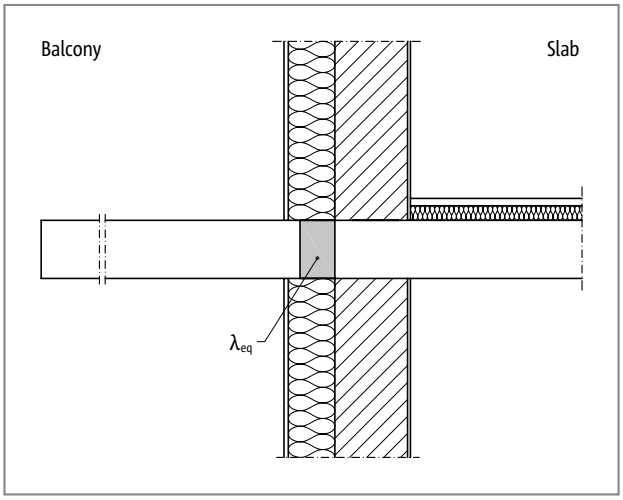


Fig. 13: Representation of a sectional drawing with substitute insulating element

Please note that a large section from the construction is selected so that the areas of the surrounding construction being influenced by the thermal bridge are shown in the model. A spacing of 2 metres around the thermal bridge is normally sufficient to take these boundary effects into account.

Thermal bridge details

Design of balconies, passageway walks and canopies

The Schöck Isokorb® must always be positioned in the insulating layer flush with the inner edge of the insulation. For monolithic constructions such as single-leaf masonry, the Isokorb® is inserted flush with the outside edges of the wall construction. The Isokorb® is also positioned flush with the inner edge of the insulation in the insulating layer of the wall for canopies. However, it is important here that the insulating layer is not interrupted. For the configuration with windows and doors, it is particularly important that they are positioned in the insulating layer. The detail centre provides several application examples for this:

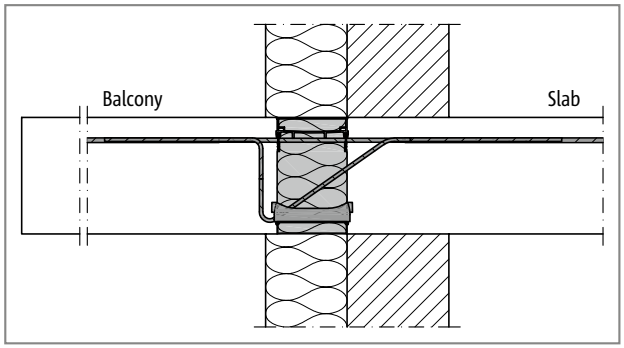


Fig. 14: Schöck Isokorb® XT type K: Connection with thermal insulation composite system (WDVS)

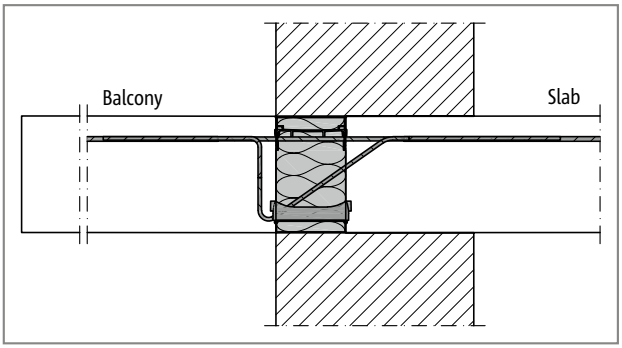


Fig. 15: Schöck Isokorb® XT type K: Connection with single-leaf masonry

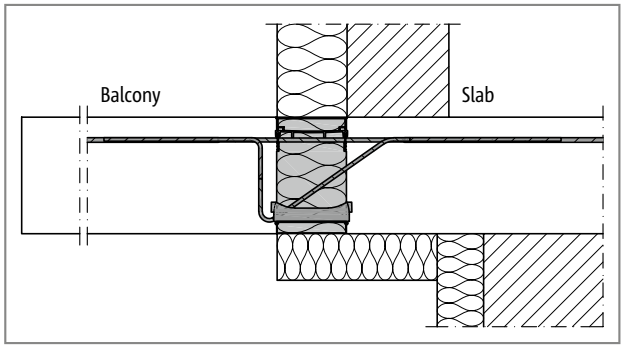


Fig. 16: Schöck Isokorb® XT type K: Connection with indirectly positioned floor and thermal insulation composite system (WDVS)

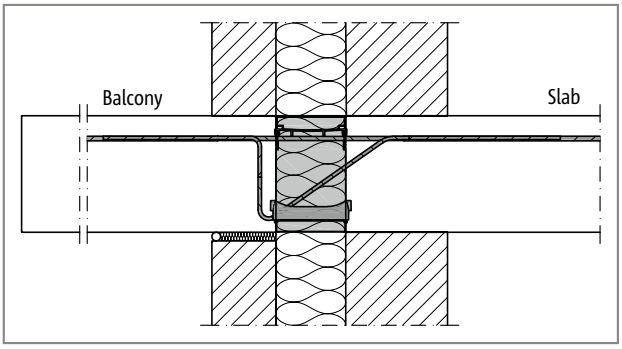


Fig. 17: Schöck Isokorb® XT type K: Connection with filled cavity brickwork with core insulation

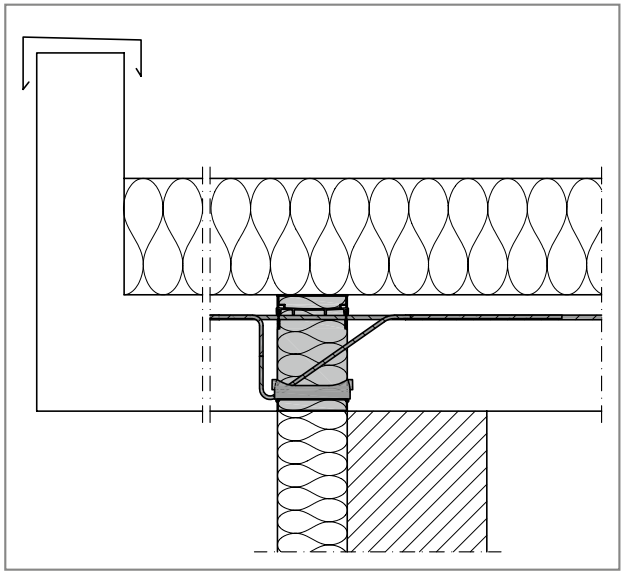


Fig. 18: Schöck Isokorb® XT type K: Connection to a canopy

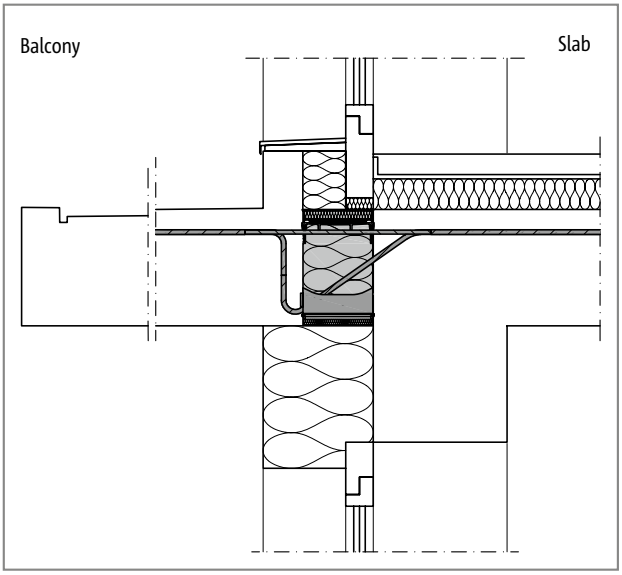


Fig. 19: Schöck Isokorb® XT type K: Connection with window detail above and below the connection

Thermal bridge details

Design of parapets and balustrades

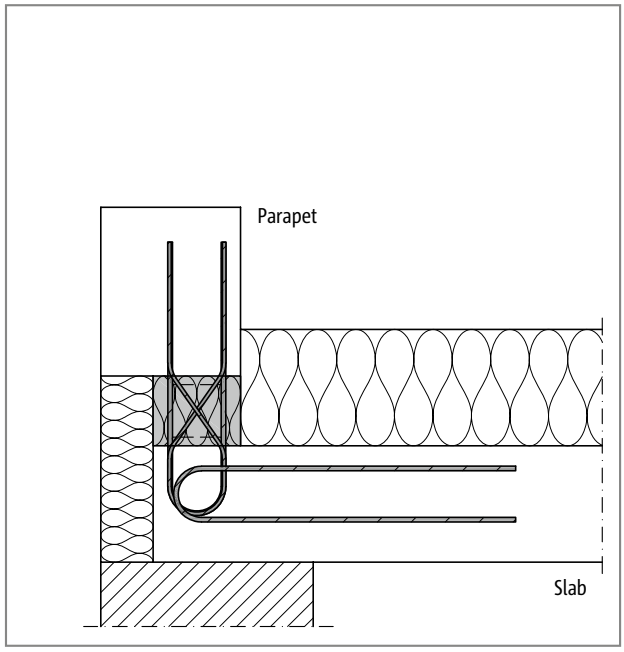


Fig. 20: Schöck Isokorb® XT type A: Connection to a parapet (type A-MM1-VV1)

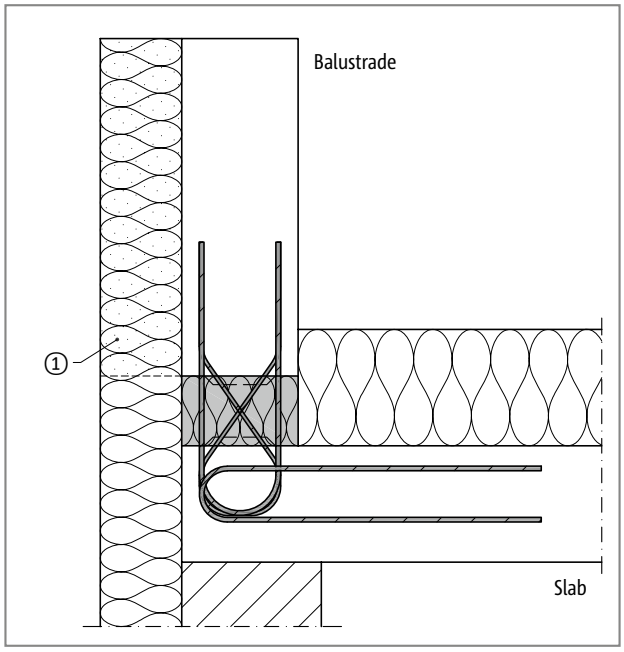


Fig. 21: Schöck Isokorb® XT type A: Connection to a balustrade (type A-MM2-VV1)

For a parapet design, it should be noted that the Schöck Isokorb® is always in the insulating layer. Here it is not necessary to wrap the parapets in insulation The marked area for insulation ① does not have to be carried out for energetic reasons. The insulation is usually only added up to the upper edge of the parapet for practical reasons.

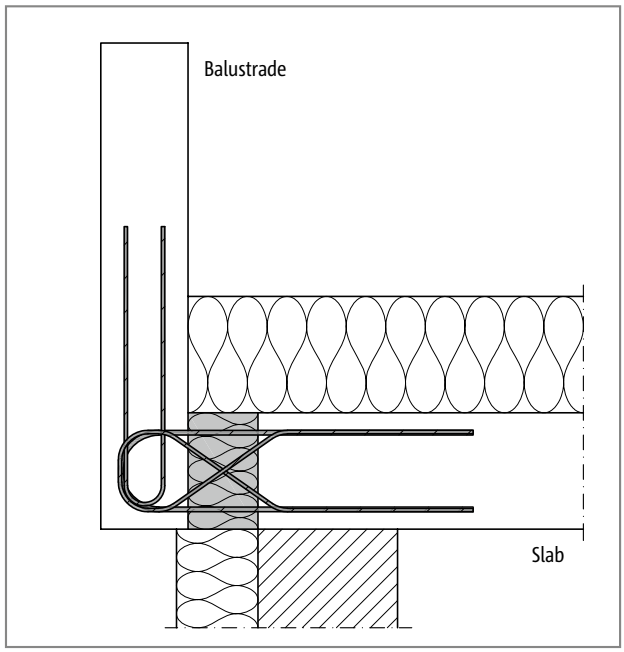


Fig. 22: Schöck Isokorb® XT type F: Connection to a corbelled sill with thermal insulation composite system (WDVS)

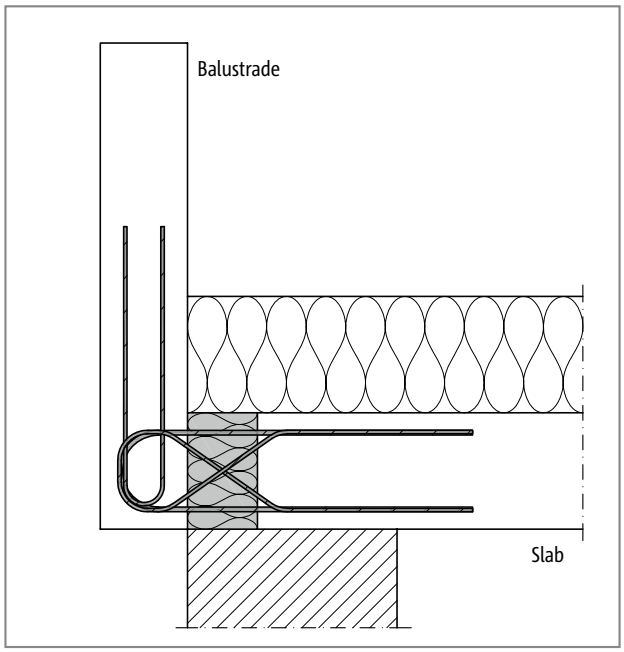


Fig. 23: Schöck Isokorb® XT type F: Connection to a corbelled sill for thermally insulated brickwork

Building physics

Reinforced concrete – reinforced concrete

Fatigue/Temperature effect

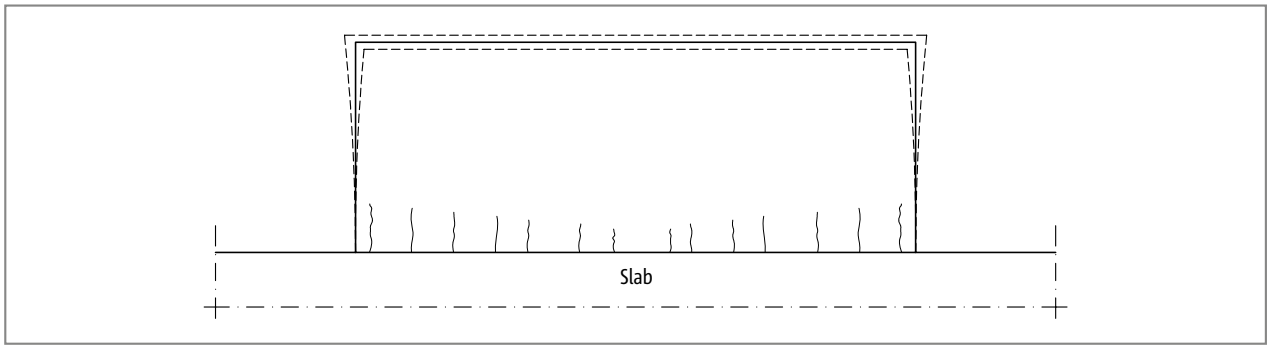


Fig. 24: Balcony slab without Schöck Isokorb®: Crack formation through fatigue possible

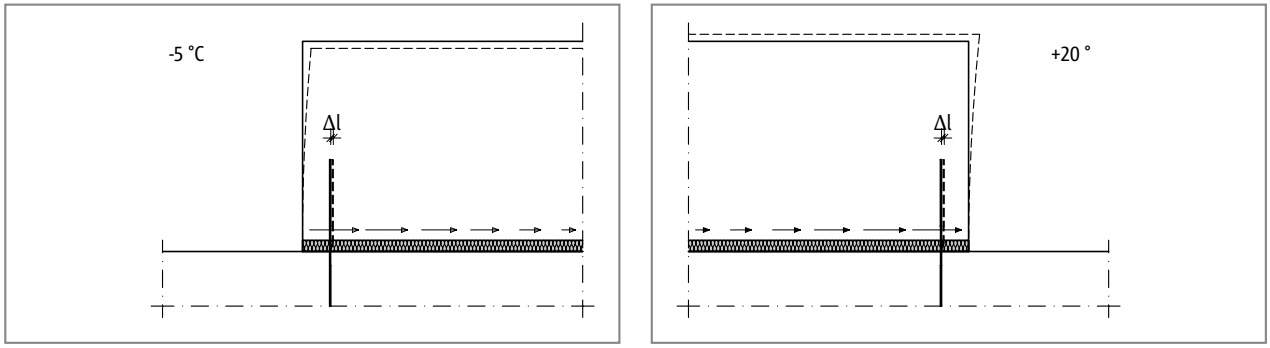


Fig. 25: Schöck Isokorb®: Displacement of the outer bars of a balcony slab by Δl as a result of temperature deformation

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.

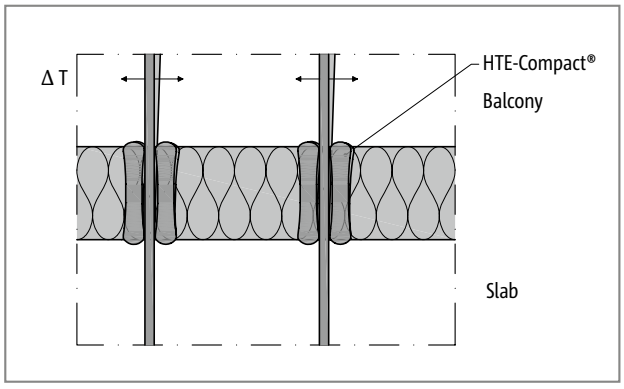


Fig. 26: Schöck Isokorb® detail: deflection of the pressure bearing as a result of temperature difference

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

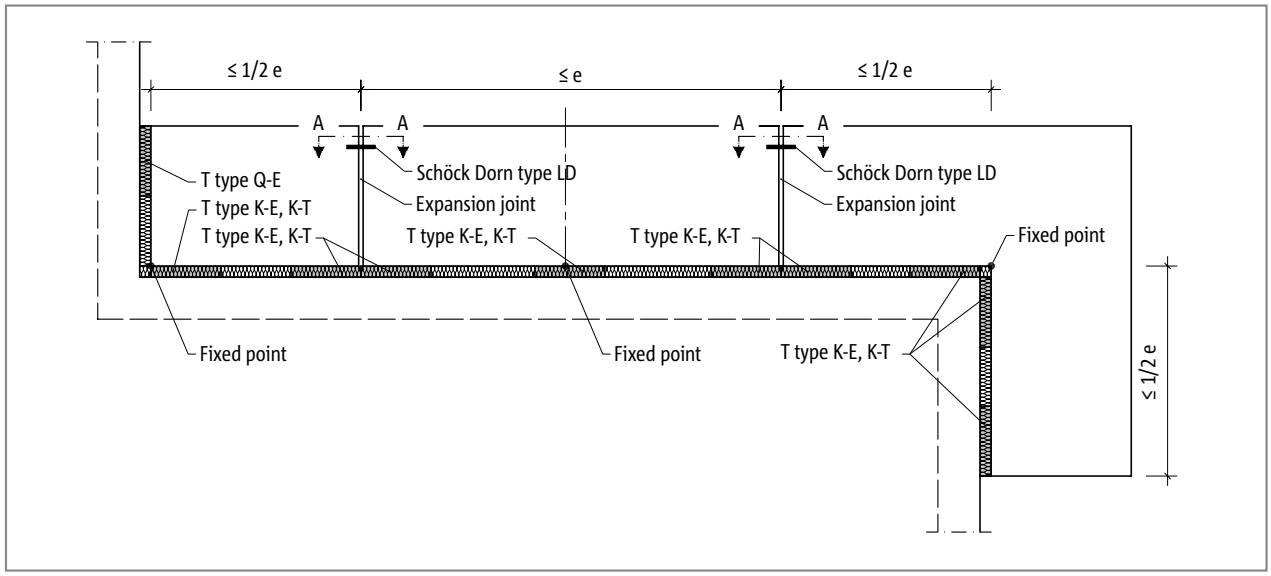


Fig. 27: Schöck Isokorb® T type K-E, K-T: Expansion joint formation with longitudinally displaceable shear force dowel, e.g. Schöck dowel

The maximum expansion joint spacings e of the Schöck Isokorb® types are different as bar diameter and type of construction of the Schöck Isokorb® types are different. For the respective Schöck Isokorb® type the maximum expansion joint spacings are given 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.

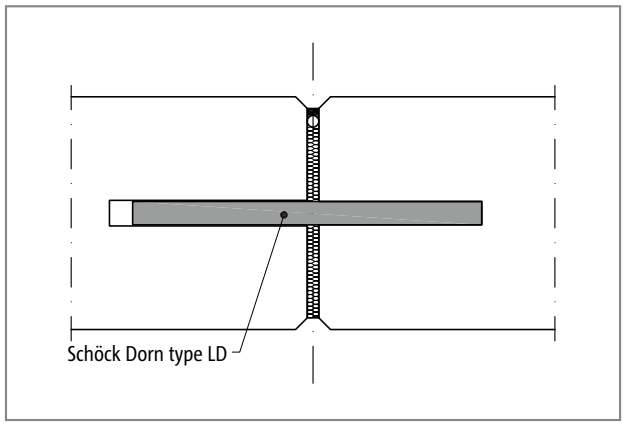


Fig. 28: Schöck Dorn: Expansion joint formation in in-situ concrete

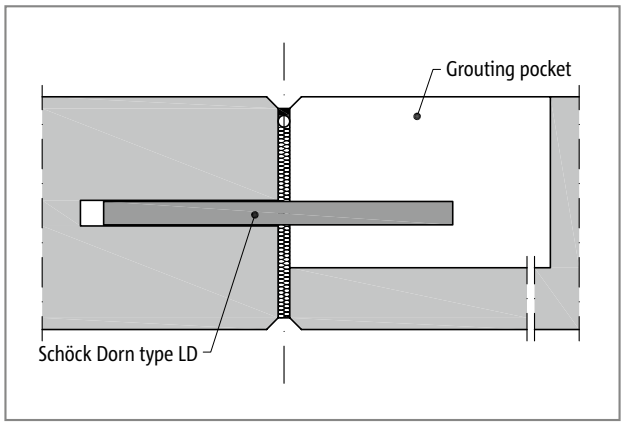


Fig. 29: Schöck Dorn: Expansion joint formation precast concrete balcony

Expansion joints

- Details for the formation of expansion joints see also: Technical Information Schöck Dorn application examples.
- The notional fixed point of the concrete element is the point where no expansion occurs due to the temperature loads. This point must be determined before estimating the maximum bar spacing. The outermost bar may not be further than e/2 from this notional fixed point.

Deflection

Deflection due to moment loading

For Schöck Isokorb® with moment capacity, it must be noted that a small angle distortion φ occurs. This angle distortion φ leads to a deflection of $w_ü = φ \cdot l_k$ for cantilever balconies. The angle distortion φ is caused by various strains δ1, δ2, of the tension and shear force bars under tension.

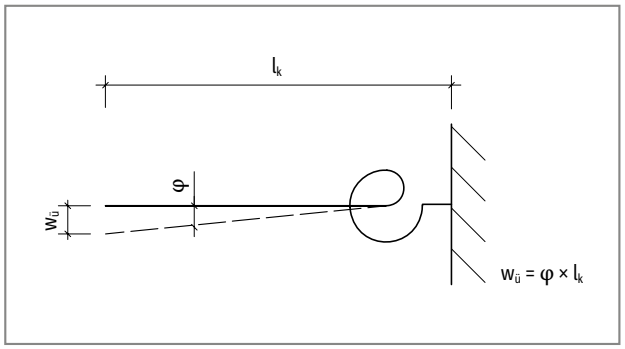


Fig. 30: Schöck Isokorb® T type K-E, K-T: Rotation angle φ and deflection $w_ü$ for modelling as a fixed torsion spring

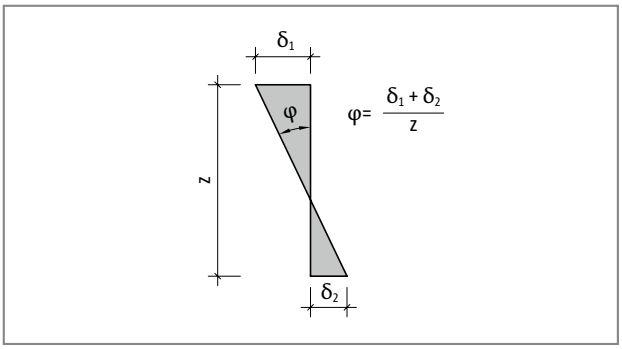


Fig. 31: Schöck Isokorb® T type K-E, K-T: Rotation angle φ via strain as a result of moment loading

Deflection ($w_ü$) as a result of the Schöck Isokorb®

$$w_ü = M_{Ed,GZG} / C \cdot l_k = φ \cdot l_k$$

Notes on deflection

- If you need to prevent a large deflection at the cantilever end, the corresponding concrete elements must be pre-cambered at the cantilever end during installation.
- The deflection caused by the Schöck Isokorb®, the creeping of the concrete and each desired deflection amount for water drainage are superimposed for the calculation of the total deflection.
- The angular deflection of the Schöck Isokorb® is a linearly elastic deformation. The angular deflection is again eliminated when the connection is relieved.
- Depending on the moment capacity, the Schöck Isokorb® has the spring constant C [kNm/rad].

Natural frequency

Avoiding disruptive vibration in cantilevers

In order to avoid vibration in cantilevers, the additional deflection from the live load should be limited to 2 - 2.5 mm depending on the cantilevered length l_k.
In addition, it is recommend that the natural frequency $f_e = (a / w_{ü})^{0.5}$ have a min. value of 6 Hz for a mass distributed evenly. Whereby a = 0,384 m/s^2 applies to the acceleration and $w_{ü}$ is the calculated deflection of the Schöck Isokorb®.

- As rule of thumb, the height H [mm] of the Schöck Isokorb® should be at least as large as 1/11 of the cantilevered length l_k.

FEM calculation

A numerical FEM analysis is an alternative when an analytical calculation does not provide sufficient clarity about the force impact on the Schöck Isokorb® connection. An investigation of the balcony with an Isokorb® connection in the reinforced concrete inner slab can be performed in a 2D slab calculation. The transmission of the forces between various components and within the components themselves is clarified. Additional information is also found in relation to deflections.

i Design

- A combination of a thin floor slab and a rigid balcony element with a large cantilever can lead to the floor hanging on the balcony element in sections. Structural analysis, see page 30.
- It is very difficult to estimate which element transfers which forces for strongly asymmetrical component geometries. The internal static forces can be determined with the help of a FEM analysis.
- If the force transfer depends on the stiffness of concrete components and the Schöck Isokorb® for statically undetermined load-bearing systems, a FEM analysis provides some clarity.

FEM calculation/Modelling

Modelling

In order to obtain useful data from the FEM analysis, it is very important that the connection between the balcony and the floor slab be modelled in a meaningful way. The floor and the balcony must be separated in the FEM model and then linked with bar-shaped elements. It is recommend to insert a finite element length of 250 mm in order to make the force distribution visible within a Schöck Isokorb®. The bars should be laid out so that the behaviour of a Schöck Isokorb® with a length of L250 is represented.

Example 1

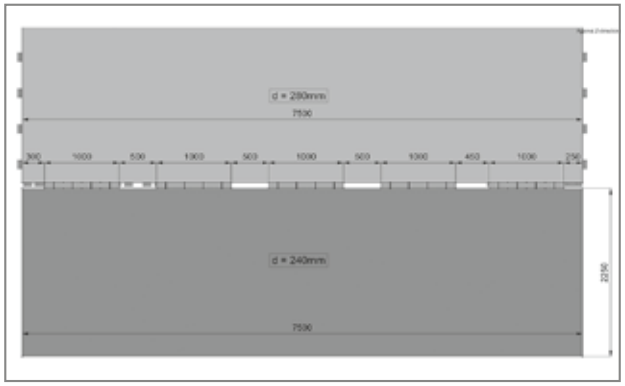


Fig. 32: Schöck Isokorb® T type K-E, K-T: Geometry of the interior floor slab and balcony

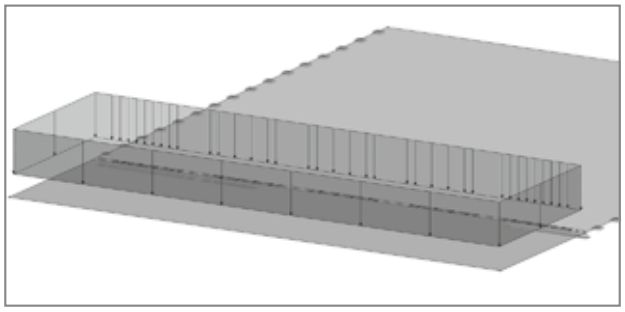


Fig. 33: Schöck Isokorb® T type K-E, K-T: 3D view of the load on the balcony; left slab support articulated, right restrained

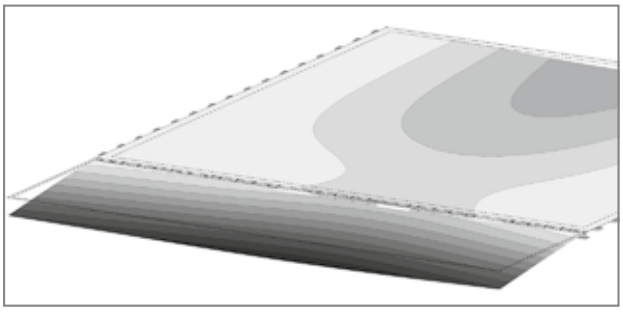


Fig. 34: Schöck Isokorb® T type K-E, K-T: 3D view of floor and balcony deformations

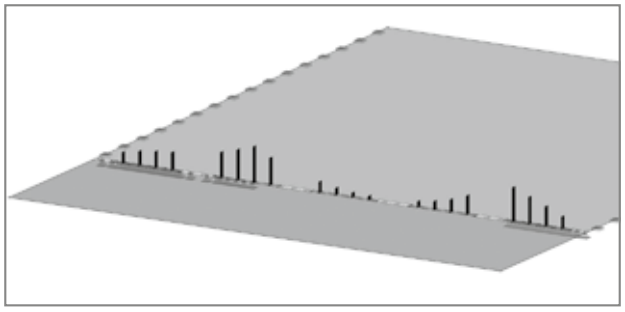


Fig. 35: Schöck Isokorb® T type K-E, K-T: 3D view of uneven shear force distribution; the floor only supports the balcony at the ends, in-between the floor hangs on the balcony

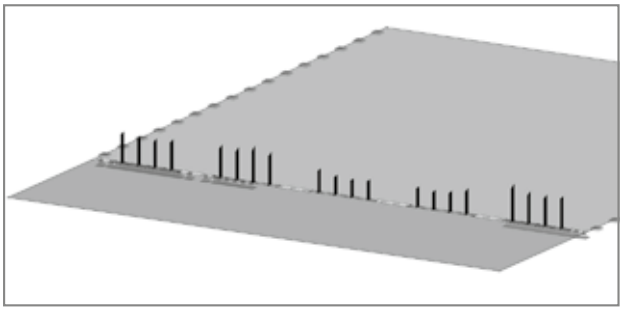


Fig. 36: Schöck Isokorb® T type K-E, K-T: 3D view of the acting moment with uniform moment distribution

This example shows that shear force peaks can occur at the location of the singularity. The use of a Schöck Isokorb® with a high shear force capacity can avoid problems.

FEM calculation/Modelling

Spring stiffness

The connection between the balcony and the inner floor can be represented as a model via bar elements. The stiffness of these bar elements determines the mutual influence of the floor slab and the balcony. For good modelling, 3 different bearing stiffnesses should be taken into account:

- Torsion spring stiffness: Indicates the required bending moment to effect a rotation of 1 rad. For the Schöck Isokorb®, the torsion spring stiffness C is listed in the value tables [kNm/rad; kNm/rad/m].
- Torsional stiffness: Indicates the required torsional moment to effect a rotation of 1 rad. The calculation value of the torsional stiffness of the Schöck Isokorb® is equal to zero.
- Vertical stiffness: This is the force required to effect a lowering of 1 metre. The vertical stiffness has an elastic portion (bar elongation) and a plastic portion. For the calculation of the shear force deformations, a stiffness of 100,000 kN/m per metre should be taken into account.

Example 2

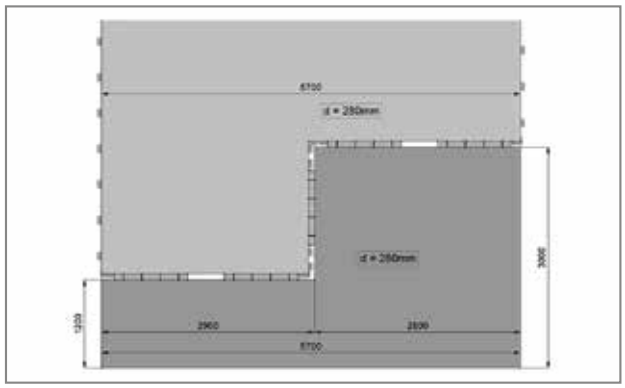


Fig. 37: Schöck Isokorb® T type K-E, K-T: Geometry of the interior floor slab and balcony

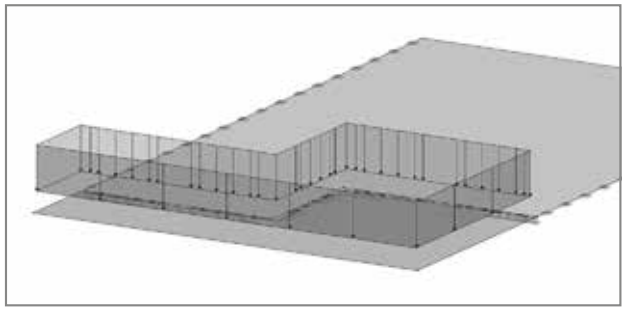


Fig. 38: Schöck Isokorb® T type K-E, K-T: 3D view of the load on the balcony; left and right slab support restrained

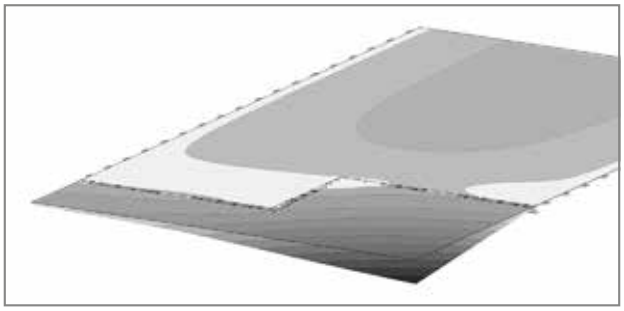


Fig. 39: Schöck Isokorb® T type K-E, K-T: 3D view of floor and balcony deformations

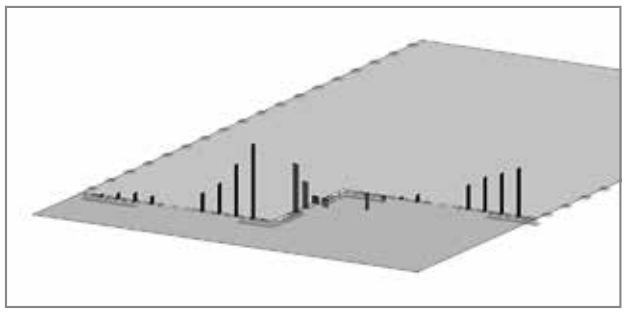


Fig. 40: Schöck Isokorb® T type K-E, K-T: 3D view of uneven shear force distribution

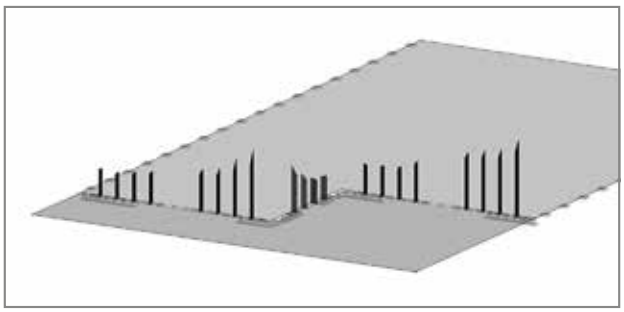


Fig. 41: Schöck Isokorb® T type K-E, K-T: 3D view of the acting moment with uniform moment distribution

Construction materials

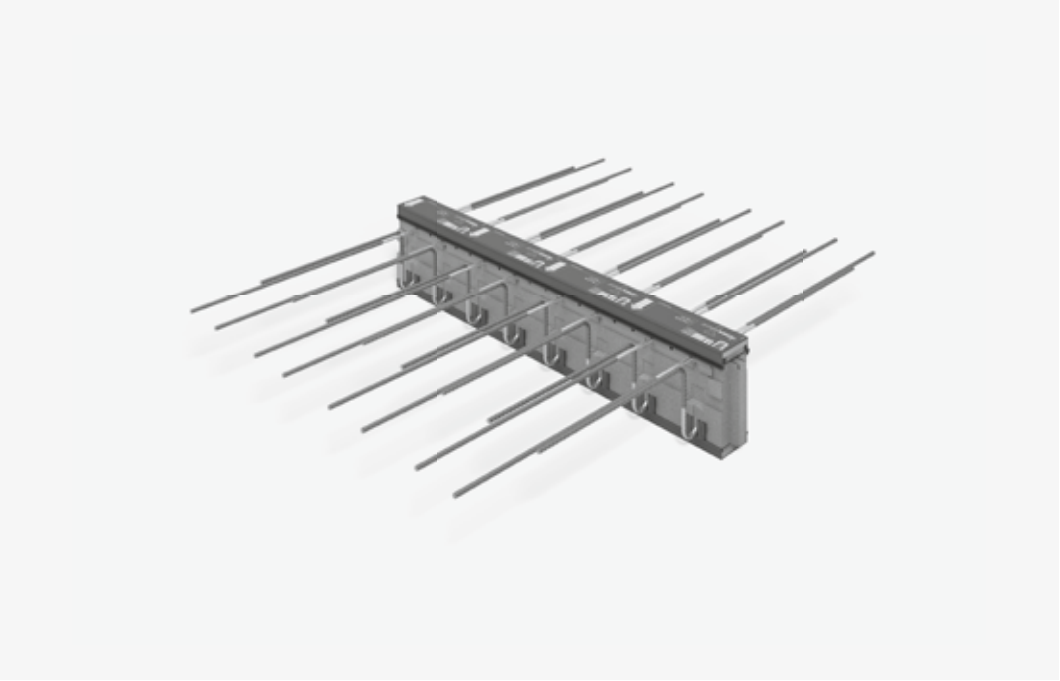
Schöck Isokorb® construction materials

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 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/mm²) 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/m³, melting point T ≥ 1000 °C and integrated fire protection tapes

Connected components

Reinforcing steel	B500A or B500B as per DS/EN 1992-1-1 (EC2) and DS/EN 1992-1-1/NA
Concrete	Normal concrete as per DS/EN 206-1 with a dry apparent density of 2000 kg/m³ to 2600 kg/m³ (lightweight concrete is not permitted) **Indicative minimum strength class of the exterior structural elements:** At least C25/30 and depending on the environmental classification as per DS/EN 1992-1-1/NA, table NA.E.1 **Indicative concrete strength classes of the interior structural elements:** At least C20/25 and depending on the environmental classification as per DS/EN 1992-1-1/NA, table NA.E.1

Schöck Isokorb® T type K-E, K-T



Schöck Isokorb® T type K-E, K-T
Suitable for cantilevered balconies. It transfers negative moments and positive shear forces. The Schöck Isokorb® T type K-T with secondary load-bearing level VV1 transmits negative moments, positive and negative shear forces.

Element arrangement | Installation cross sections

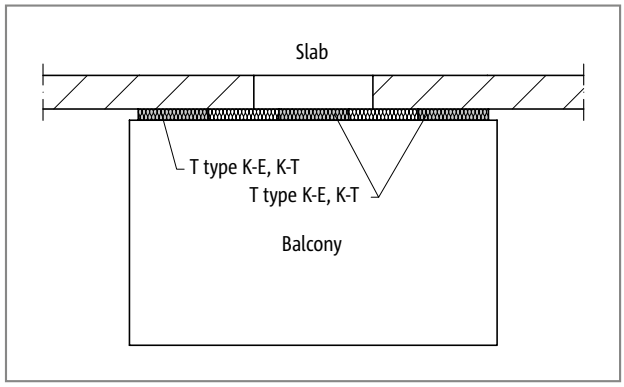


Fig. 42: Schöck Isokorb® T type K-E, K-T: Cantilevered balcony

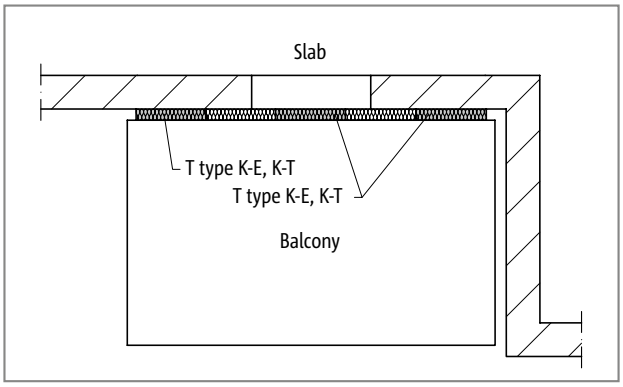


Fig. 43: Schöck Isokorb® T type K-E, K-T: Balcony with façade offset

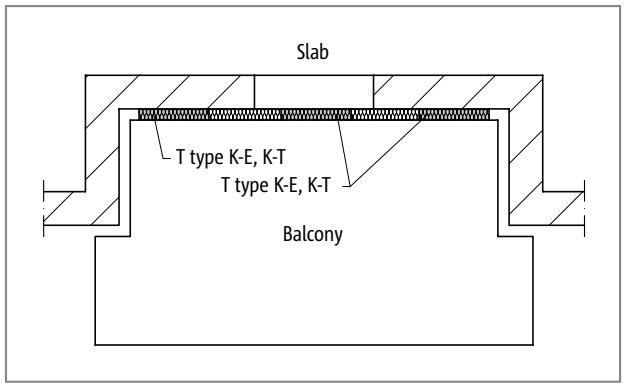


Fig. 44: Schöck Isokorb® T type K-E, K-T: Balcony with façade recess

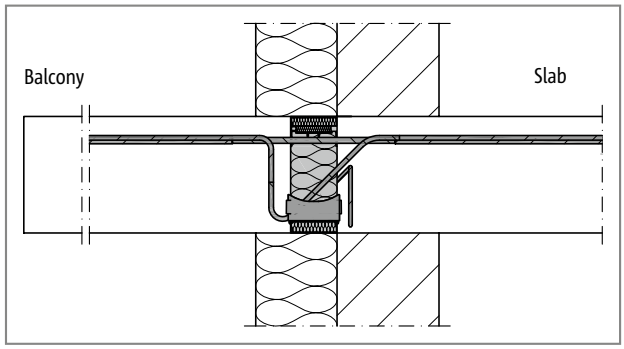


Fig. 45: Schöck Isokorb® T type K-E, K-T: Connection for a thermal insulation bonded system WDVS

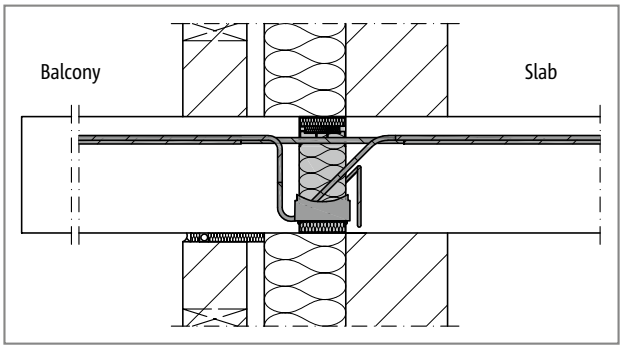


Fig. 46: Schöck Isokorb® T type K-E, K-T: Connection for core insulation

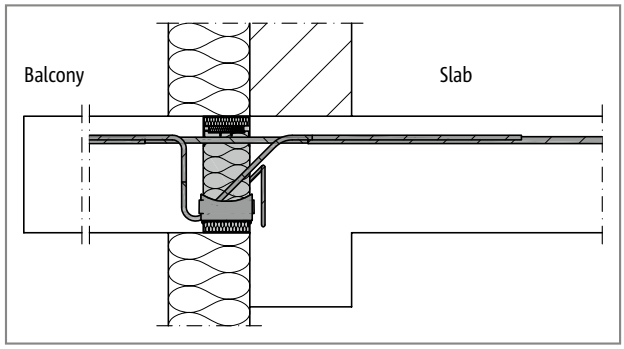


Fig. 47: Schöck Isokorb® T type K-E, K-T: Connection for edge beam and thermal insulation composite system (WDVS)

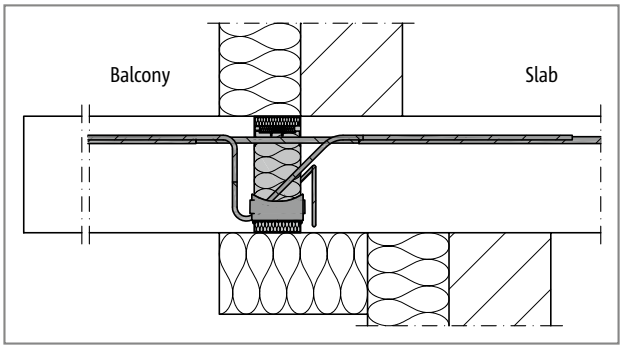


Fig. 48: Schöck Isokorb® T type K-E, K-T: Connection for an indirectly supported floor and WDVS

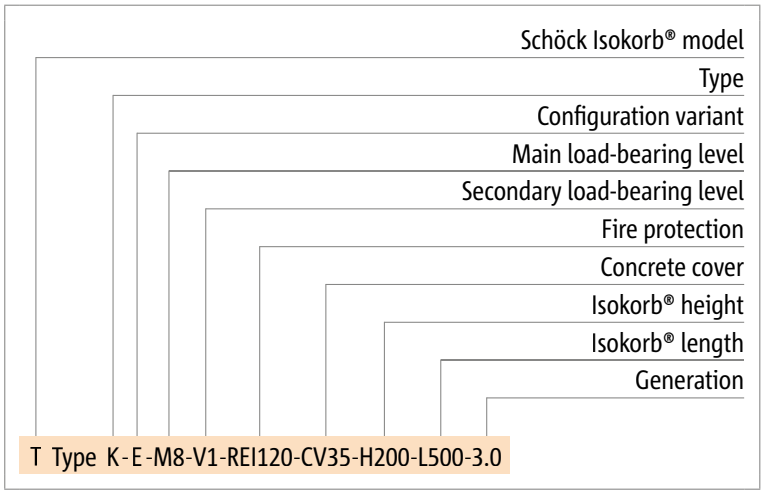
Product selection | Type designations | Special designs

Schöck Isokorb® T type K variants

The configuration of the Schöck Isokorb® T type K can be varied as follows:

- Configuration variant:
  type K-E: Available in lengths L1000, L500 and L250; can be used with Schöck IDock®
  type K-T: Available in lengths L1000 and L500
- Main load-bearing level:
  M1 to M10
  type K-E with main load-bearing level M2, M4, M6, M8
  type K-T with main load-bearing level M1, M3, M5, M7, M9, M10
- Secondary load-bearing level:
  type K-E: V1, V2
  type K-T: V1, V2, VV1
- Fire resistance class:
  REI120 is standard
  R0 is available for improved thermal insulation and sound proofing
- Concrete cover of the tension bars:
  CV30 = 30 mm, CV35 = 35 mm, CV50 = 50 mm
- Isokorb® height:
  H = 160 - 250 mm for concrete cover CV30, CV35
  H = 180 - 250 mm for concrete cover CV50
- Isokorb® length:
  L1000 = 1000 mm, L500 = 500 mm, L250 = 250 mm
- Generation:
  3.0

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

Design

Design

- The Schöck Isokorb® T type K-E with Schöck IDock® can be used for a flexible design of the construction process See Schöck IDock® technical information.
- 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, contact our Design Support department.

Static system

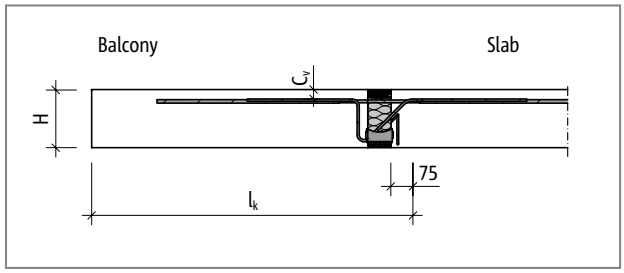


Fig. 49: Schöck Isokorb® T type K-E, K-T: Static system, cross-section

C25/30 design

Schöck Isokorb® T type				K-T-M1	K-E-M2	K-T-M3	K-E-M4	K-T-M5	K-E-M6
Design values with	Concrete cover CV [mm]			Concrete strength class ≥ C25/30					
	CV30	CV35	CV50	$m_{Rd,y}$ [kNm/m]					
Isokorb® height H [mm]	-	160	-	-8.2	-15.9	-23.5	-21.7	-29.3	-31.2
	160	-	180	-8.7	-16.8	-24.9	-23.0	-31.1	-33.1
	-	170	-	-9.2	-17.8	-26.3	-24.3	-32.9	-35.2
	170	-	190	-9.7	-18.7	-27.7	-25.6	-34.8	-37.1
	-	180	-	-10.2	-19.7	-29.1	-27.0	-36.7	-39.2
	180	-	200	-10.7	-20.7	-30.5	-28.3	-38.5	-41.2
	-	190	-	-11.3	-21.7	-31.9	-29.7	-40.4	-43.3
	190	-	210	-11.8	-22.7	-33.3	-31.0	-42.2	-45.3
	-	200	-	-12.3	-23.7	-34.6	-32.4	-44.2	-47.4
	200	-	220	-12.8	-24.7	-36.0	-33.7	-46.0	-49.4
	-	210	-	-13.4	-25.7	-37.3	-35.1	-48.0	-51.5
	210	-	230	-13.9	-26.7	-38.7	-36.5	-49.8	-53.5
	-	220	-	-14.5	-27.7	-40.0	-37.9	-51.8	-55.7
	220	-	240	-15.0	-28.7	-41.4	-39.2	-53.7	-57.7
	-	230	-	-15.6	-29.8	-42.7	-40.7	-55.7	-59.9
	230	-	250	-16.1	-30.8	-44.1	-42.0	-57.6	-61.9
	-	240	-	-16.7	-31.8	-45.4	-43.5	-59.6	-64.1
	240	-	-	-17.3	-32.9	-46.8	-44.9	-61.5	-66.2
	-	250	-	-17.9	-34.0	-48.1	-46.3	-63.5	-68.4
	250	-	-	-18.4	-35.0	-49.5	-47.7	-65.4	-70.4
Secondary load-bearing level				$v_{Rd,z}$ [kN/m]					
	V1			28.0	56.0	42.0	99.5	56.0	99.5
	V2			-	99.5	-	-	99.5	-

Schöck Isokorb® T type	K-T-M1	K-E-M2	K-T-M3	K-E-M4	K-T-M5	K-E-M6
Isokorb® length [mm]	1000	1000	1000	1000	1000	1000
Tension bars V1/V2	4 ⌀ 8	8 ⌀ 8	12 ⌀ 8	8 ⌀ 10	16 ⌀ 8	8 ⌀ 12
Shear force bars V1	4 ⌀ 6	8 ⌀ 6	6 ⌀ 6	8 ⌀ 8	8 ⌀ 6	8 ⌀ 8
Shear force bars V2	-	8 ⌀ 8	-	-	8 ⌀ 8	-
Pressure bearing V1/V2 (piece)	4	8	8	8	10	12
Special stirrup (piece)	-	-	-	-	-	4

Schöck Isokorb® T type	K-T-M1	K-E-M2	K-T-M3	K-E-M4	K-T-M5	K-E-M6
Isokorb® length [mm]	500	500	500	500	500	500
Tension bars V1/V2	2 ⌀ 8	4 ⌀ 8	6 ⌀ 8	4 ⌀ 10	8 ⌀ 8	4 ⌀ 12
Shear force bars V1	2 ⌀ 6	4 ⌀ 6	3 ⌀ 6	4 ⌀ 8	4 ⌀ 6	4 ⌀ 8
Shear force bars V2	-	4 ⌀ 8	-	-	4 ⌀ 8	-
Pressure bearing V1/V2 (piece)	2	4	4	4	5	6
Special stirrup (piece)	-	-	-	-	-	2

Design

- Static system and infomation on the design see page 37.
- T type K-E is also available in length L250.

C25/30 design

Schöck Isokorb® T type				K-T-M7	K-E-M8	K-T-M9	K-T-M10	K-T-M10
Design values with	Concrete cover CV [mm]			Concrete strength class ≥ C25/30				≥ C30/37
	CV30	CV35	CV50	$m_{Rd,y}$ [kNm/m]				
Isokorb® height H [mm]	-	160	-	-38.7	-40.7	-46.3	-46.4	-50.2
	160	-	180	-41.2	-43.2	-49.2	-49.2	-53.3
	-	170	-	-43.7	-45.8	-52.1	-52.1	-56.3
	170	-	190	-46.2	-48.3	-55.0	-55.0	-59.4
	-	180	-	-48.7	-50.9	-57.8	-57.8	-62.5
	180	-	200	-51.2	-53.4	-60.7	-60.7	-65.6
	-	190	-	-53.7	-56.0	-63.5	-63.5	-68.7
	190	-	210	-56.2	-58.5	-66.4	-66.4	-71.8
	-	200	-	-58.8	-61.1	-69.3	-69.3	-74.9
	200	-	220	-61.3	-63.6	-72.1	-72.1	-78.0
	-	210	-	-63.9	-66.1	-75.0	-75.0	-81.1
	210	-	230	-66.4	-68.7	-77.8	-77.8	-84.2
	-	220	-	-69.0	-71.2	-80.7	-80.7	-87.3
	220	-	240	-71.6	-73.8	-83.6	-83.6	-90.4
	-	230	-	-74.2	-76.3	-86.4	-86.4	-93.5
	230	-	250	-76.8	-78.9	-89.3	-89.3	-96.6
	-	240	-	-79.4	-81.4	-92.2	-92.2	-99.7
	240	-	-	-82.0	-84.0	-95.0	-95.0	-102.8
	-	250	-	-84.7	-86.5	-97.9	-97.9	-105.9
	250	-	-	-87.3	-89.0	-100.7	-100.7	-109.0
				$v_{Rd,z}$ [kN/m]				
	V1			99.5	99.5	99.5	124.4	124.4
	VV1			99.5/–49.8	-	-	124.4/–49.8	124.4/–49.8

Schöck Isokorb® T type	K-T-M7	K-E-M8	K-T-M9	K-T-M10	K-T-M10
Isokorb® length [mm]	1000	1000	1000	1000	1000
Tension bars V1/VV1	10 ⌀ 12	8 ⌀ 14	12 ⌀ 12	14 ⌀ 12	14 ⌀ 12
Shear force bars V1	8 ⌀ 8	8 ⌀ 8	8 ⌀ 8	10 ⌀ 8	10 ⌀ 8
Shear force bars VV1	8 ⌀ 8 + 4 ⌀ 8	-	-	10 ⌀ 8 + 4 ⌀ 8	10 ⌀ 8 + 4 ⌀ 8
Pressure bearing V1/ V2/VV1 (pce)	16	16	18	18	18
Special stirrup (piece)	4	4	4	4	4

Schöck Isokorb® T type	K-T-M7	K-E-M8	K-T-M9	K-T-M10	K-T-M10
Isokorb® length [mm]	500	500	500	500	500
Tension bars V1/VV1	5 ⌀ 12	4 ⌀ 14	6 ⌀ 12	7 ⌀ 12	7 ⌀ 12
Shear force bars V1	4 ⌀ 8	4 ⌀ 8	4 ⌀ 8	5 ⌀ 8	5 ⌀ 8
Shear force bars VV1	4 ⌀ 8 + 2 ⌀ 8	-	-	5 ⌀ 8 + 2 ⌀ 8	5 ⌀ 8 + 2 ⌀ 8
Pressure bearing V1/VV1 (pce)	8	8	9	9	9
Special stirrup (piece)	2	2	2	2	2

Design

- Static system and infomation on the design see page 37.
- T type K-E is also available in length L250.

Design C30/37

Schöck Isokorb® T type				K-T-M3	K-E-M4	K-T-M7	K-E-M8	K-T-M9	K-T-M10
Design values with	Concrete cover CV [mm]			concrete strength class ≥ C30/37					
	CV30	CV35	CV50	$m_{Rd,y}$ [kNm/m]					
Isokorb® height H [mm]	-	160	-	-23.5	-21.7	-38.7	-42.8	-46.3	-50.2
	160	-	180	-24.9	-23.0	-41.2	-45.5	-49.2	-53.3
	-	170	-	-26.3	-24.4	-43.7	-48.3	-52.2	-56.3
	170	-	190	-27.7	-25.6	-46.2	-51.0	-55.2	-59.4
	-	180	-	-29.1	-27.0	-48.7	-53.8	-58.2	-62.5
	180	-	200	-30.5	-28.3	-51.2	-56.6	-61.1	-65.6
	-	190	-	-32.0	-29.7	-53.7	-59.4	-64.2	-68.7
	190	-	210	-33.4	-31.0	-56.2	-62.2	-67.1	-71.8
	-	200	-	-34.9	-32.4	-58.8	-65.1	-70.2	-74.9
	200	-	220	-36.3	-33.7	-61.3	-67.9	-73.2	-78.0
	-	210	-	-37.8	-35.1	-63.9	-70.8	-76.3	-81.1
	210	-	230	-39.2	-36.5	-66.4	-73.6	-79.3	-84.2
	-	220	-	-40.8	-37.9	-69.0	-76.5	-82.4	-87.3
	220	-	240	-42.2	-39.2	-71.6	-79.3	-85.4	-90.4
	-	230	-	-43.7	-40.7	-74.2	-82.2	-88.5	-93.5
	230	-	250	-45.2	-42.0	-76.8	-85.1	-91.6	-96.6
	-	240	-	-46.7	-43.5	-79.4	-88.0	-94.7	-99.7
	240	-	-	-48.2	-44.9	-82.0	-90.8	-97.8	-102.8
	-	250	-	-49.8	-46.3	-84.7	-93.6	-100.9	-105.9
	250	-	-	-51.2	-47.7	-87.3	-96.3	-104.0	-109.0
				$v_{Rd,z}$ [kN/m]					
	V1			42.0	99.5	99.5	99.5	99.5	124.4
	VV1			-	-	99.5/–49.8	-	-	124.4/–49.8

Schöck Isokorb® T type	K-T-M3	K-E-M4	K-T-M7	K-E-M8	K-T-M9	K-T-M10
Isokorb® length [mm]	1000	1000	1000	1000	1000	1000
Tension bars V1/VV1	12 ⌀ 8	8 ⌀ 10	10 ⌀ 12	8 ⌀ 14	12 ⌀ 12	14 ⌀ 12
Shear force bars V1	6 ⌀ 6	8 ⌀ 8	8 ⌀ 8	8 ⌀ 8	8 ⌀ 8	10 ⌀ 8
Shear force bars VV1	-	-	8 ⌀ 8 + 4 ⌀ 8	-	-	10 ⌀ 8 + 4 ⌀ 8
Pressure bearing V1/VV1 (pce)	8	8	16	16	18	18
Special stirrup (piece)	-	-	4	4	4	4

Schöck Isokorb® T type	K-T-M3	K-E-M4	K-T-M7	K-E-M8	K-T-M9	K-T-M10
Isokorb® length [mm]	500	500	500	500	500	500
Tension bars V1/VV1	6 ⌀ 8	4 ⌀ 10	5 ⌀ 12	4 ⌀ 14	6 ⌀ 12	7 ⌀ 12
Shear force bars V1	3 ⌀ 6	4 ⌀ 8	4 ⌀ 8	4 ⌀ 8	4 ⌀ 8	5 ⌀ 8
Shear force bars VV1	-	-	4 ⌀ 8 + 2 ⌀ 8	-	-	5 ⌀ 8 + 2 ⌀ 8
Pressure bearing V1/VV1 (pce)	4	4	8	8	9	9
Special stirrup (piece)	-	-	2	2	2	2

Design

- T type K-E, K-T: The main load-bearing levels M1, M2, M5 and M6 achieve the maximum value of the design moment mRd,y with concrete strength class ≥ C25/30.
- T type K-E is also available in length L250.

Torsional spring stiffness

Schöck Isokorb® T type				K-T-M1	K-E-M2	K-T-M3	K-E-M4	K-T-M5	K-E-M6
Torsion spring stiffness for	Concrete cover CV [mm]			Concrete strength class ≥ C25/30					
	CV30	CV35	CV50	C [kNm/rad/m]					
Isokorb® height H [mm]	-	160	-	823	1647	2142	1843	2465	2266
	160	-	180	923	1846	2402	2069	2783	2565
	-	170	-	1028	2057	2676	2307	3120	2884
	170	-	190	1140	2279	2965	2559	3476	3221
	-	180	-	1256	2513	3269	2825	3851	3576
	180	-	200	1379	2758	3588	3103	4246	3951
	-	190	-	1507	3014	3921	3394	4660	4343
	190	-	210	1641	3282	4270	3698	5093	4755
	-	200	-	1781	3561	4633	4015	5546	5185
	200	-	220	1926	3852	5011	4346	6018	5634
	-	210	-	2077	4154	5404	4689	6509	6101
	210	-	230	2234	4467	5812	5046	7019	6587
	-	220	-	2396	4792	6234	5415	7549	7091
	220	-	240	2564	5128	6672	5798	8097	7615
	-	230	-	2738	5476	7124	6193	8665	8156
	230	-	250	2917	5835	7591	6602	9253	8717
	-	240	-	3103	6205	8073	7024	9859	9296
	240	-	-	3293	6587	8569	7459	10485	9894
	-	250	-	3490	6980	9081	7906	11130	10510
	250	-	-	3692	7385	9607	8367	11795	11145

Torsional spring stiffness

Schöck Isokorb® T type				K-T-M7	K-E-M8	K-T-M9	K-T-M10
Torsion spring stiffness for	Concrete cover CV [mm]			Concrete strength class ≥ C25/30			
	CV30	CV35	CV50	C [kNm/rad/m]			
Isokorb® height H [mm]	-	160	-	2892	2888	3398	3756
	160	-	180	3275	3276	3848	4253
	-	170	-	3681	3687	4325	4781
	170	-	190	4111	4123	4831	5340
	-	180	-	4565	4584	5364	5929
	180	-	200	5043	5068	5926	6550
	-	190	-	5545	5577	6515	7201
	190	-	210	6070	6111	7132	7883
	-	200	-	6619	6668	7777	8596
	200	-	220	7192	7251	8450	9340
	-	210	-	7788	7857	9151	10115
	210	-	230	8409	8488	9880	10920
	-	220	-	9053	9143	10637	11757
	220	-	240	9721	9823	11422	12624
	-	230	-	10412	10527	12235	13523
	230	-	250	11128	11255	13075	14452
	-	240	-	11867	12008	13944	15412
	240	-	-	12630	12785	14840	16403
	-	250	-	13417	13586	15765	17424
	250	-	-	14227	14412	16717	18477

Deflection/Camber | Vibrations

Deflection

The deflection calculation is used to estimate the required precamber. The arithmetic camber of the balcony slab formwork results from the calculation acc. to DS/EN 1992-1-1 (EC2) and DS/EN 1992-1-1/NA in addition to 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 cantileverslab end).

Deflection ($w_ü$) as a result of the Schöck Isokorb®

$w_ü$ = $M_{Ed,GZG}$ / C · l_k ·10^3 [mm]

Factors to be applied:

$M_{Ed,GZG}$ = Relevant bending moment [kNm/m] in the ultimate limit state for the determination of the deflection $w_ü$ [mm] from the Schöck Isokorb®.
The load combination to applied for the deflection is determined by the structural engineer.
(Recommendation: Load combination for the determination of the camber $w_ü$: determine g + 0,3 · q, $M_{Ed,GZG}$ in the ultimate limit state)

C = Torsion spring stiffness of the Schöck Isokorb® [kNm/rad/m], see design

l_k = cantilever length [m]

Calculation example, see page 52

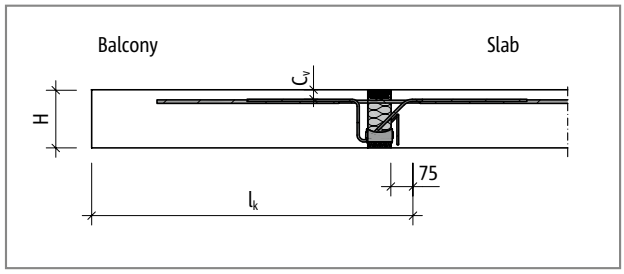


Fig. 50: Schöck Isokorb® T type K-E, K-T: Static system, cross-section

Vibrations

To ensure the serviceability, we recommend calculating the natural frequency of the balcony. The first natural frequency f_e is calculated simply with the deflection $w_ü$ as a result of the Schöck Isokorb®. At f_e > 6 Hz, disruptive vibrations should be ruled out. A natural frequency f_e > 5 Hz is sufficient when the deflection being used takes into account the bending of the balcony slab.

Natural frequency (f_e) taking into account the torsion spring stiffness of the Schöck Isokorb®

f_e = √(0,384 • 10^3/$w_ü$) > 6 Hz (> 5 Hz)

Factors to be applied:

$w_ü$ = deflection as a result of the Schöck Isokorb® [mm]

Calculation example, see page 52

Slenderness | Expansion joint spacing

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® T type		K-E, K-T		
maximum cantilever length with		$l_{k,max}$ [m]		
		CV30	CV35	CV50
Isokorb® height H [mm]	160	1.81	1.74	-
	170	1.95	1.88	-
	180	2.10	2.03	1.81
	190	2.25	2.17	1.95
	200	2.39	2.32	2.10
	210	2.54	2.46	2.25
	220	2.68	2.61	2.39
	230	2.83	2.76	2.54
	240	2.98	2.90	2.68
	250	3.12	3.05	2.83

maximum cantilever length

- The maximum cantilevered length for ensuring the serviceability is a benchmark. It can be limited by the load bearing capacity when using the Schöck Isokorb® T type K-E, K-T.
- The table value for the maximum cantilevered length $l_{k,max}$ should be reduced by 10% for heavier balustrades.

Maximum expansion joint spacing

If the component length exceeds the maximum expansion joint spacing e, then expansion joints must be incorporated into the external concrete components at right angles to the insulating layer in order to limit the effect as a result of temperature changes. Because the layout of the Isokorb® is only possible along the side of the component due to the installation in conjunction with the external concrete precast element, corners of balconies, parapets and balustrades cannot form any fixed points.

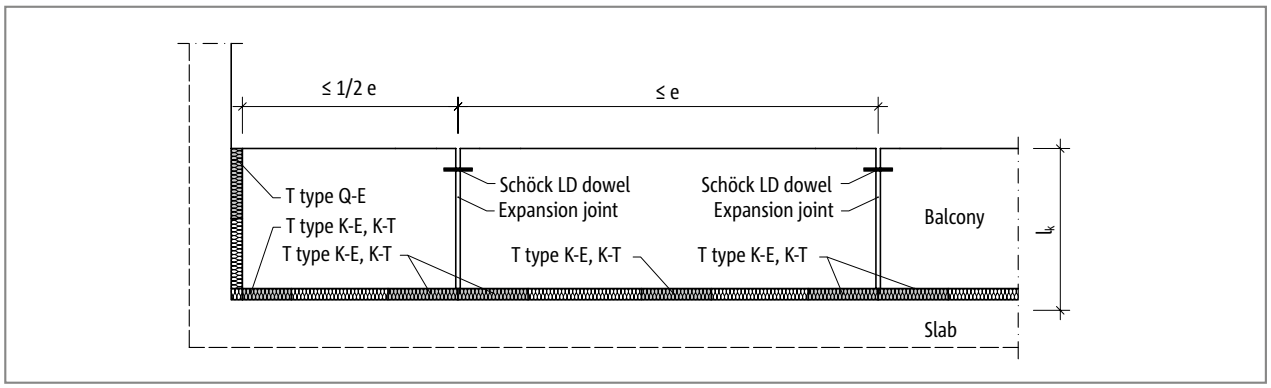


Fig. 51: Schöck Isokorb® T type K-E, K-T: Expansion joint spacing

Schöck Isokorb® T type K-E, K-T		M1 - M5	M6, M7, M9, M10	M8
Maximum expansion joint spacing		e [m]		
Insulating element thickness [mm]	80	13.5	13.0	11.7

Edge distances

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

- For centre distance of the tension bars from the free edge resp. from the expansion joint: $e_R \geq 50$ mm applies.
- For the centre distance of the compression bars from the free edge resp. exapansion joint: $e_R \geq 100$ mm applies.

Product description

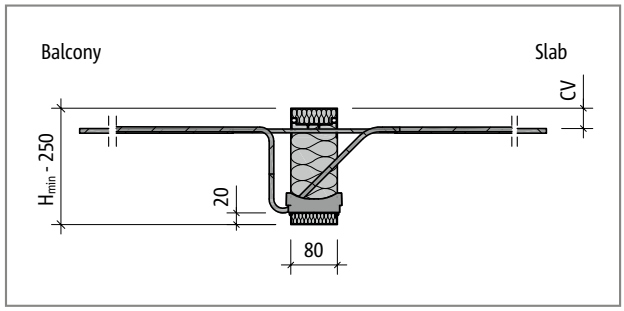


Fig. 52: Schöck Isokorb® T type K-T-M1, K-E-M2, K-T-M3: Product section

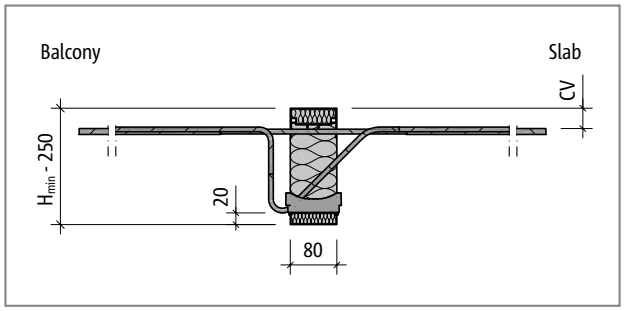


Fig. 53: Schöck Isokorb® T type K-E-M4: Product section

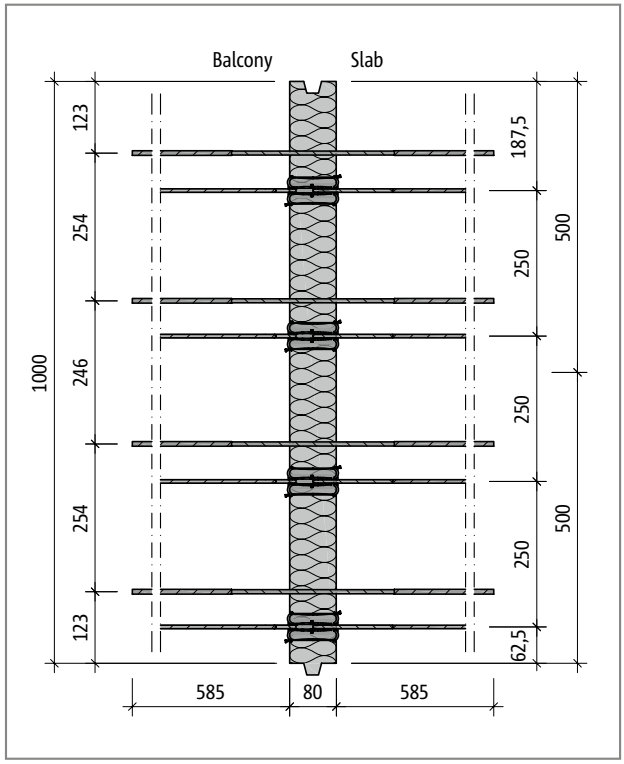


Fig. 54: Schöck Isokorb® T type K-T-M1: Product layout

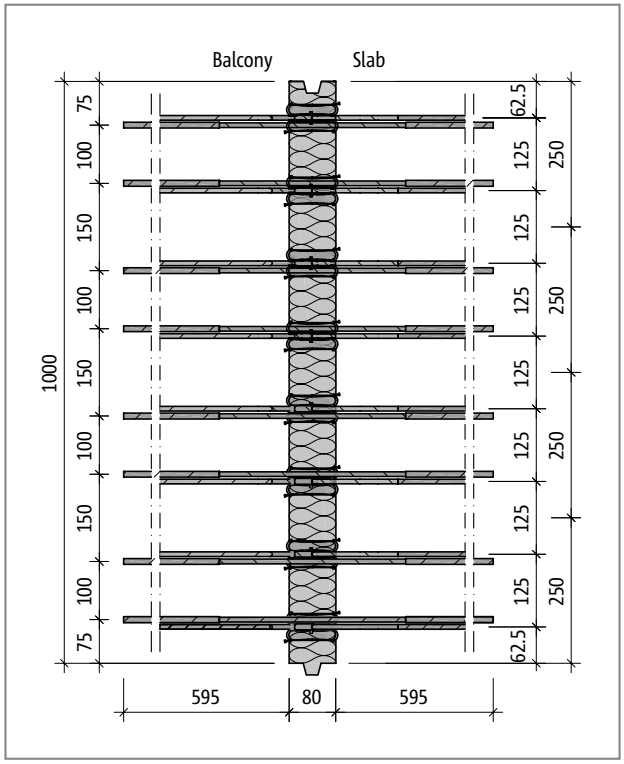


Fig. 55: Schöck Isokorb® type K-E-M4: Product layout

Product information

- For additional 2D and 3D product drawings contact our Design Support department.
- Concrete cover of the tension bars: CV30 = 30 mm, CV35 = 35 mm, CV50 = 50 mm
- If the fire protection designation (R0) is left out when ordering, then fire protection configuration (REI120) is delivered by default.

Product description

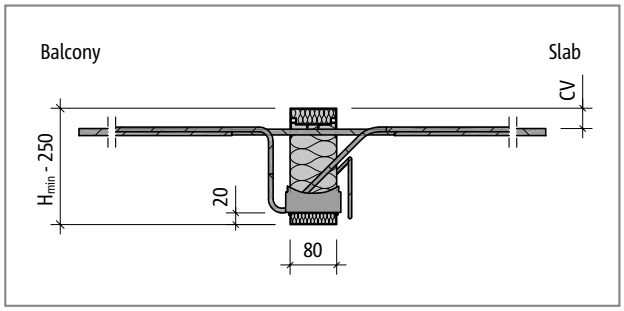


Fig. 56: Schöck Isokorb® T type K-E-M6, K-T-M7, -M9, -M10: Product section

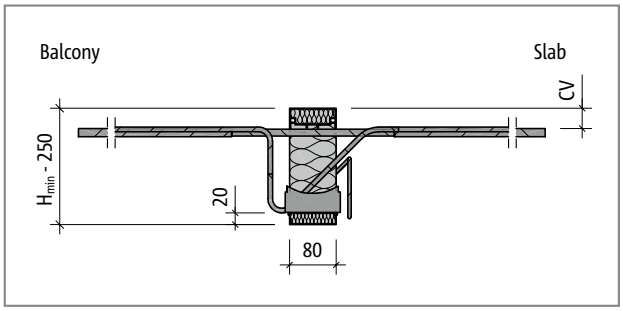


Fig. 57: Schöck Isokorb® T type K-E-M8: Product section

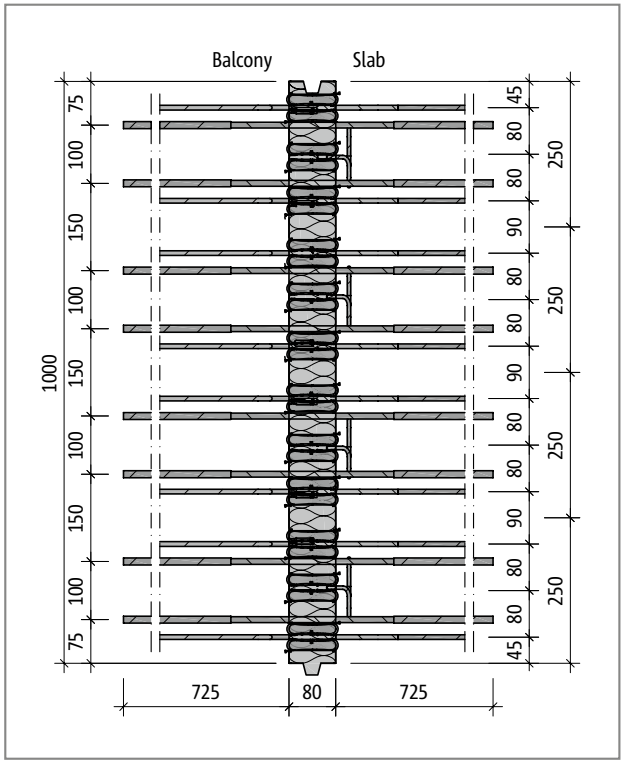


Fig. 58: Schöck Isokorb® T type K-E-M6: Product layout

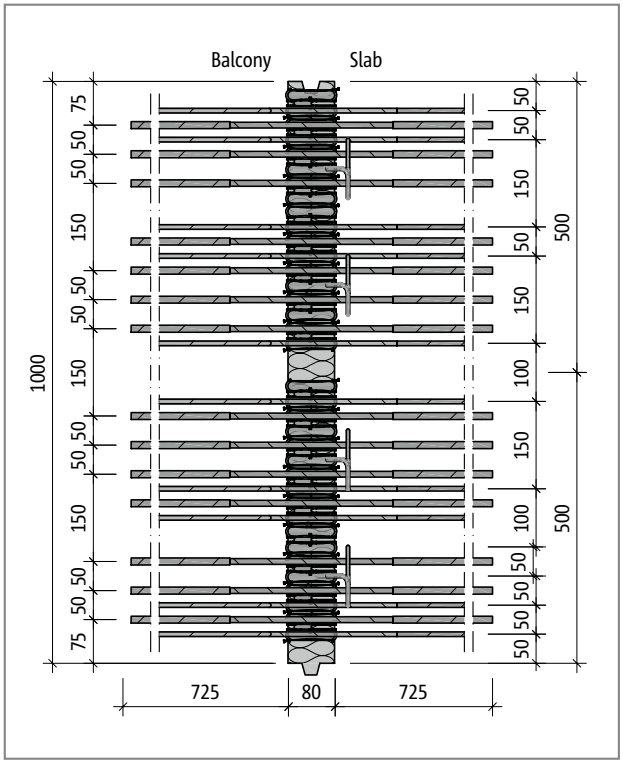


Fig. 59: Schöck Isokorb® T type K-T-M10-V1: Product layout

Product information

- For additional 2D and 3D product drawings contact our Design Support department.
- Concrete cover of the tension bars: CV30 = 30 mm, CV35 = 35 mm, CV50 = 50 mm

Product description

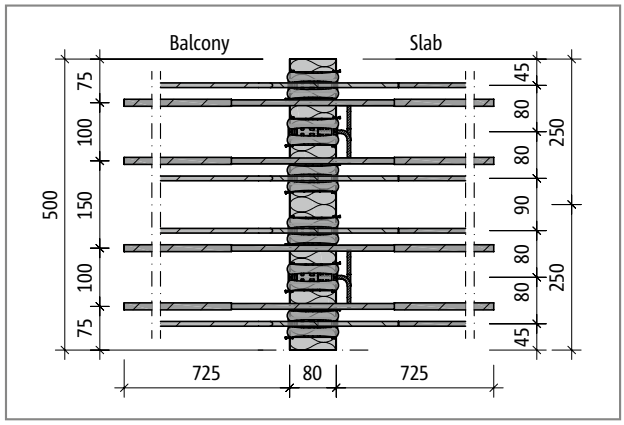


Fig. 60: Schöck Isokorb® T type K-E-M6: Product layout of the variant length L500

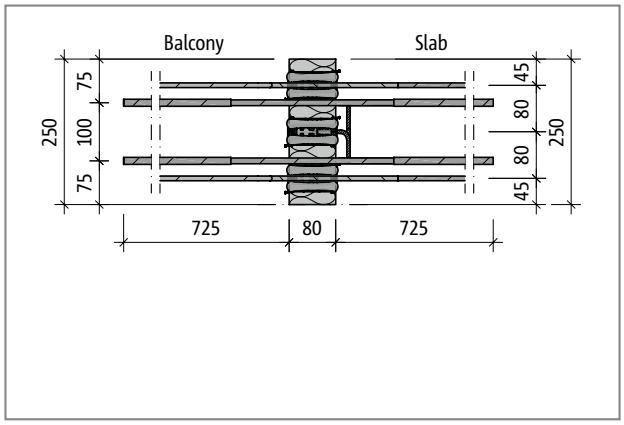


Fig. 61: Schöck Isokorb® T type K-E-M6: Product layout of the variant length L250

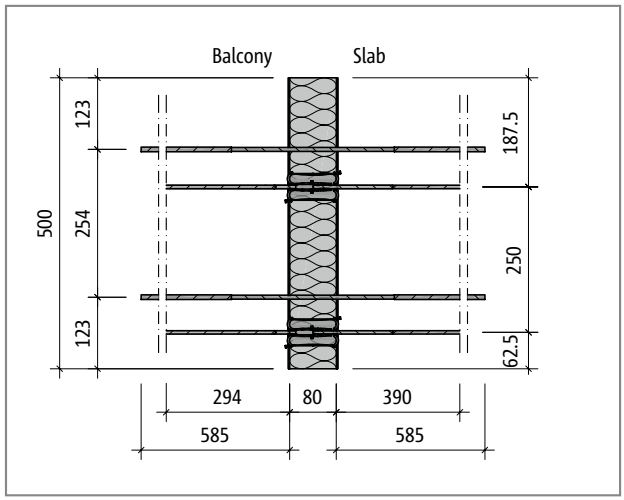


Fig. 62: Schöck Isokorb® T type K-T-M1: Product layout of the variant length L500

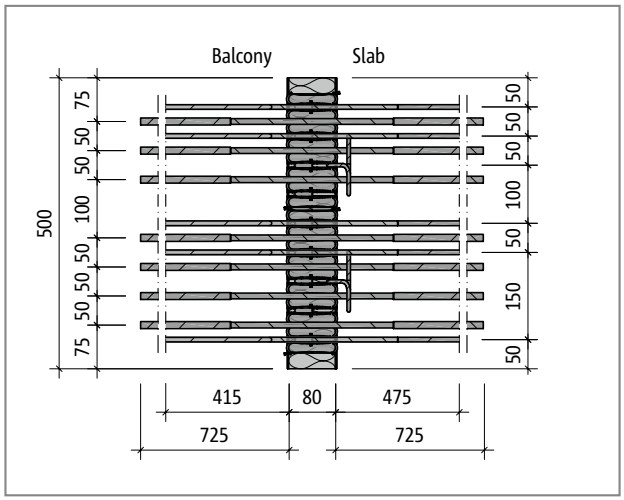


Fig. 63: Schöck Isokorb® T type K-T-M10: Product layout of the variant length L500

Product information

- For additional 2D and 3D product drawings contact our Design Support department.
- Concrete cover of the tension bars: CV30 = 30 mm, CV35 = 35 mm, CV50 = 50 mm
- Length: L = 250 mm, L = 500 mm or L = 1000 mm for Schöck Isokorb® T type K-E
- Length: L = 500 mm or L = 1000 mm for Schöck Isokorb® T type K-T
- If the fire protection designation (R0) is left out when ordering, then fire protection configuration (REI120) is delivered by default.

On-site reinforcement

Without edge beams

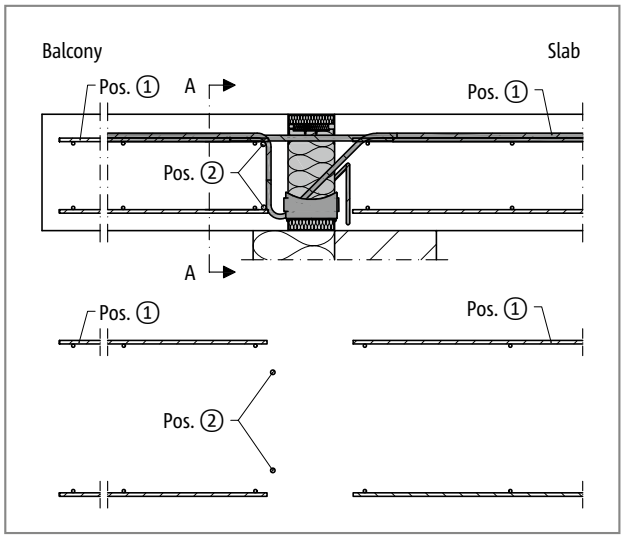


Fig. 64: Schöck Isokorb® T type K-E, K-T: On site reinforcement; inner slab edge with wall support

With edge beams

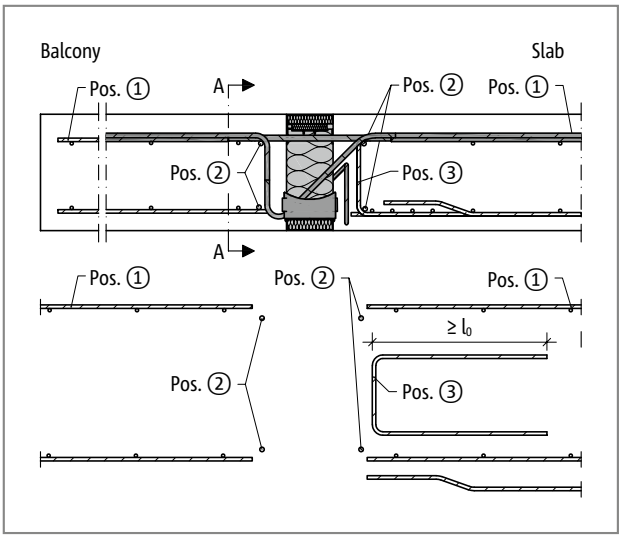


Fig. 65: Schöck Isokorb® T type K-E, K-T: On site reinforcement; floor with edge beams

Information on side reinforcement

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

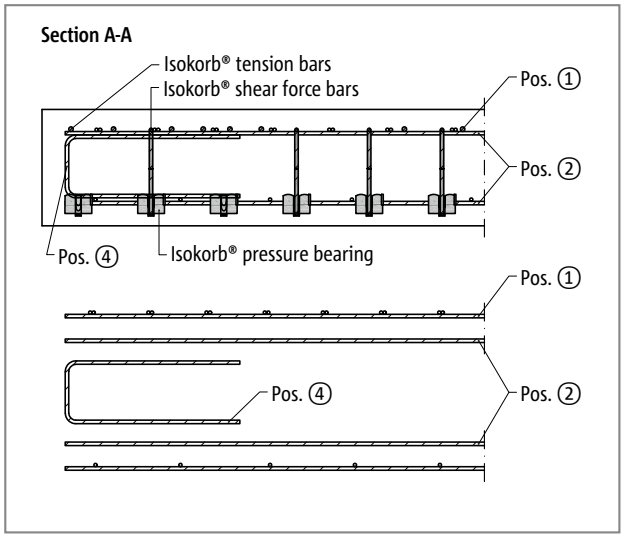


Fig. 66: Schöck Isokorb® T type K-E, K-T: On-site reinforcement on the balcony side in section A-A; Pos.4 = supplementary edge reinforcement on the free edge perpendicular to the Schöck Isokorb®

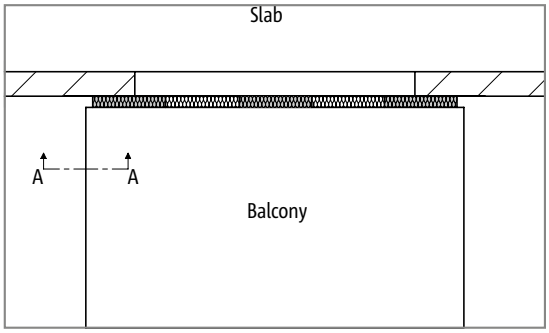


Fig. 67: Schöck Isokorb® T type K-E, K-T: Section A-A

On-site reinforcement

Schöck Isokorb® type			K-T-M1	K-E-M2	K-T-M3	K-E-M4	K-T-M5
On-site reinforcement	Location	Height [mm]	Concrete strength class ≥ C25/30				
Pos. 1 Lapping reinforcement							
Pos. 1 [mm²/m]	Balcony/floor side	160 - 250	201	402	604	628	804
Pos. 2 Steel bars along the insulation joint							
Pos. 2	Balcony/floor side	160 - 250	acc. to the specifications of the structural engineer				
Pos. 3 Edge- and splitting tension reinforcement							
Pos. 3 [mm²/m]	Floor side	160 - 250	125	125	125	125	287
Pos. 4 Side reinforcement at the free edge							
Pos. 4	Balcony/floor side	160 - 250	acc. to EN 1992-1-1 (EC2), 9.3.1.4				

Schöck Isokorb® T type			K-E-M6	K-T-M7	K-E-M8	K-T-M9	K-T-M10
On-site reinforcement	Location	Height [mm]	Concrete strength class ≥ C25/30				
Pos. 1 Lapping reinforcement							
Pos. 1 [mm²/m]	Balcony/floor side	160 - 250	905	1131	1232	1357	1583
Pos. 2 Steel bars along the insulation joint							
Pos. 2	Balcony/floor side	160 - 250	acc. to the specifications of the structural engineer				
Pos. 3 Edge- and splitting tension reinforcement							
Pos. 3 [mm²/m]	Floor side	160 - 250	421	421	421	451	520
Pos. 4 Side reinforcement at the free edge							
Pos. 4	Balcony/floor side	160 - 250	acc. to EN 1992-1-1 (EC2), 9.3.1.4				

Information about on-site reinforcement

- Alternative connection reinforcements are possible. The rules as per DS/EN 1992-1-1 (EC2) and DS/EN 1992-1-1/NA apply for calculating the lap length. A reduction of the required lap length using m_{Ed}/m_{Rd} is permitted.
- 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

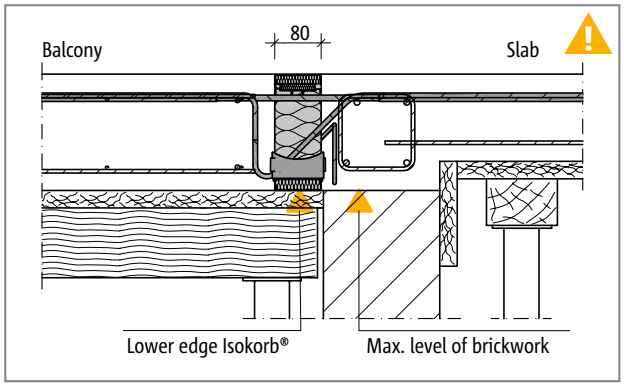


Fig. 68: Schöck Isokorb® T type K-E, K-T: In-situ concrete construction with height offset floor on masonry wall

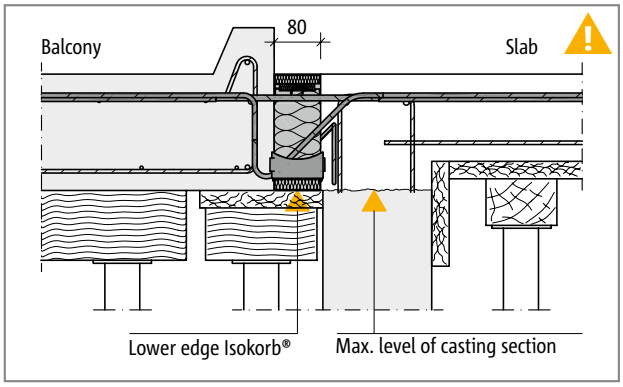


Fig. 69: Schöck Isokorb® T type K-E, K-T: Fully-finished balcony with height offset floor on reinforced concrete wall

⚠ 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

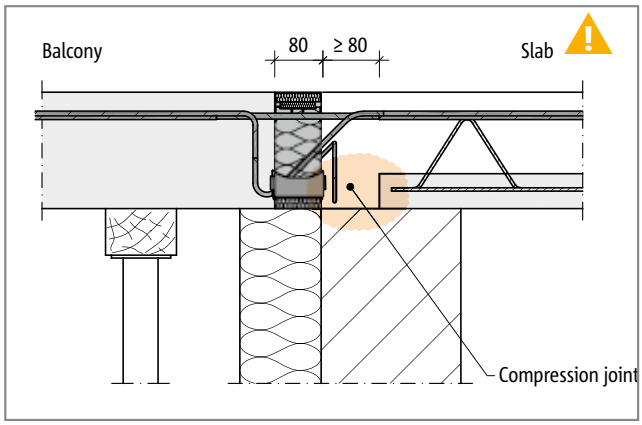


Fig. 70: Schöck Isokorb® T type K-E, K-T: Installation in conjunction with prefabricated slab with wall support, compression joint on the floor side

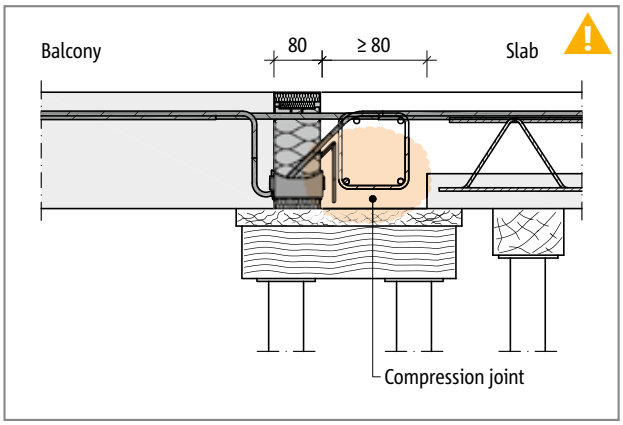


Fig. 71: Schöck Isokorb® T type K-E, K-T: Installation in conjunction with prefabricated slab with edge beams, compression joint on the floor side

⚠ Hazard note: Compression joints

Compression joints are joints which, with unfavourable loading combination, remain always in compression (DS/EN 1992-1-1/NA, NCI to 10.9.4.3(1)). The underside of a cantilever balcony is always a compression zone. If the cantilever balcony is a complete 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®, a in-situ concrete resp. pour of ≥ 80 mm width is to be cast. This is to be entered in the working drawings.
- We recommend the installation of the Schöck Isokorb® and/or the pouring of the balcony-side compression joint already in the precast concrete plant.

Precast construction

Precast part construction - Fully precast balcony
IDock1 without edge beams

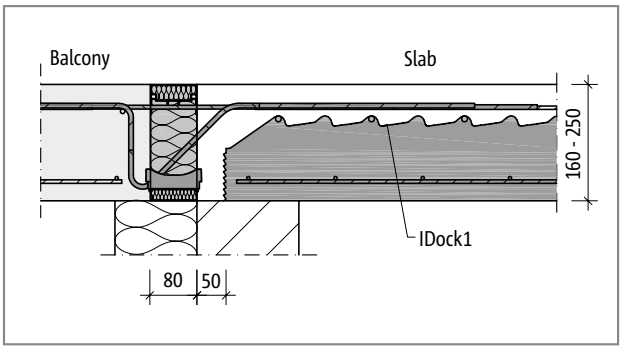


Fig. 72: Schöck Isokorb® T type K-E: Connection of balconies with slab thicknesses of 160 mm to 200 mm with IDock1

IDock2 with edge beams

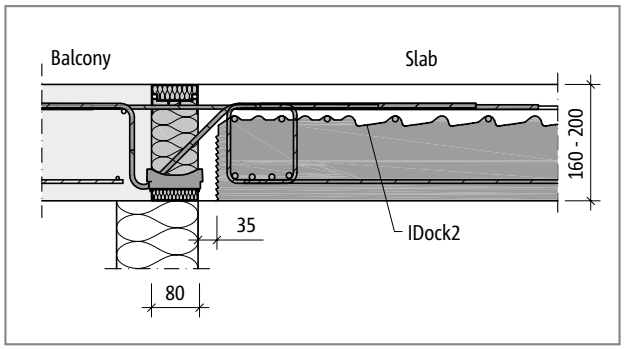


Fig. 73: Schöck Isokorb® T type K-E: Connection of balconies with slab thicknesses of 160 mm to 200 mm with IDock2

Precast part construction

- The Schöck Isokorb® T type K-E with Schöck IDock® can be used for a flexible design of the construction process See Schöck IDock® technical information.

Design example

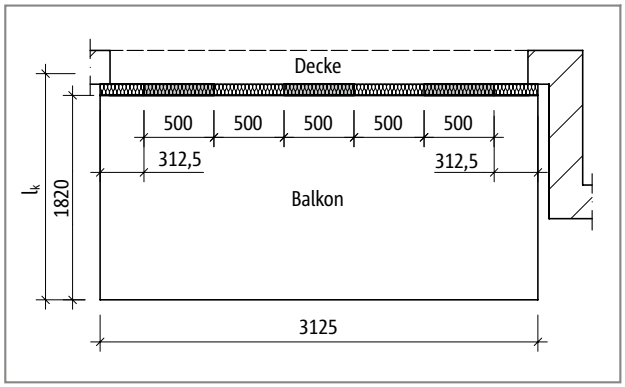


Fig. 74: Schöck Isokorb® T type K-E, K-T: Static system, layout

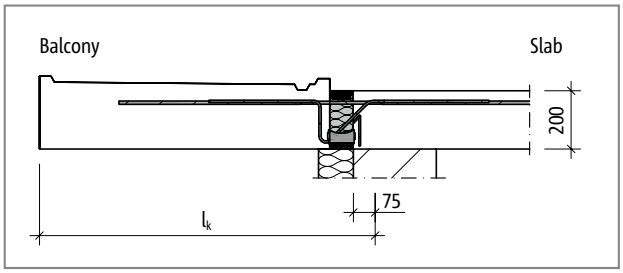


Fig. 75: Schöck Isokorb® T type K-E, K-T: Static system, cross-section

Static system and load assumptions

Geometry:	Schöck Isokorb® height	h = 200 mm
	cantilever length	l_k = 1.98 m
	Average balcony slab thickness	h = 230 mm
Load assumptions:	balcony slab	g = 5.75 kN/m²
	live load	q = 2.5 kN/m²
	edge load (balustrade)	g_R = 1.0 kN/m
Exposure classes:	external XC 4	
	internal XC 1	
chosen:	Concrete strength class C25/30 for floor	
	Concrete strength class C45/55 for balcony	
	Concrete cover c_v = 35 mm for Schöck Isokorb® tension bars	
Connection geometry:	no height offset, no floor downstand beam, no balcony upstand	
Support floor:	floor edge directly supported	
Support balcony:	restraint of cantilever slab using T type K-E	

Proof of limits of load-bearing capacity (moment stress and shear force)

The calculation takes into account the gaps shown in the above drawing with the proportion of the balcony length to the length of the connection with Isokorb®(= 3.125 m / 1.50 m).

Internal forces:

m_{Ed} = $-(0.5 \cdot [3.125 \cdot (\gamma_G \cdot g + \gamma_Q \cdot q) + 2 \cdot \gamma_G \cdot g_R] \cdot l_k^2 + 3.125 \cdot \gamma_G \cdot g_R \cdot l_k) / 1.50$

m_{Ed} = $-(0.5 \cdot [3.125 \cdot (1.0 \cdot 5.75 + 1.5 \cdot 2.5) + 2 \cdot 1.0 \cdot 1.0] \cdot 1.98^2 + 3.125 \cdot 1.0 \cdot 1.0 \cdot 1.98) / 1.50$

= -45.3 kNm/m

v_{Ed} = $+([3.125 \cdot [(\gamma_G \cdot g + \gamma_Q \cdot q) + 2 \cdot \gamma_G \cdot g_R] \cdot l_k + 3.125 \cdot \gamma_G \cdot g_R) / 1{,}50$

v_{Ed} = $+([3.125 \cdot [(1.2 \cdot 5.75 + 1.5 \cdot 4.0) + 2 \cdot 1.2 \cdot 1.0] \cdot 1.92 + 3.125 \cdot 1.2 \cdot 1.0) / 1.50$

= +43.8 kN/m

Selected: **3 pieces of Schöck Isokorb® T type K-E-M8-V1-REI120-CV35-H200-L500**

m_{Rd} = -61,1 kNm/m (see page 39) > m_{Ed}

v_{Rd} = +99.5 kN/m (see page 39) > v_{Ed}

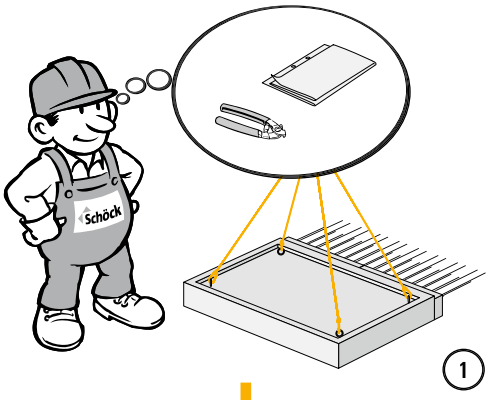
Design example

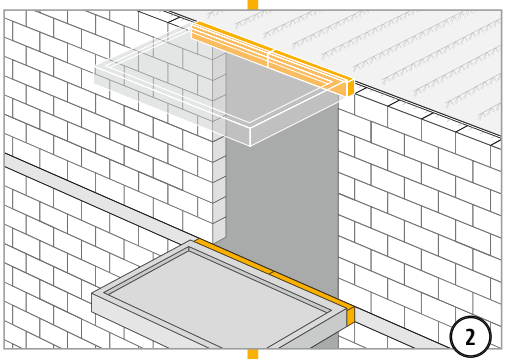
Proof of ultimate limit state (deflection/precamber, vibrations)

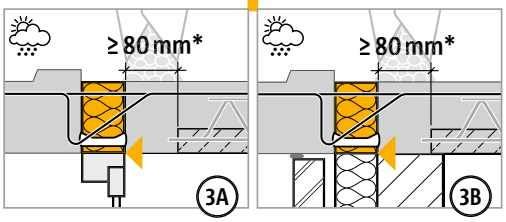
The calculation takes into account the gaps shown in the above drawing with the proportion of the balcony length to the length of the connection with Isokorb® (= 3.125 m / 1.50 m).

Torsion spring stiffness:	C	= 6668 kNm/rad/m (from table, see page 42)
Quasi-state load combination:	g + 0.3 • q	
	(Recommendation for the calculation of the precamber from Schöck Isokorb®)	
	$M_{Ed,GZG}$ Determine in ultimate limit state	
	$M_{Ed,GZG}$	$= -(0.5 \cdot [3.125 \cdot (g + \psi_{2,i} \cdot q) + 2 \cdot g_R] \cdot l_k^2 + 3.125 \cdot g_R \cdot l_k) / 1.50$
	$M_{Ed,GZG}$	$= -(0.5 \cdot [3.125 \cdot (5.75 + 0.3 \cdot 2.5) + 2 \cdot 1.0] \cdot 1.98^2 + 3.125 \cdot 1.0 \cdot 1.98) / 1.50$
		= -33.1 kNm/m
Deflection	$w_{ü}$	$= \lvert M_{Ed,GZG} \rvert / C \cdot l_k \cdot 10^3$ [mm]
	$w_{ü}$	$= 33.1 / 6668 \cdot 1.98 \cdot 10^3 = 9.8$ mm
Natural frequency	f_e	$= \sqrt{(0.384 \cdot 10^3 / 9.8)} = 6.3$ Hz > 6 Hz
	=> no disruptive vibrations	
Layout of expansion joints	Length of balcony:	3.125 m < 13.00 m
	=> no expansion joints required	

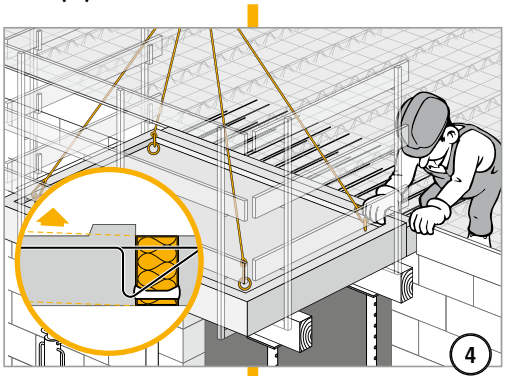
Installation instructions for precast balconies

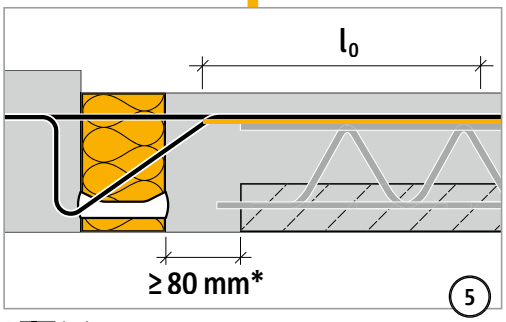




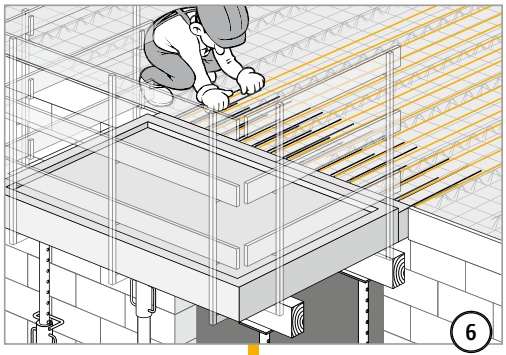


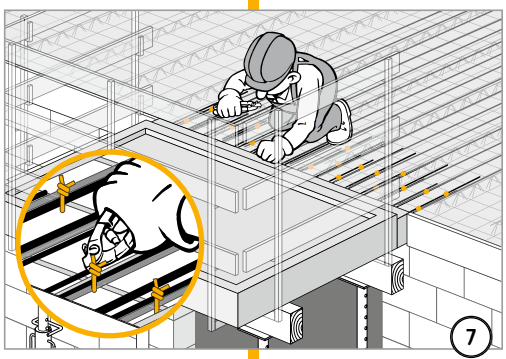
* (FI): ≥ 100 mm

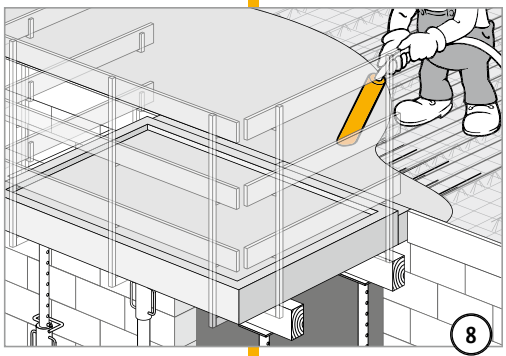




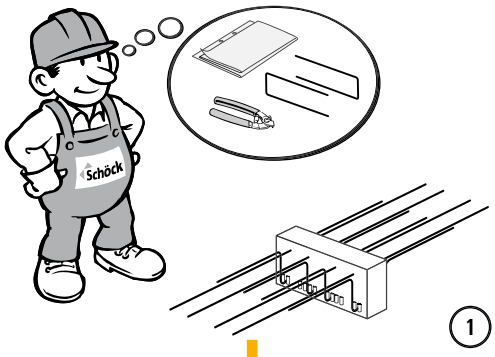
* (FI): ≥ 100 mm

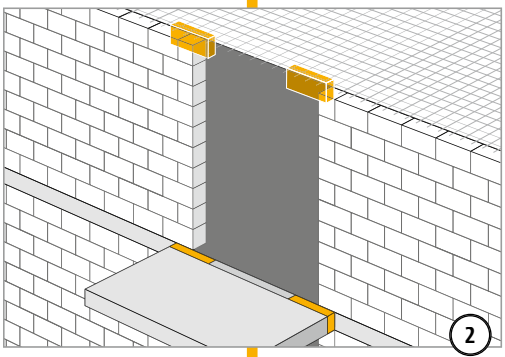


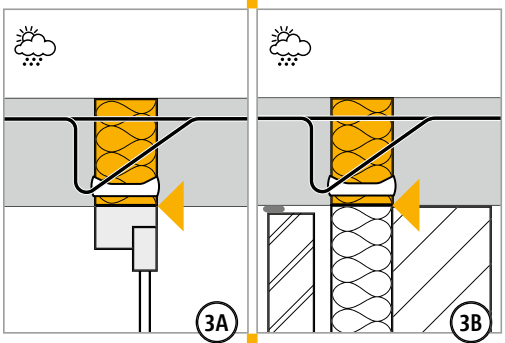


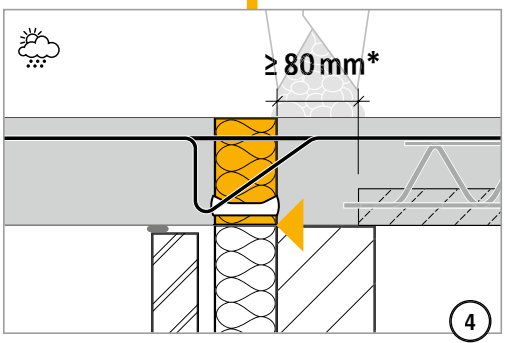


Installation instructions for in-situ concrete at the building site

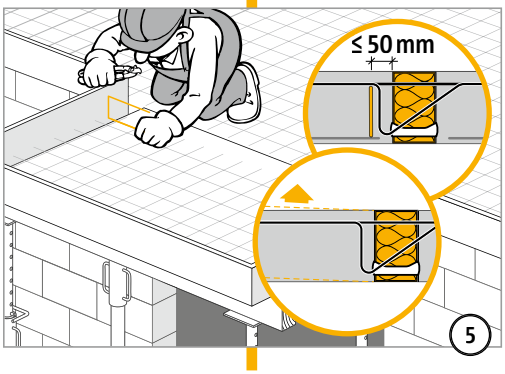


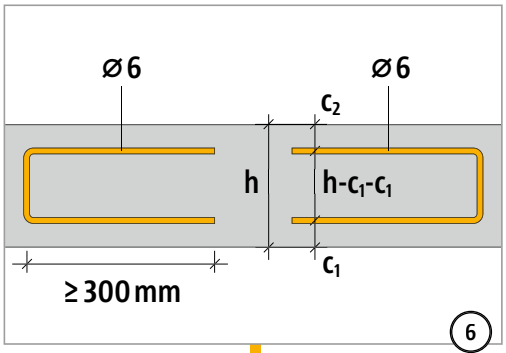


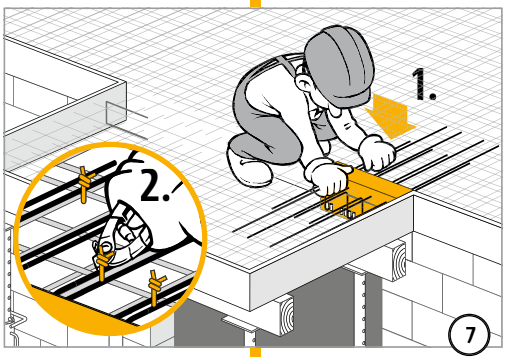


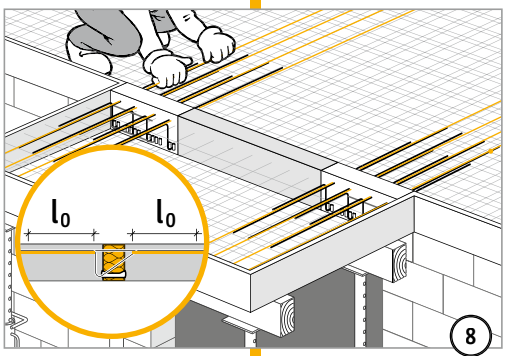


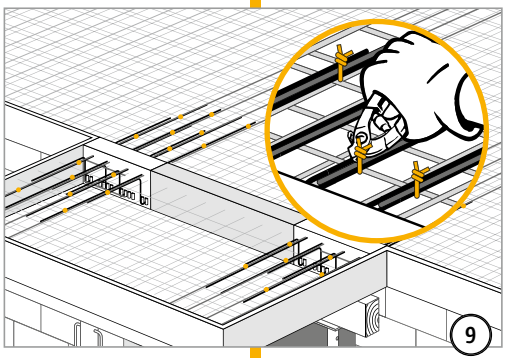
* (FI): ≥ 100 mm

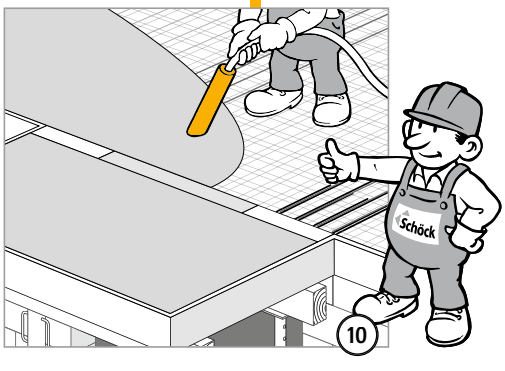




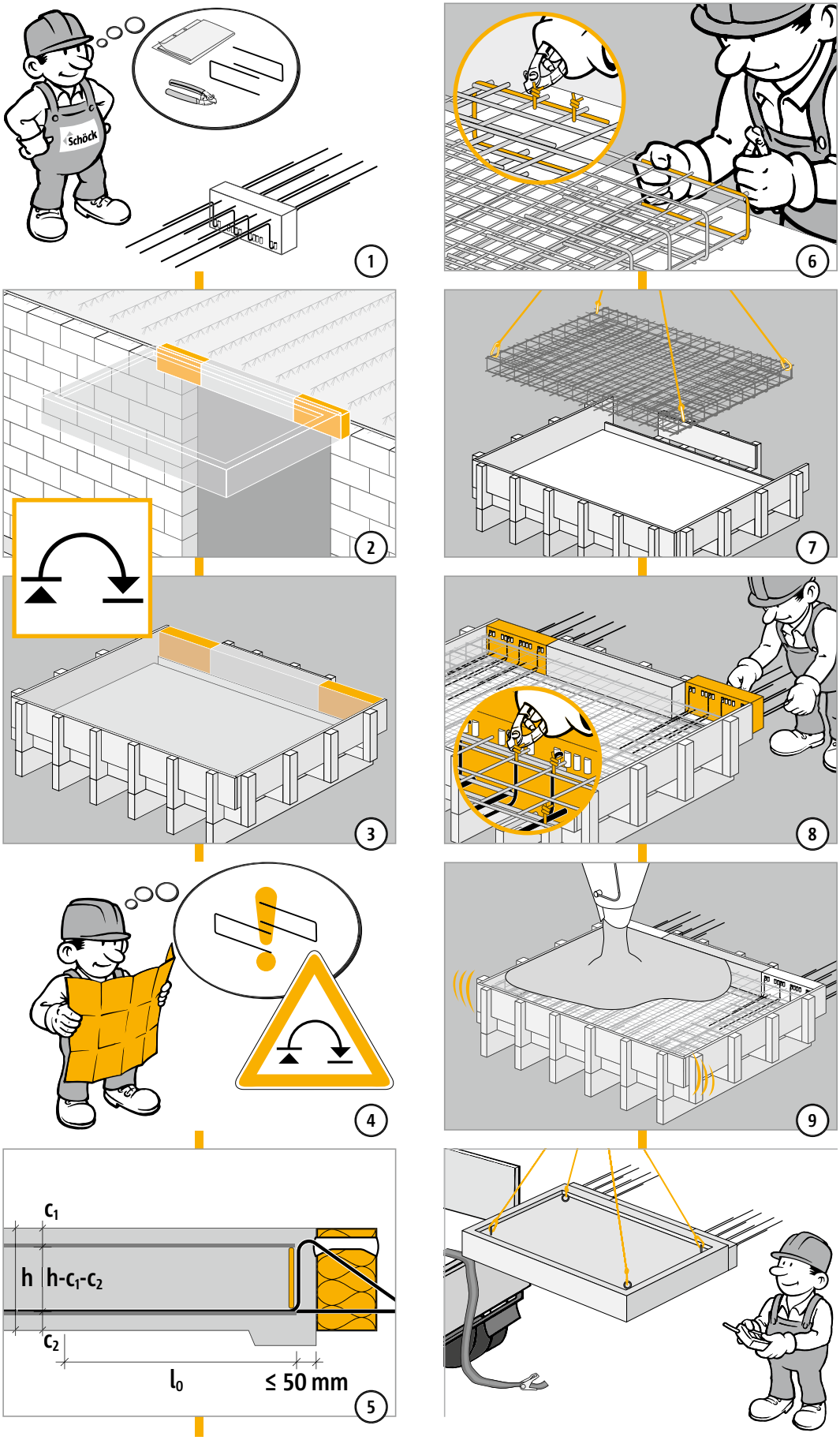




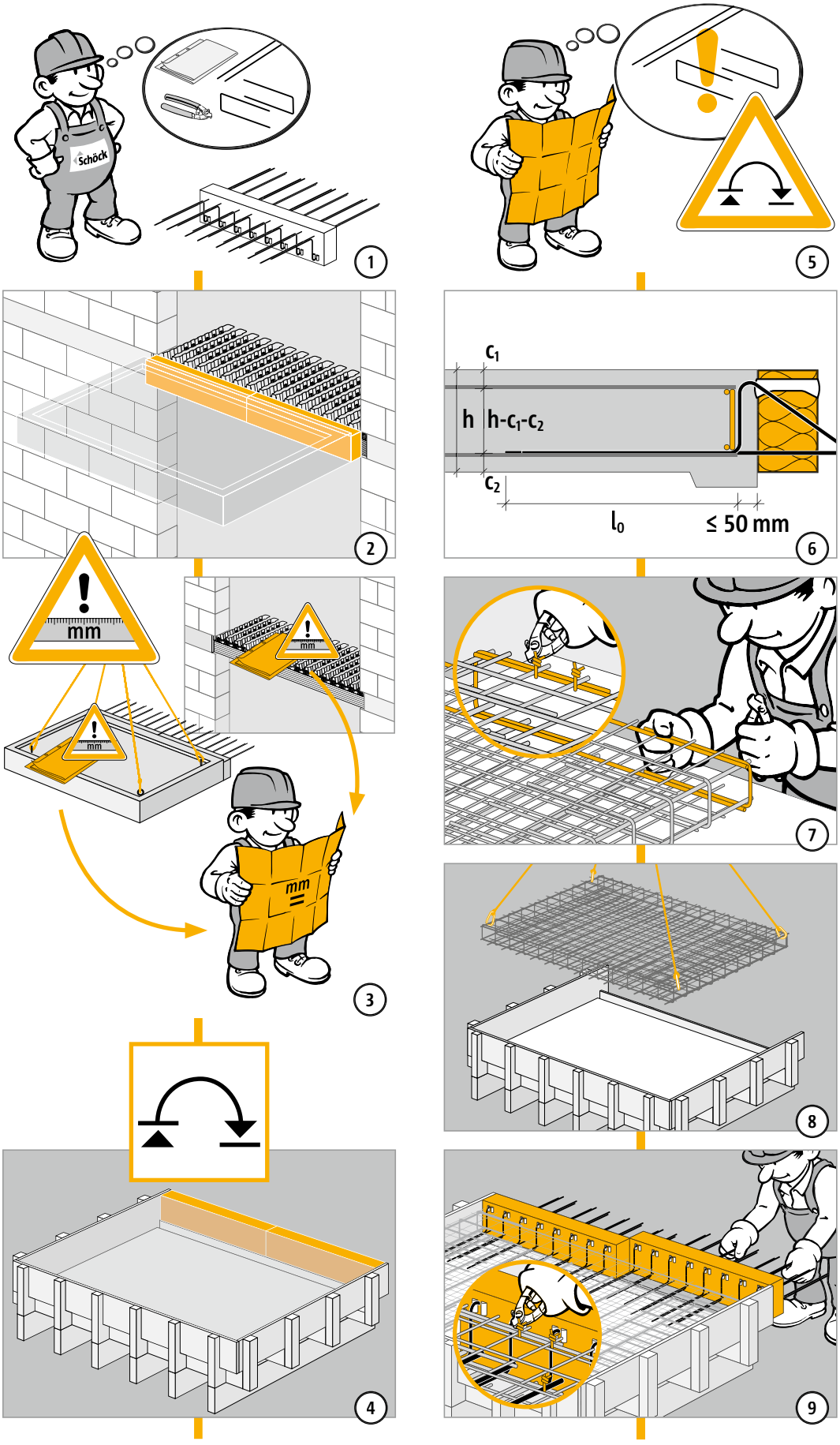




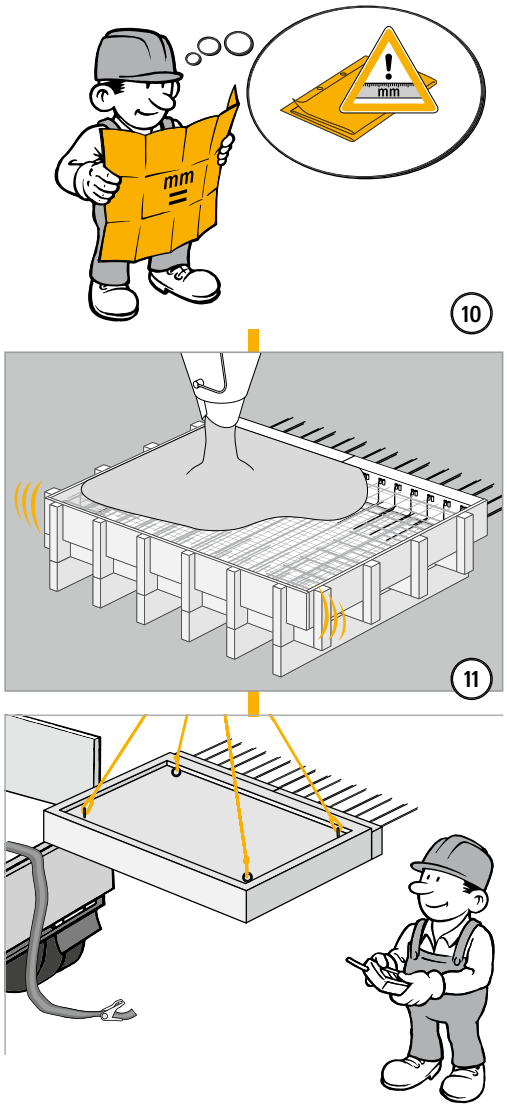
Installation instructions for prefabricating plants



Installation instructions for prefabricating plants



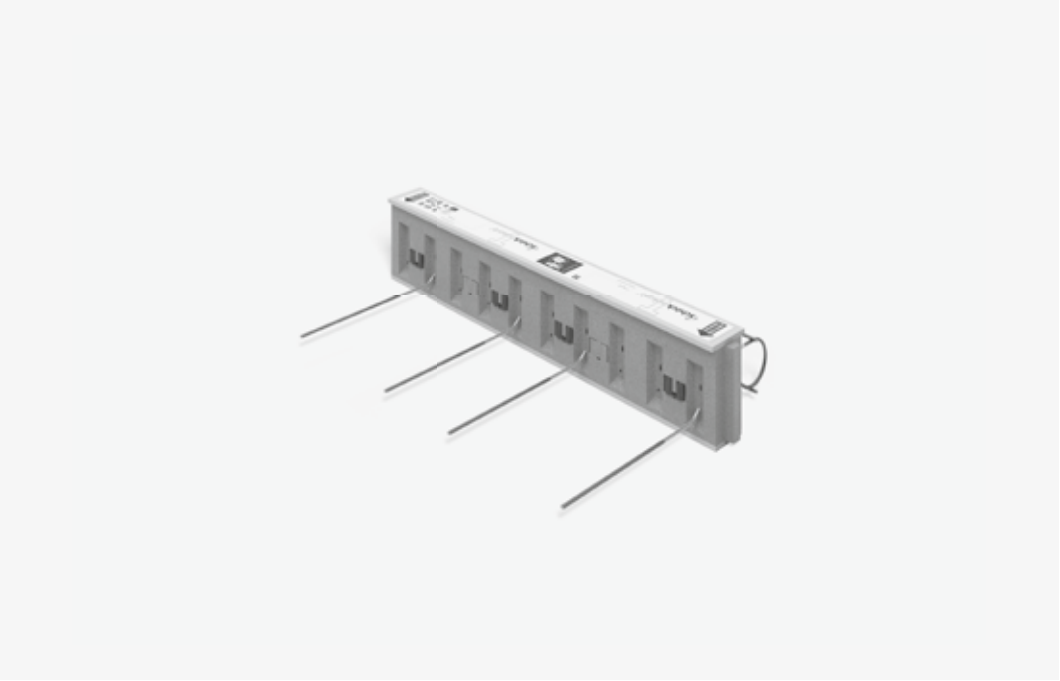
Installation instructions for prefabricating plants



Check list

- ☐ Is the same height level planned for the balcony and floor in relation to the upper edges of the shell?
- ☐ For fully precast balconies, are any necessary gaps for the frontal transport anchors and rainwater downpipes for internal drainage taken into account?
- ☐ 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 minimum slab thickness H_{min} for the respective Schöck Isokorb® type 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 Schöck FEM guidelines taken into acount with the calculation using FEM?
- ☐ Is the relevant concrete strength class taken into account when selecting the design and calculation table?
- ☐ 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 cast-in-place strips of concrete for the T type K-E and T type K-T, in the compression joint (width ≥ 80 mm from pressure bearing element), in conjunction with semi-precast balcony slabs, been entered in the construction drawings?
- ☐ Have the requirements for on-site reinforcement of connections been defined in each case?
- ☐ Has the minimum slab thickness (≥ 180 mm) and the required 2nd layer (-CV50) been taken into account for the corner balcony?
- ☐ Has a soft elastic joint been taken into account between the upper edge of the facing shell and the balcony?
- ☐ Is the type designation of the Schöck Isokorb® explicit in the plans? - Example: Schöck Isokorb® T type K-E-M6-V1-REI120-CV30-H200-L1000

Schöck Isokorb® T type Q-E, Q-E-W, Q-E-Z, Q-E-Z-W



Schöck Isokorb® T type Q-E, Q-E-W
Suitable for supported balconies. It transfers positive shear forces.

Schöck Isokorb® T type Q-E-Z, Q-E-Z-W
Suitable for supported balconies with a connection free of constraint forces. It transfers positive shear forces.

Element arrangement | Installation cross sections

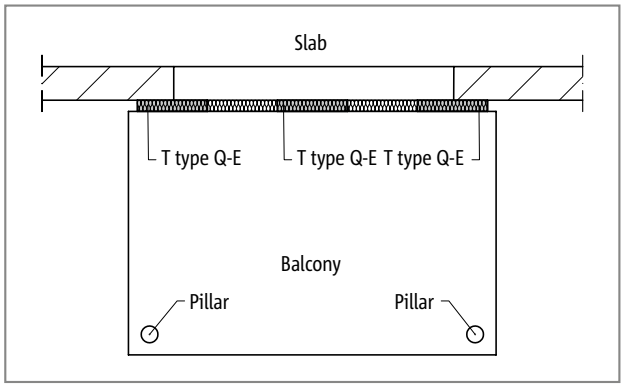


Fig. 76: Schöck Isokorb® T type Q-E: Balcony with pillar support

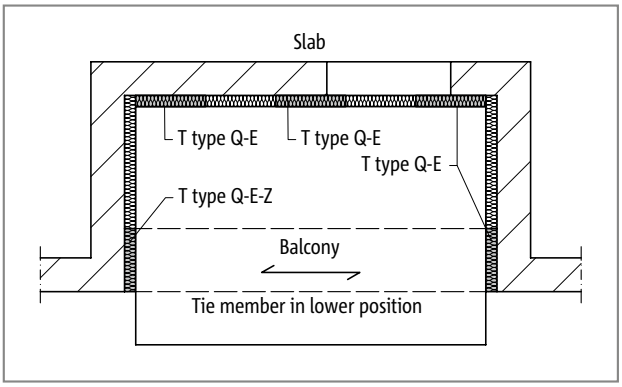


Fig. 77: Schöck Isokorb® T type Q-E, Q-E-Z: Recessed balcony supported on three sides with tie member

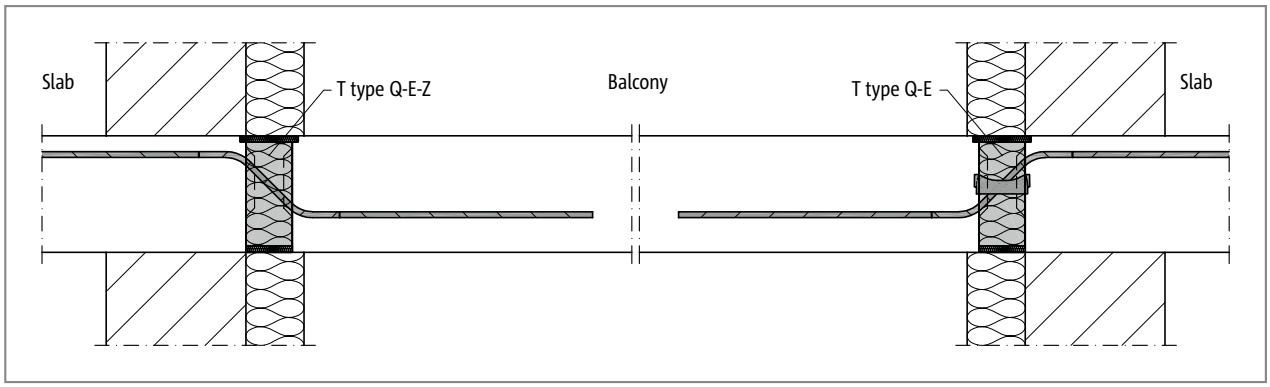


Fig. 78: Schöck Isokorb® T type Q-E-Z, Q-E: Application case one-way reinforced concrete slab

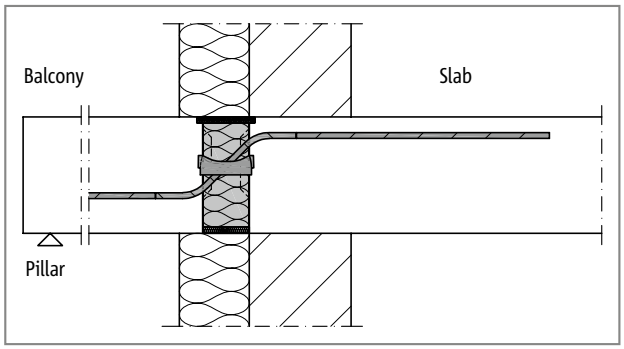


Fig. 79: Schöck Isokorb® T type Q-E: Connection for exterior insulation

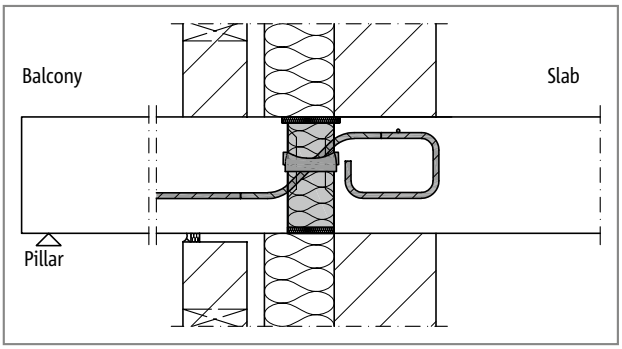


Fig. 80: Schöck Isokorb® T type Q-E-W-V: Connection for core insulation

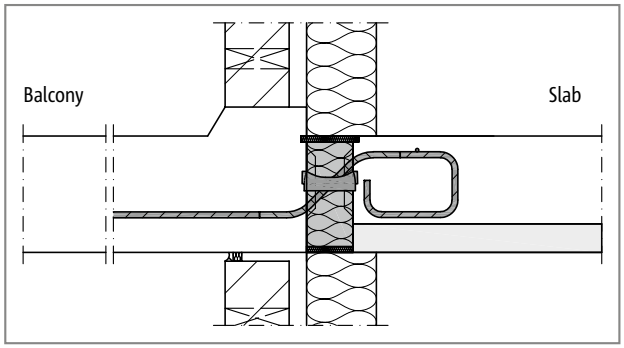


Fig. 81: Schöck Isokorb® T type Q-E-W-V: Point connection

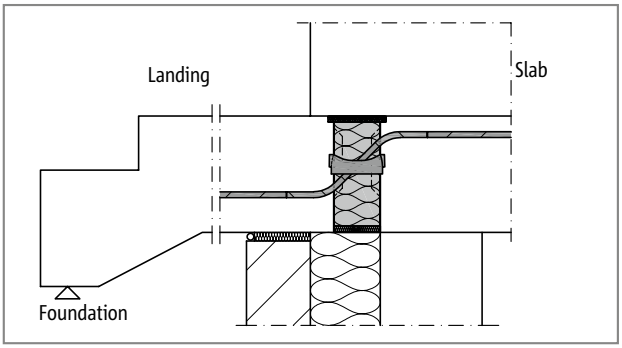


Fig. 82: Schöck Isokorb® T type Q-E-V: Stair flight connection

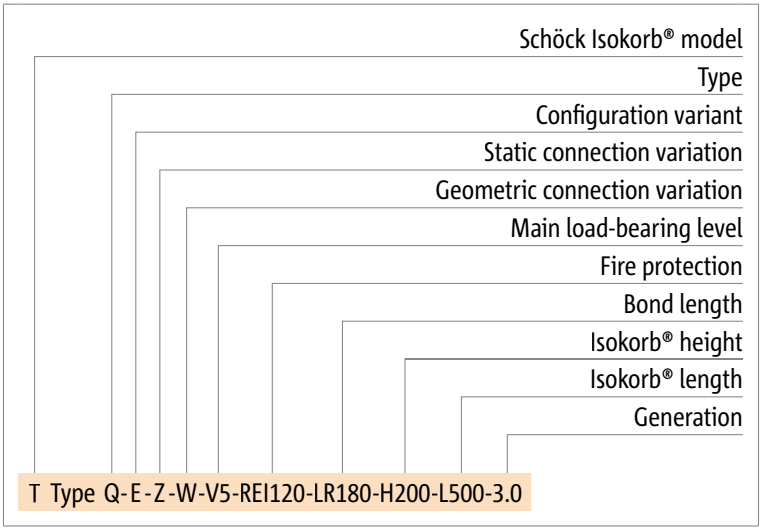
Product selection | Type designations | Special designs

Variants Schöck Isokorb® T type Q-E, Q-E-W, Q-E-Z, Q-E-Z-W

Shear force bars for positive shear forces are available for all variants. The shear force bars are straight on the balcony side. The configuration of the Schöck Isokorb® T type Q-E can be varied as follows:
T type Q-E: Shear force bar for positive shear force and pressure bearing
T type Q-E-Z: Shear force bar for positive shear force, free of constraint forces without pressure bearing

- Main load-bearing level:
  V1 to V7: Shear force bar straight on the floor side, straight on the balcony side
  W-V1 to W-V5: Shear force bar on floor side bent, balcony side straight
- Fire resistance class:
  REI120 is standard, fire protection board projecting on both sides by 10 mm
  R0 is available as an option for improved thermal insulation and sound proofing
- Bond length LR: Dimensions for Schöck Isokorb® T type Q-E-W, Q-E-Z-W, see page 64
- Concrete cover of the shear force bars:
  bottom: CV ≥ 30 mm (depending on the type and height of the Isokorb®)
  top: CV ≥ 21 mm
- Isokorb® height:
  H = H_{min} up to 250 mm (note minimum slab height depending on load bearing capacity and fire protection)
- Isokorb® length:
  L250, L500, L1000, info in mm
- Generation:
  3.0

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).

Bond length

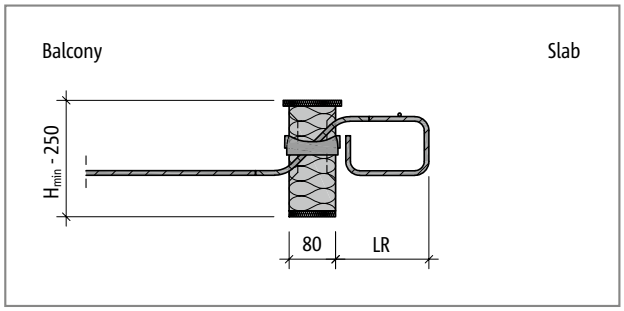


Fig. 83: Schöck Isokorb® type Q-E-W: Product section, representation of bond length LR

Schöck Isokorb® T type Q-E-W, Q-E-Z-W		V1 - V3	V4	V5
Bond length		LR [mm]		
Isokorb® height H [mm]	H_{min} - 250	155	160	180

Design

Design table T type Q-E in length L1000

Schöck Isokorb® T type Q-E	V1 W-V1	V2 W-V2	V3 W-V3	V4 W-V4	V5 W-V5	V6	V7
Design values with	$v_{Rd,z}$ [kN/m]						
Concrete C25/30	33.3	50.0	66.6	118.5	185.1	266.6	328.0
Isokorb® length [mm]	1000	1000	1000	1000	1000	1000	1000
Shear force bars	4 ⌀ 6	6 ⌀ 6	8 ⌀ 6	8 ⌀ 8	8 ⌀ 10	8 ⌀ 12	8 ⌀ 14
Pressure bearing (piece)	4	4	4	4	8	8	8
H_{min} [mm]	160	160	160	160	170	180	190

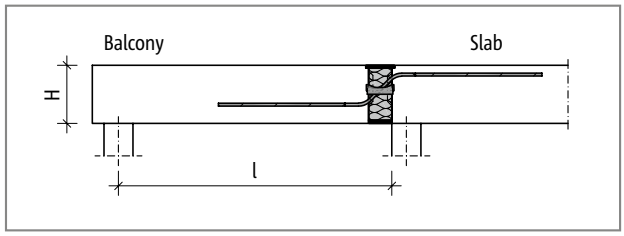


Fig. 84: Schöck Isokorb® T type Q-E-V: Static system

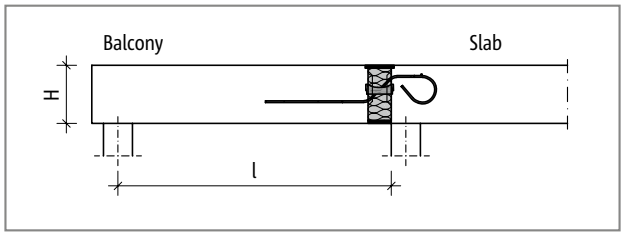


Fig. 85: Schöck Isokorb® T type Q-E-W-V1 up to V3: Static system

Design table T type Q-E in length L250, L500

Schöck Isokorb® T type Q-E	V4 W-V4	V5 W-V5	V6	V7	V4 W-V4	V5 W-V5	V6	V7
Design values with	$V_{Rd,z}$ [kN/element]				$V_{Rd,z}$ [kN/element]			
Concrete C25/30	29.6	46.3	66.6	82.0	59.2	92.6	133.3	164.0
Isokorb® length [mm]	250	250	250	250	500	500	500	500
Shear force bars	2 ⌀ 8	2 ⌀ 10	2 ⌀ 12	2 ⌀ 14	4 ⌀ 8	4 ⌀ 10	4 ⌀ 12	4 ⌀ 14
Pressure bearing (piece)	2	2	2	2	4	4	4	4
H_{min} [mm]	160	170	180	190	160	170	180	190

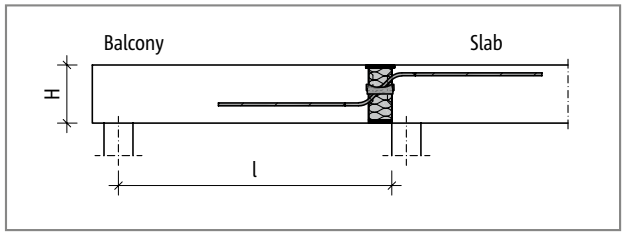


Fig. 86: Schöck Isokorb® T type Q-E-V: Static system

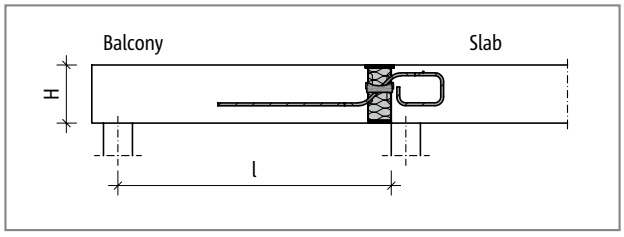


Fig. 87: Schöck Isokorb® T type Q-E-W-V4 up to V5: Static system

Design

Design table T type Q-E-Z in length L1000

Schöck Isokorb® T type Q-E-Z	V1 W-V1	V2 W-V2	V3 W-V3	V4 W-V4	V5 W-V5	V6	V7
Design values with	$v_{Rd,z}$ [kN/m]						
Concrete C25/30	33.3	50.0	66.6	118.5	185.1	266.6	362.8
Isokorb® length [mm]	1000	1000	1000	1000	1000	1000	1000
Shear force bars	4 ⌀ 6	6 ⌀ 6	8 ⌀ 6	8 ⌀ 8	8 ⌀ 10	8 ⌀ 12	8 ⌀ 14
Pressure bearing (piece)	-	-	-	-	-	-	-
H_{min} [mm]	160	160	160	160	170	180	190

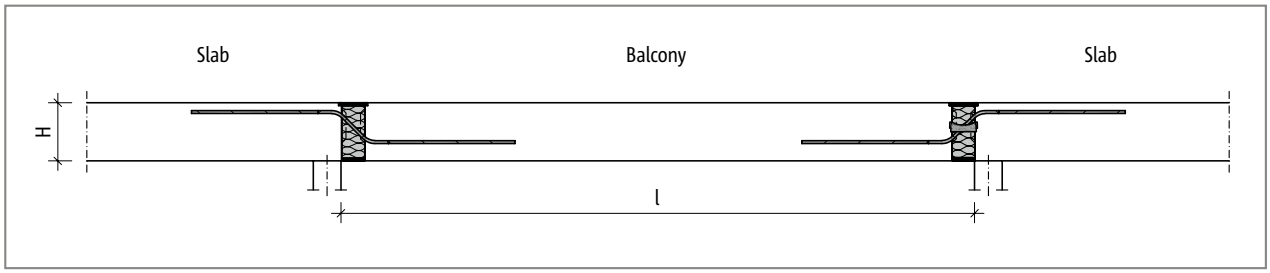


Fig. 88: Schöck Isokorb® T type Q-E-V, Q-E-Z-V: Static system

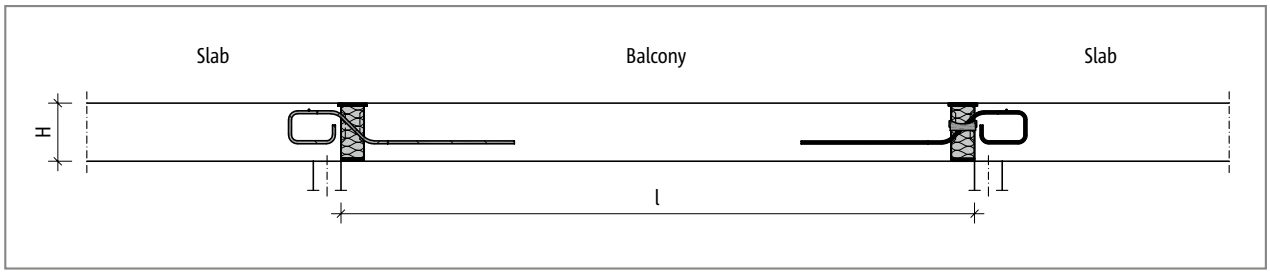


Fig. 89: Schöck Isokorb® T type Q-E-W-V, Q-E-Z-W-V: Static system

Design

Design table T type Q-E-Z in length L250, L500

Schöck Isokorb® T type Q-E-Z	V4 W-V4	V5 W-V5	V6	V7	V4 W-V4	V5 W-V5	V6	V7
Design values with	$V_{Rd,z}$ [kN/element]				$V_{Rd,z}$ [kN/element]			
Concrete C25/30	29.6	46.3	59.2	66.6	90.7	92.6	133.3	181.4

Isokorb® length [mm]	250	250	250	250	500	500	500	500
Shear force bars	2 ⌀ 8	2 ⌀ 10	2 ⌀ 12	2 ⌀ 14	4 ⌀ 8	4 ⌀ 10	4 ⌀ 12	4 ⌀ 14
Pressure bearing (piece)	-	-	-	-	-	-	-	-
H_{min} [mm]	160	170	180	190	160	170	180	190

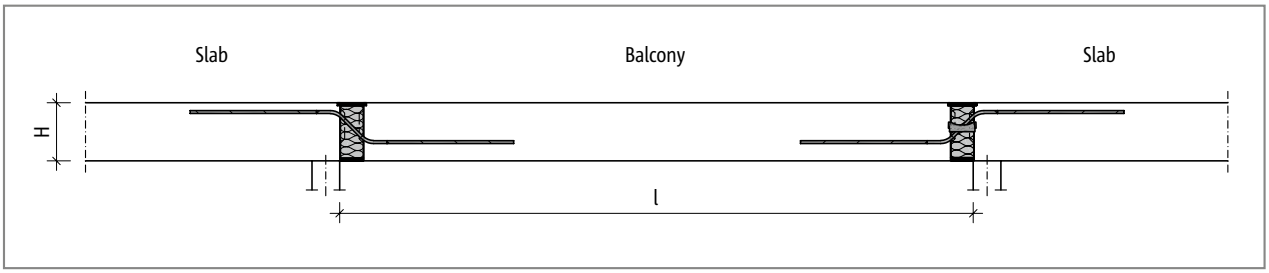


Fig. 90: Schöck Isokorb® T type Q-E-V, Q-E-Z-V: Static system

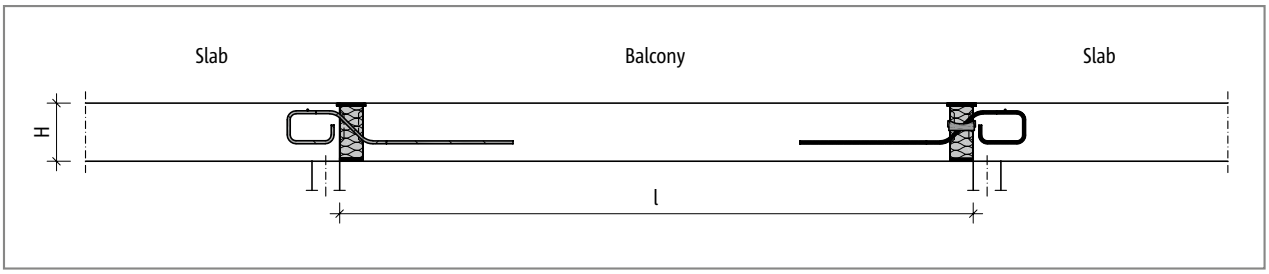


Fig. 91: Schöck Isokorb® T type Q-E-W-V, Q-E-Z-W-V: Static system

Notes on design

- A static verification is to be provided for the adjacent reinforced concrete structural component on both sides of the Schöck Isokorb®.
- Due to the excentric force application of the Schöck Isokorb®, an offset moment is generated at the adjacent slab edges. This is to be taken into account with the design of the slabs.

Moments from excentric connection

Moments from excentric connection

Moments from excentric connection for the Schöck Isokorb® are to be taken into account for the design of the connection reinforcement for each balcony and slab side. These moments are respectively to be overlaid with the moments from the ordinary loading, if they have the same sign.
The following table values ΔM_{Ed} have been calculated for 100% utilisation of v_{Rd}.

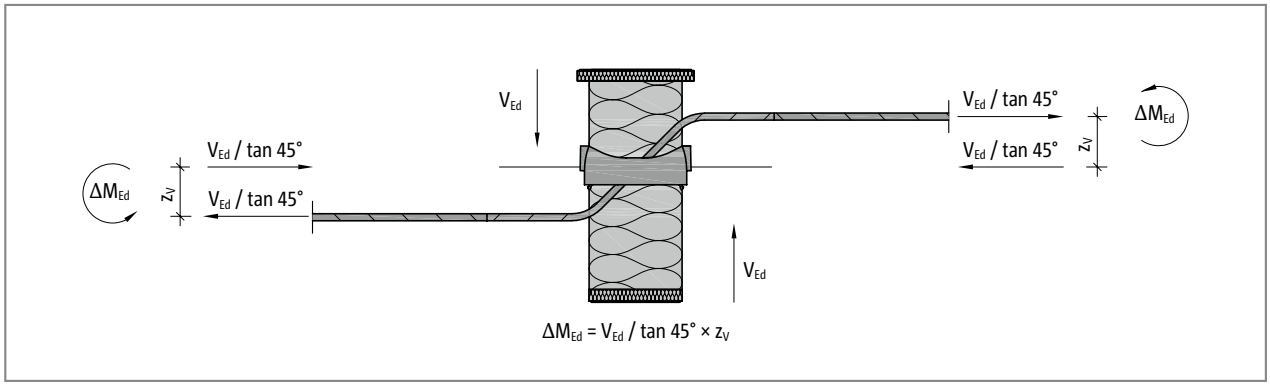


Fig. 92: Schöck Isokorb® T type Q-E, Q-E-W: Moments from excentric connection

Schöck Isokorb® T type Q-E	V1 W-V1	V2 W-V2	V3 W-V3	V4 W-V4	V5 W-V5	V6	V7
Isokorb® length [mm]	1000	1000	1000	1000	1000	1000	1000
Design values with	Δ M_{Ed} [kNm/Element]						
Concrete C25/30	1.7	2.6	3.3	6.0	10.4	15.2	20.5

Schöck Isokorb® T type Q-E	V4 W-V4	V5 W-V5	V6	V7	V4 W-V4	V5 W-V5	V6	V7
Isokorb® length [mm]	250	250	250	250	500	500	500	500
Design values with	Δ M_{Ed} [kNm/Element]				Δ M_{Ed} [kNm/Element]			
Concrete C25/30	1.5	2.6	3.8	5.1	3.0	5.2	7.6	10.3

Expansion joint spacing | Product description

Maximum expansion joint spacing

If the component length exceeds the maximum expansion joint spacing e, then expansion joints must be incorporated into the external concrete components at right angles to the insulating layer in order to limit the effect as a result of temperature changes. Because the layout of the Isokorb® is only possible along the side of the component due to the installation in conjunction with the external concrete precast element, corners of balconies, parapets and balustrades cannot form any fixed points.
The shear force transmission in the expansion joint can be ensured using a longitudinally displaceable shear force dowel, e.g. Schöck Dorn.

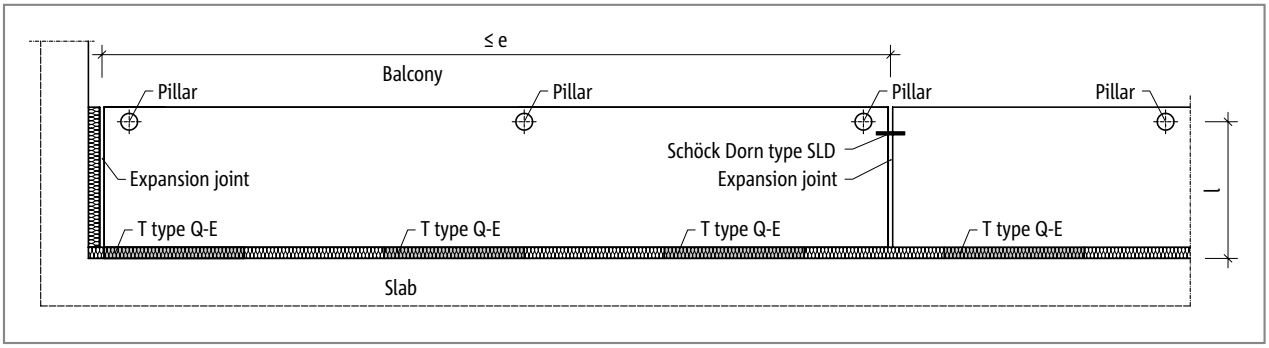


Fig. 93: Schöck Isokorb® T type Q-E: Expansion joint spacing

Schöck Isokorb® T type Q-E, Q-E-Z		V1 - V4 W-V1 - W-V4	V5 W-V5	V6	V7
Maximum expansion joint spacing e		e [m]			
Insulating element thickness [mm]	80	13.5	13.0	11.7	10.1

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 bars from the free edge resp. exapansion joint: $e_R \geq 100$ mm applies.

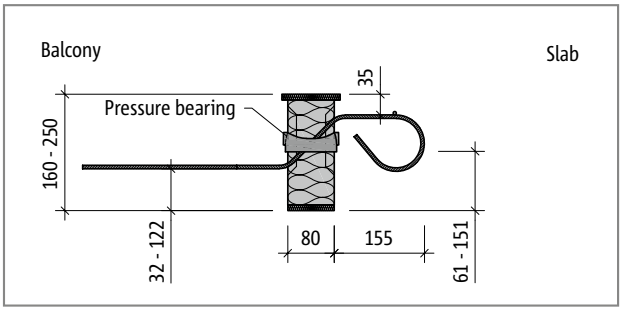


Fig. 94: Schöck Isokorb® T type Q-E-W-V1 up to V3: Product section

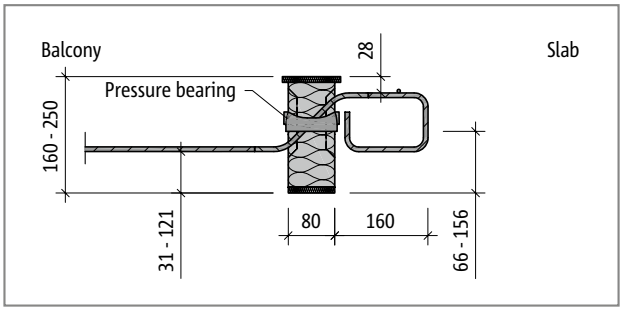


Fig. 95: Schöck Isokorb® T type Q-E-W-V4: Product section

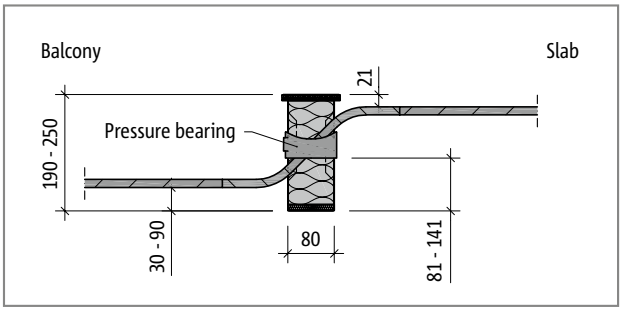


Fig. 96: Schöck Isokorb® T type Q-E-V7: Product section

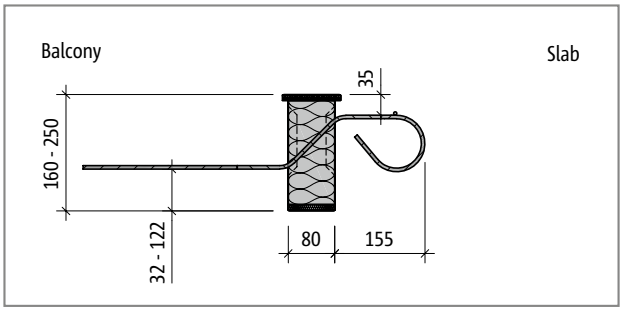


Fig. 97: Schöck Isokorb® T type Q-E-Z-W-V1 up to V3: Product section

Product information

- For additional 2D and 3D product drawings contact our Design Support department.
- Observe min. height H_{min} Schöck Isokorb® T type Q-E, Q-E-Z.

Product description

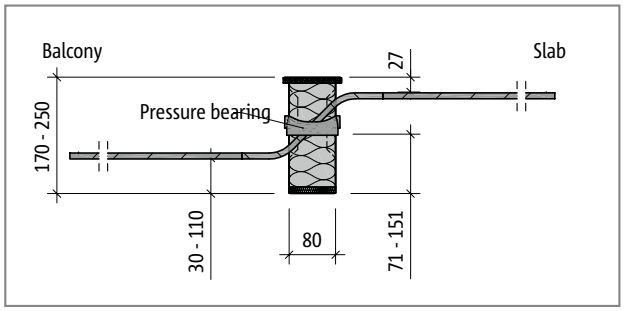


Fig. 98: Schöck Isokorb® T type Q-E-V5: Product section

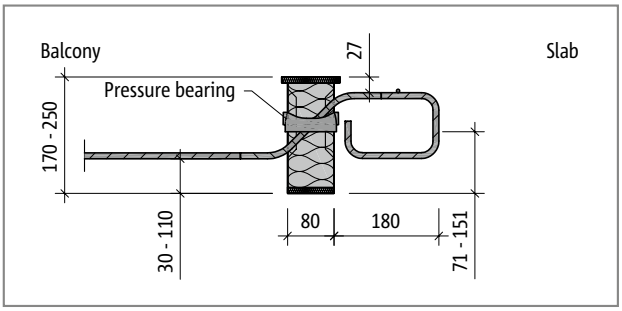


Fig. 99: Schöck Isokorb® T type Q-E-W-V5: Product section

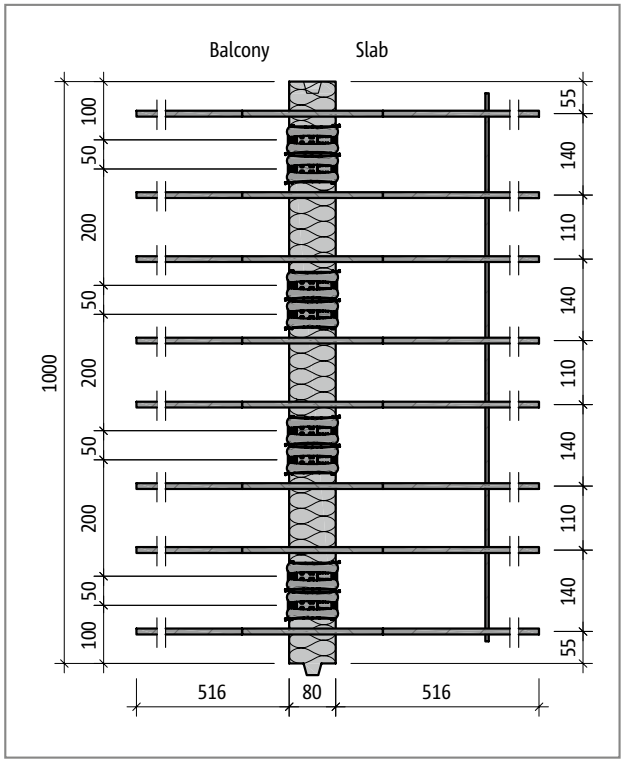


Fig. 100: Schöck Isokorb® T type Q-E-V5: Product layout

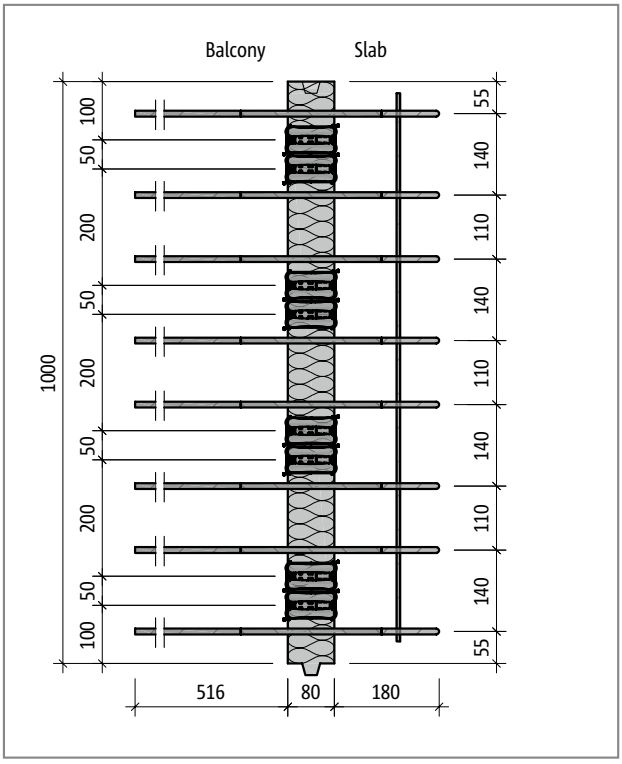


Fig. 101: Schöck Isokorb® T type Q-E-W-V5: Product layout

Product description

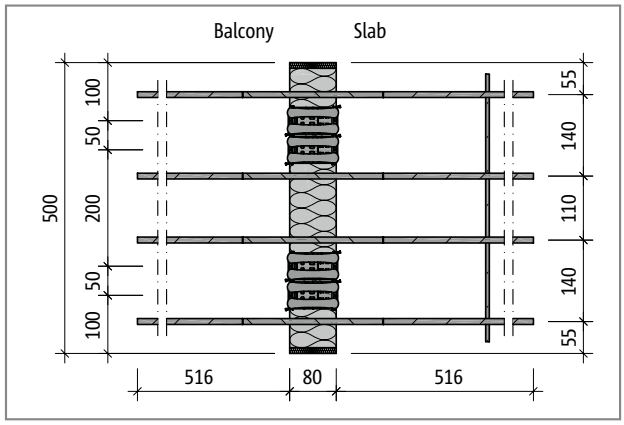


Fig. 102: Schöck Isokorb® T type Q-E-V5-L500: Product layout

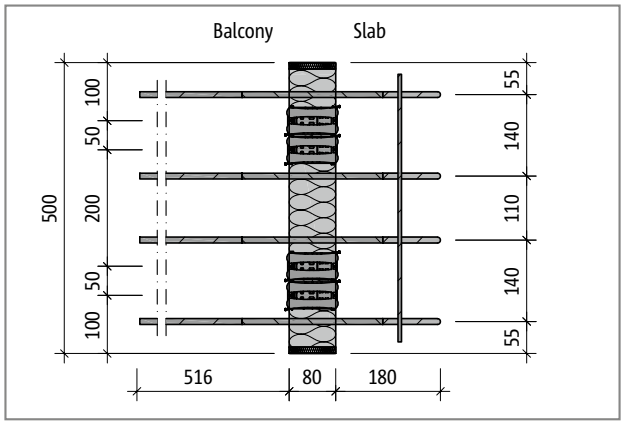


Fig. 103: Schöck Isokorb® T type Q-E-W-V5-L500: Product layout

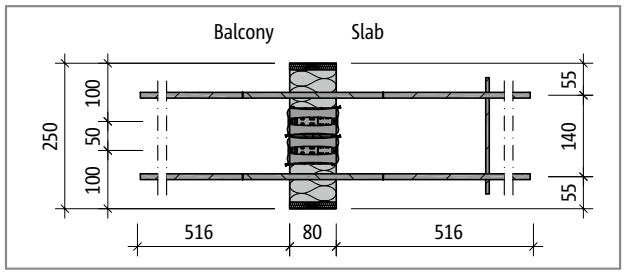


Fig. 104: Schöck Isokorb® T type Q-E-V5-L250: Product layout

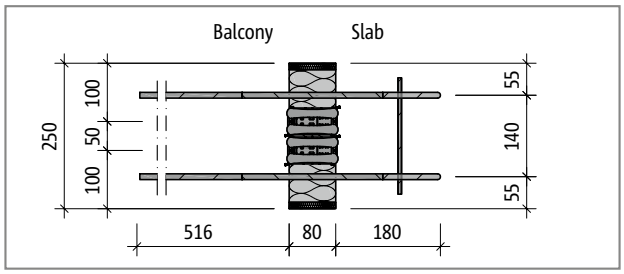


Fig. 105: Schöck Isokorb® T type Q-E-W-V5-L250: Product layout

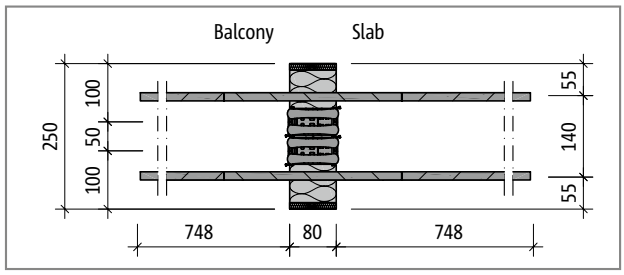


Fig. 106: Schöck Isokorb® T type Q-E-V7-L250: Product layout

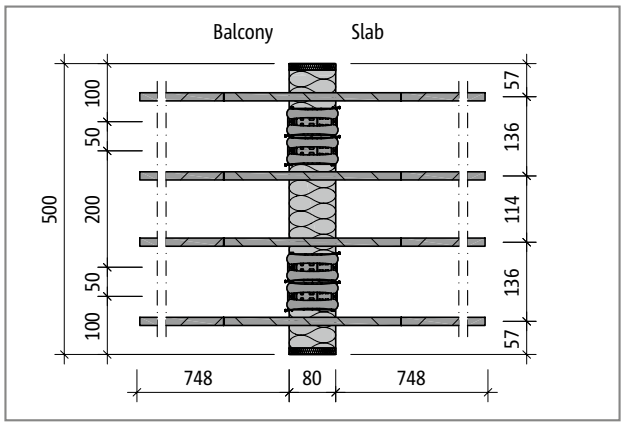


Fig. 107: Schöck Isokorb® T type Q-E-V7-L500: Product layout

Product information

- For additional 2D and 3D product drawings contact our Design Support department.
- Observe min. height H_{min} Schöck Isokorb® T type Q-E, Q-E-Z.
- Schöck Isokorb® T type Q-E can be planned in combination with Schöck IDock®, see Schöck IDock® technical information.

Configuration without fire protection

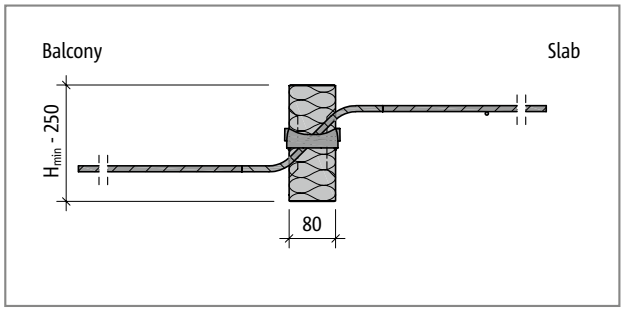


Fig. 108: Schöck Isokorb® T type Q-E-V5 for R0: Product section

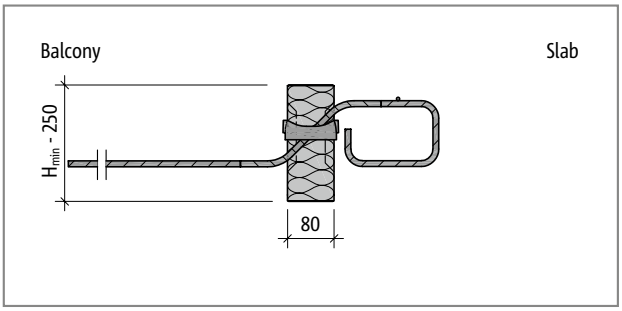


Fig. 109: Schöck Isokorb® T type Q-E-W-V5 for R0: Product section

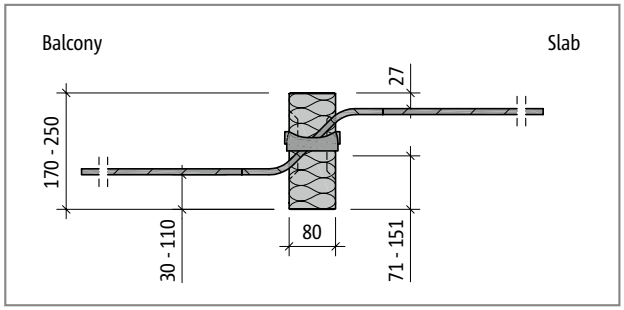


Fig. 110: Schöck Isokorb® T type Q-E-Z-V5 for R0: Product section

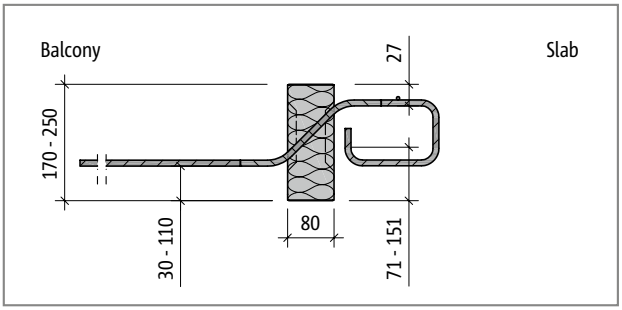


Fig. 111: Schöck Isokorb® T type Q-E-Z-W-V5 for R0: Product section

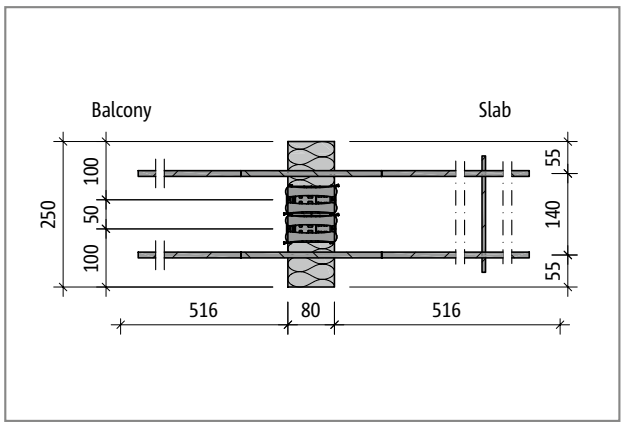


Fig. 112: Schöck Isokorb® T type Q-E-V5-L250 for R0: Product layout

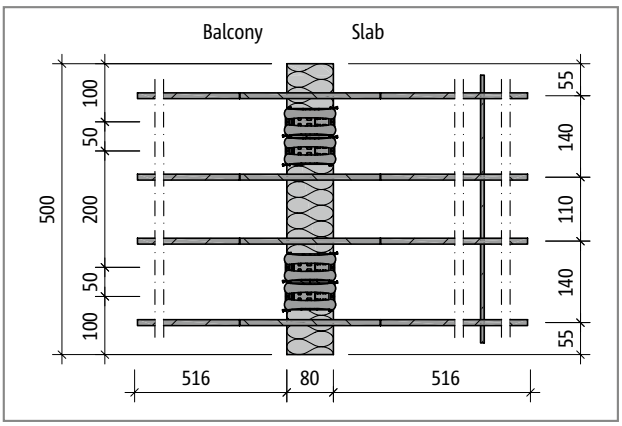


Fig. 113: Schöck Isokorb® T type Q-E-V5-L500 for R0: Product layout

Fire protection

- Observe min. height H_{min} Schöck Isokorb® T type Q-E, Q-E-Z.
- Schöck Isokorb® T type Q-E in lengths L250 and L500 with lateral fire protection boards

On-site reinforcement

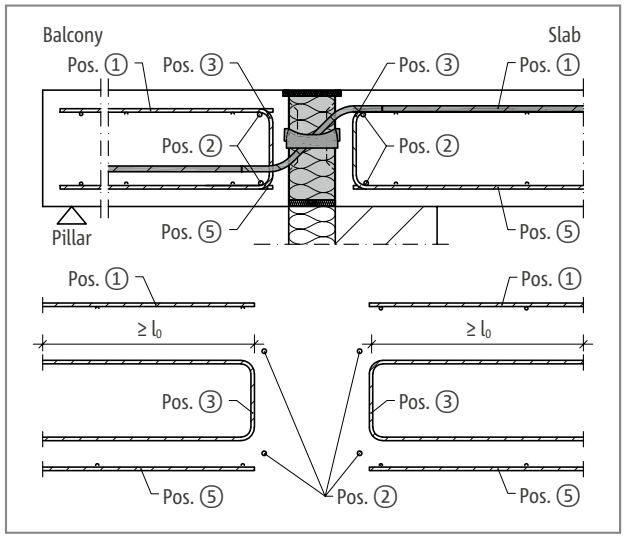


Fig. 114: Schöck Isokorb® T type Q-E-V: On-site reinforcement

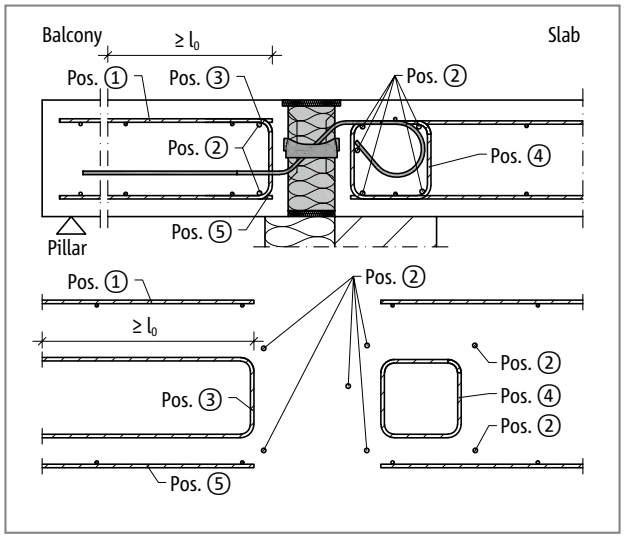


Fig. 115: Schöck Isokorb® T type Q-E-W-V: On-site reinforcement

Schöck Isokorb® T type Q-E, Q-E-Z		V1	V2	V3	V4
On-site reinforcement	**Location**	**Floor (XC1) concrete strength class ≥ C25/30 Balcony (XC4) 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	acc. to the specifications of the structural engineer			
Pos. 3 Stirrup					
Pos. 3 [mm²/m]	Balcony/floor side	80	120	160	284
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 DS/EN 1992-1-1 (EC2), 9.3.1.4 (not pictured)			

Schöck Isokorb® T type Q-E		V5, Z-V5	V6, Z-V6	V7	Z-V7
On-site reinforcement	**Location**	**Floor (XC1) concrete strength class ≥ C25/30 Balcony (XC4) 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	acc. to the specifications of the structural engineer			
Pos. 3 Stirrup					
Pos. 3 [mm²/m]	Balcony/floor side	444	640	834	871
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 DS/EN 1992-1-1 (EC2), 9.3.1.4 (not pictured)			

On-site reinforcement

Schöck Isokorb® T type Q-E-W, Q-E-Z-W		V1	V2	V3	V4	V5
On-site reinforcement	Location	Floor (XC1) concrete strength class ≥ C25/30 Balcony (XC4) 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	acc. to the specifications of the structural engineer				
Pos. 3 Stirrup						
Pos. 3 [mm²/m]	Balcony side	80	120	160	284	444
Pos. 4 Stirrup (edge beam according to Z-15.7-240)						
Pos. 4	Floor side	acc. to the specifications of the structural engineer				
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 DS/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 structural edging Pos. 6 should be selected so low that it can be arranged between the upper and lower reinforcement position.

Application example reinforced concrete slab spanning in one direction

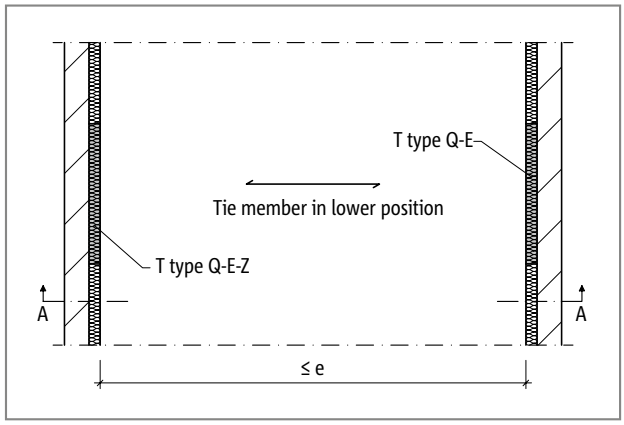


Fig. 116: Schöck Isokorb® T type Q-E, Q-E-Z: Reinforced concrete slab tensioned in a single axis

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

Expansion joints

- Expansion joint spacing e see p. 69

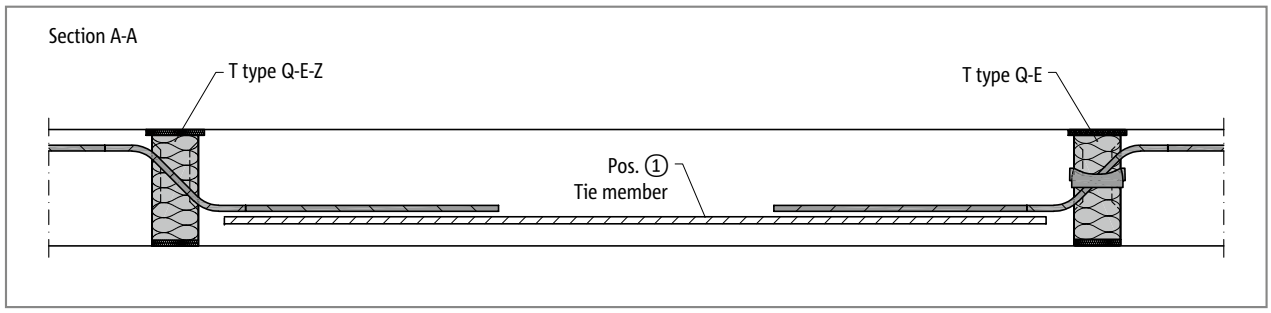


Fig. 117: Schöck Isokorb® T type Q-E, Q-E-Z: Section A-A; one-way reinforced concrete slab

Schöck Isokorb® T type Q-E, Q-E-Z	V1 W-V1	V2 W-V2	V3 W-V3	V4 W-V4
On-site reinforcement	Floor (XC1) concrete strength class ≥ C25/30 Balcony (XC4) concrete strength class ≥ C25/30			
Pos. 1 Tie				
Pos. 1	⌀ 6/250 mm	⌀ 6/125 mm	⌀ 6/125 mm	H8@125 mm

Schöck Isokorb® T type Q-E, Q-E-Z	V5 W-V5	V6	V7
On-site reinforcement	Floor (XC1) concrete strength class ≥ C25/30 Balcony (XC4) concrete strength class ≥ C25/30		
Pos. 1 Tie			
Pos. 1	⌀ 10/125 mm	⌀ 12/125 mm	⌀ 12/125 mm

Information about on-site reinforcement

- The required suspension reinforcement and the on-site slab reinforcement are not shown here.
- On site reinforcement for Schöck Isokorb® T type Q-E, see page 73.

Application case recessed balcony

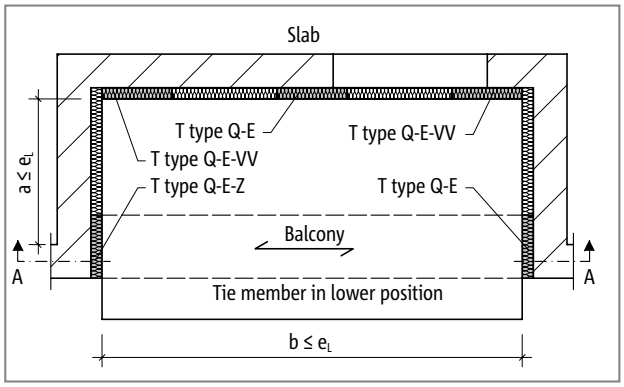


Fig. 118: Schöck Isokorb® T type Q-E-Z, Q-E: Layout of recessed balcony

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

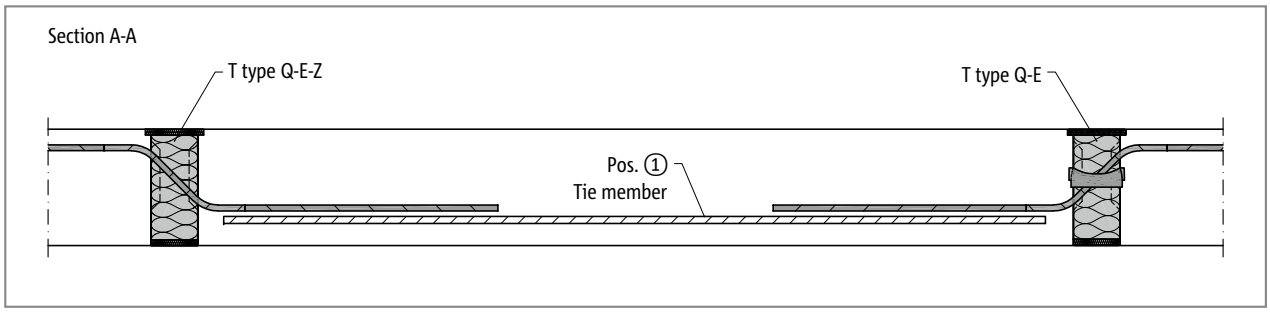


Fig. 119: Schöck Isokorb® T type Q-E, Q-E-Z: Section A-A; one-way reinforced concrete slab

Schöck Isokorb® T type Q-E, Q-E-Z		V4, W-V4	V5, W-V5	V6	V7
On-site reinforcement	Isokorb® length [mm]	Floor (XC1) concrete strength class ≥ C25/30 Balcony (XC4) concrete strength class ≥ C25/30			
Pos. 1 Tie					
Pos. 1	250	2 ⌀ 8	2 ⌀ 10	3 ⌀ 10	2 ⌀ 12
Pos. 1	500	4 ⌀ 8	4 ⌀ 10	5 ⌀ 10	4 ⌀ 12

Schöck Isokorb® T type Q-E, Q-E-Z	V4, W-V4	V5, W-V5	V6	V7
Fixed point separation recessed balcony	e_L [m]			
a, b ≤	6.75	6.50	5.85	5.05

Information on tie bar

- The fixed point separations a, b are to be selected witht a ≤ e_L and b ≤ e_L .
- The required suspension reinforcement and the on-site slab reinforcement are not shown here.

Application example recessed balcony - symmetrical

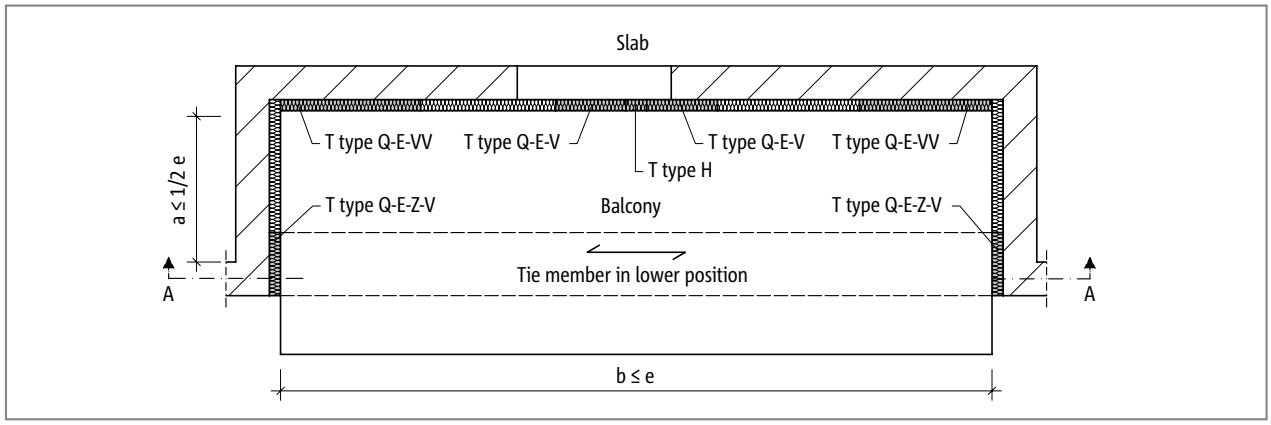


Fig. 120: Schöck Isokorb® T type Q-E-Z-V: Layout of recessed balcony - symmetrical

Under symmetrical loads, a Schöck Isokorb® T type Q-E-Z-V without pressure bearing is to be be arranged on both sides for for support free of constraint forces. In order to maintain the balance of forces a tie member, which overlaps the shear force bars of both Schöck Isokorb®, is to be be used.

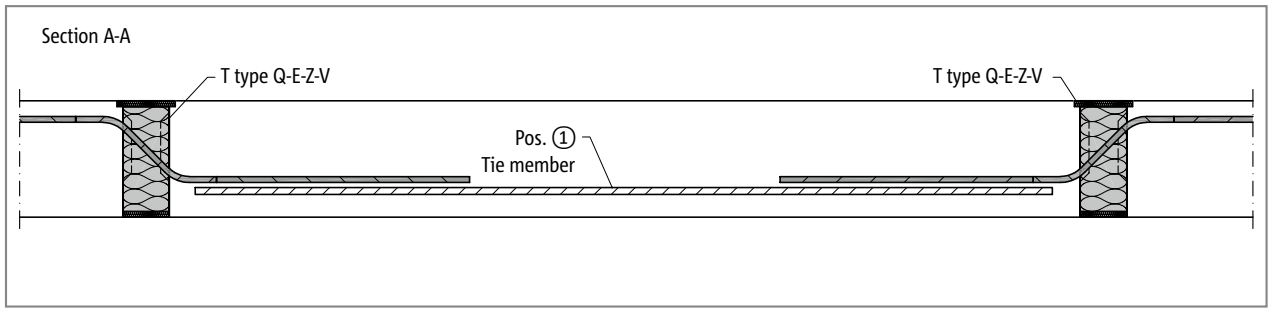


Fig. 121: Schöck Isokorb® T type Q-E-Z-V: Tie member connection

Schöck Isokorb® T type Q-E-Z		V4, W-V4	V5, W-V5	V6	V7
On-site reinforcement	Isokorb® length [mm]	Floor (XC1) concrete strength class ≥ C25/30 Balcony (XC4) concrete strength class ≥ C25/30			
Pos. 1 Tie					
Pos. 1	250	2 ⌀ 8	2 ⌀ 10	3 ⌀ 10	2 ⌀ 12
Pos. 1	500	4 ⌀ 8	4 ⌀ 10	5 ⌀ 10	4 ⌀ 12

Schöck Isokorb® T type Q-E-Z		V1 - V4 W-V1 - W-V4	V5 W-V5	V6	V7
Maximum expansion joint spacing e		e [m]			
Insulating element thickness [mm]	80	13.0	13.0	11.7	10.1

Recessed balcony

- The fixed point spacings a, b are to be selected as a ≤ 1/2 e and b ≤ e.
- The required suspension reinforcement and the on-site slab reinforcement are not shown here.
- This arrangement of the Schöck Isokorb® (T type Q-E-Z opposing) is only suitable for symmetrical layouts only, if the asymmetrical load case is not relevant
- The horizontal stability of the balcony is to be be verified, possibly using a Schöck Isokorb® T type H.

Type of bearing: supported

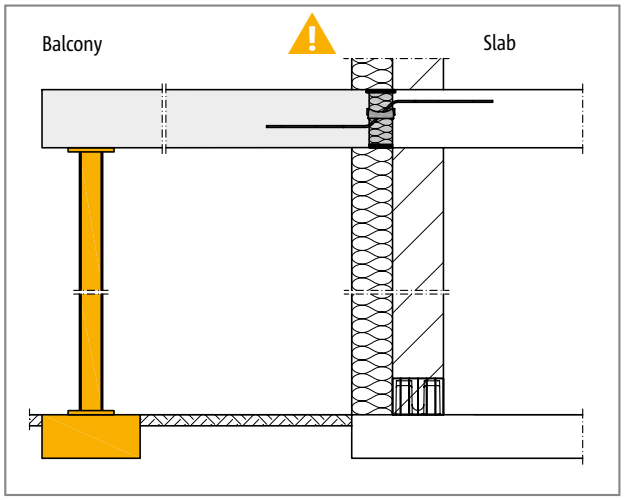


Fig. 122: Schöck Isokorb® T type Q-E-V, Q-E-W-V: Support required at all times

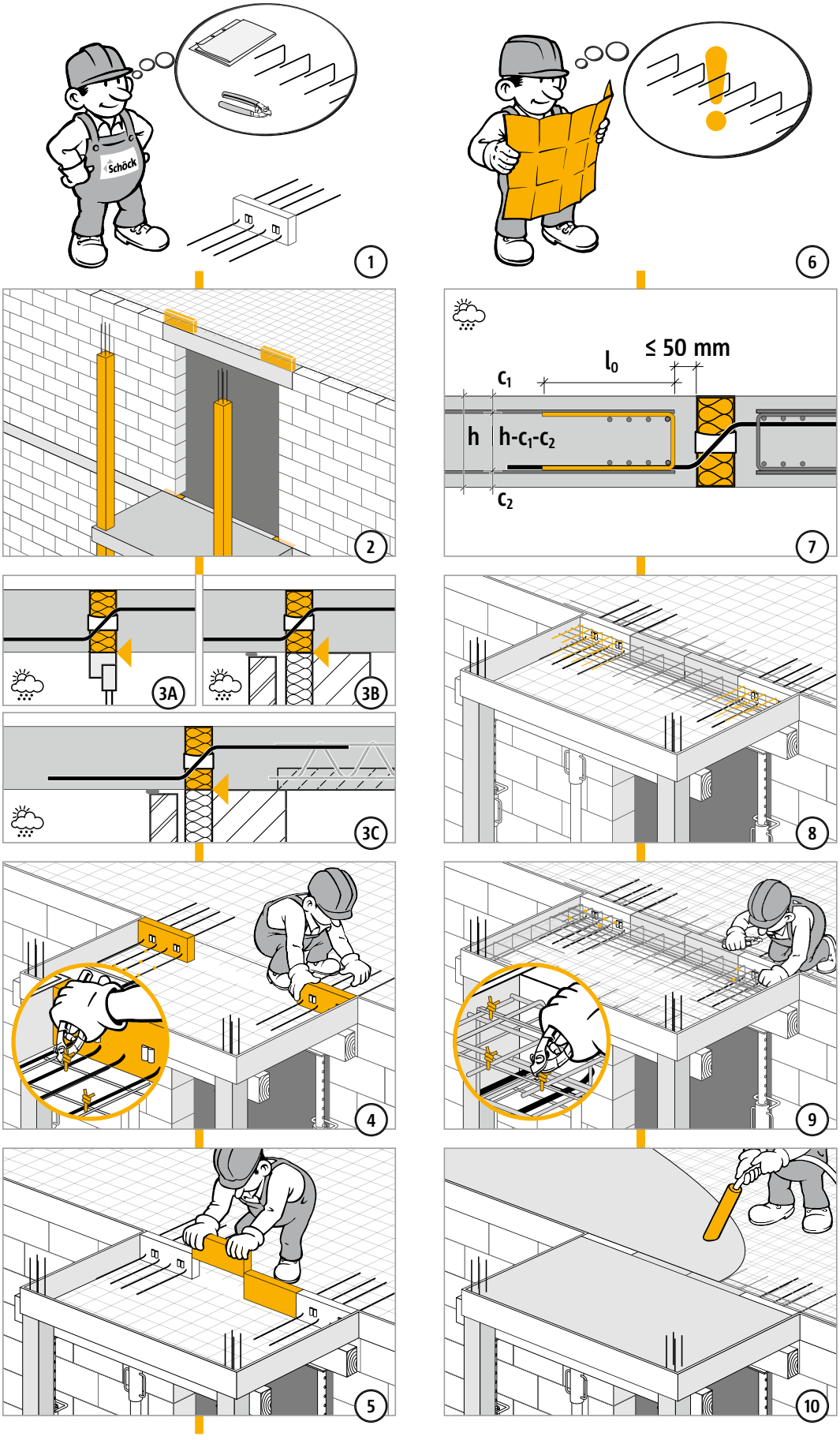
Supported balconies

The Schöck Isokorb® T type Q-E is developed for supported balconies. It transfers exclusively shear forces, no bending moments.

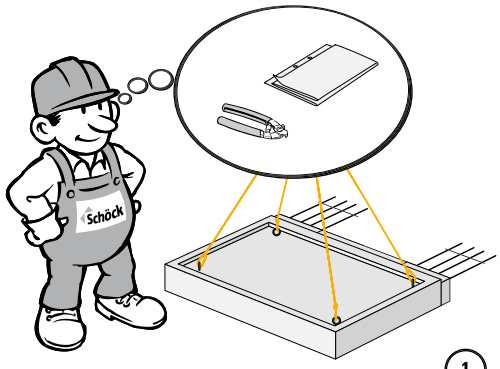
Warning - omitting the pillars

- 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.

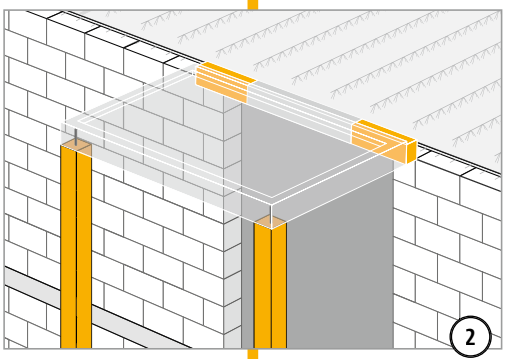
Installation instructions



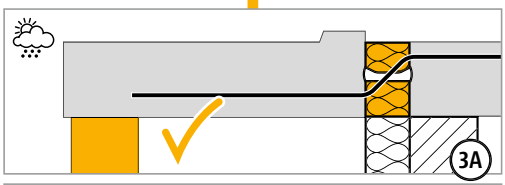
Installation instructions for the building site



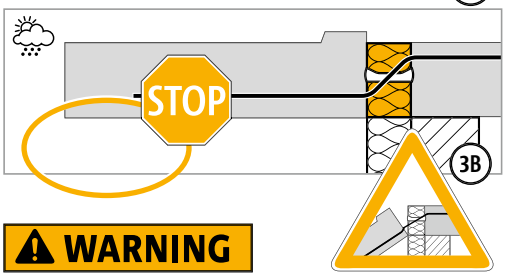
1



2



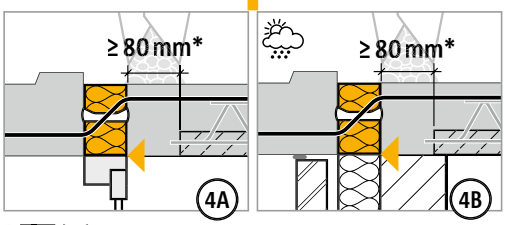
3A



3B

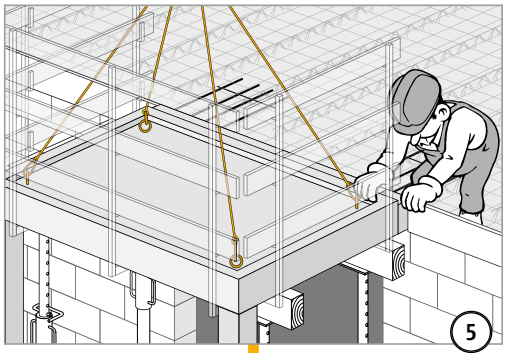
⚠ WARNING

Always support the balcony!
To securely connect the balcony, it must always be supported on the outside or combined with other Isokorb® elements. Temporary support can only be removed after the permanent support has been placed.

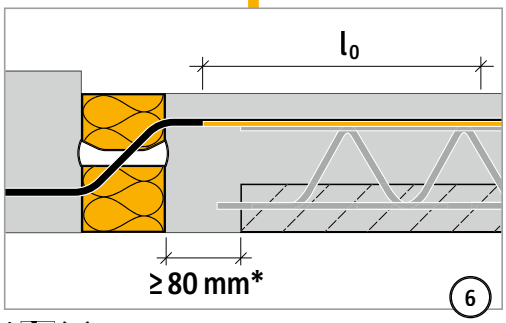


4A 4B

* (FI): ≥ 100 mm

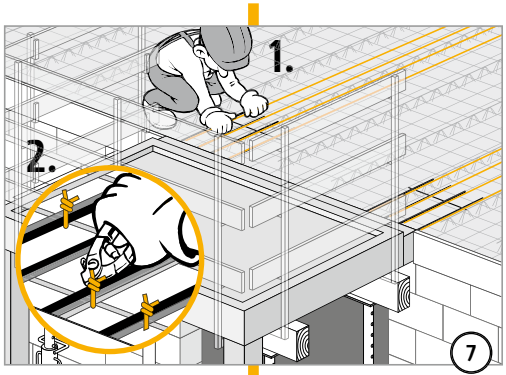


5



6

* (FI): ≥ 100 mm



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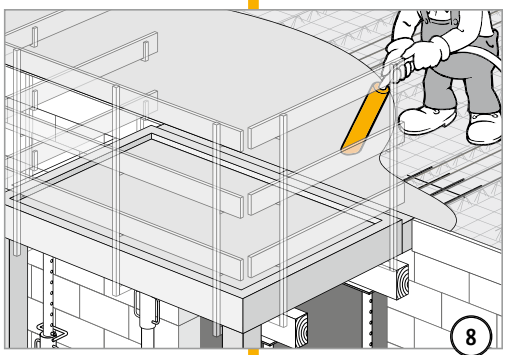
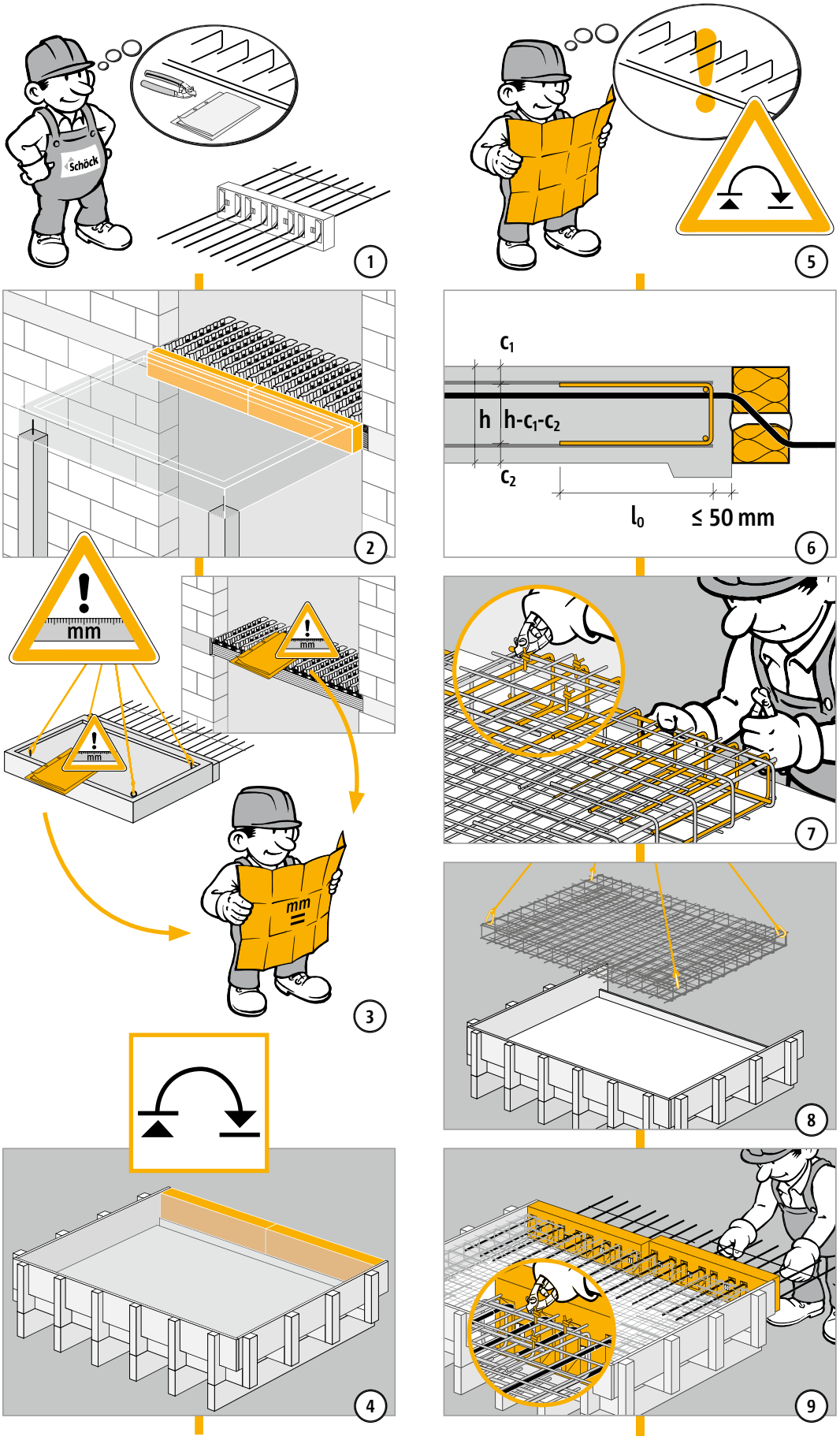


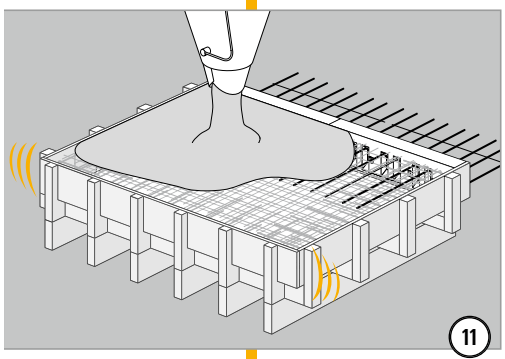
8

Installation instructions for prefabricating plants



Installation instructions for prefabricating plants

10



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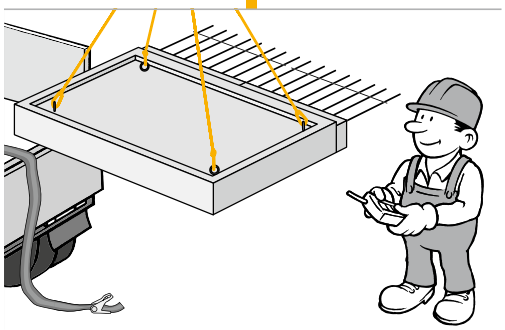
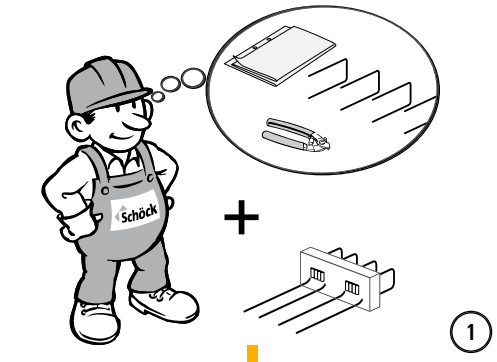
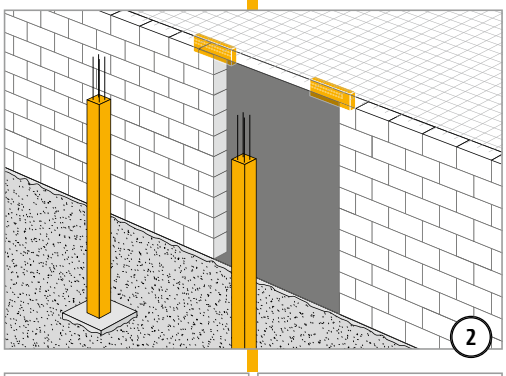
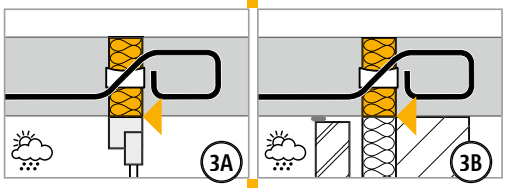
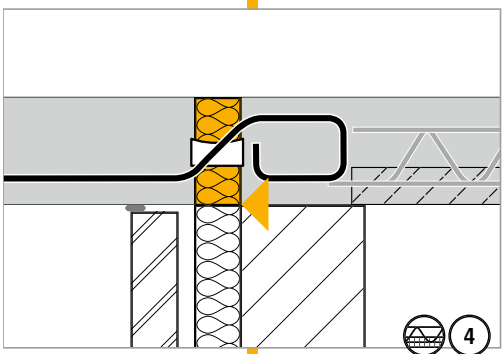


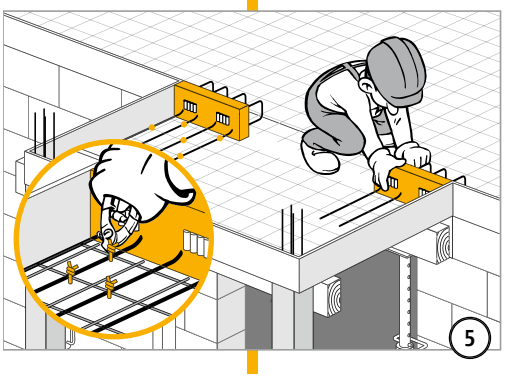
Installation instructions for the building site

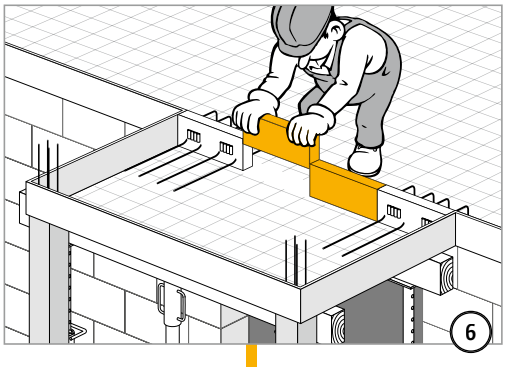


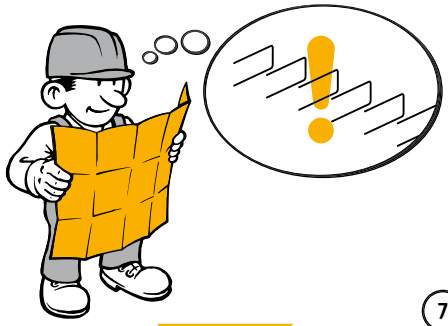


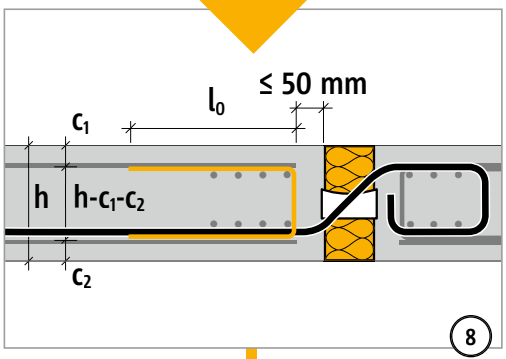


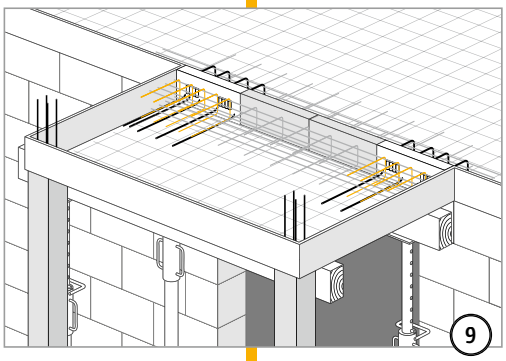


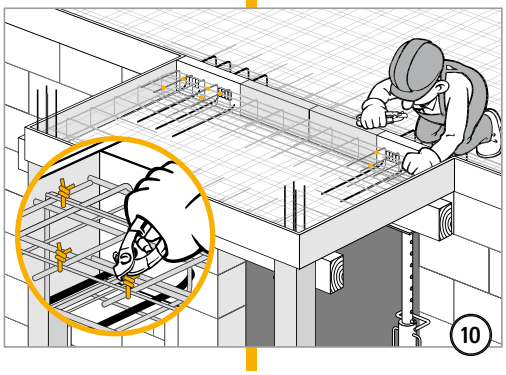




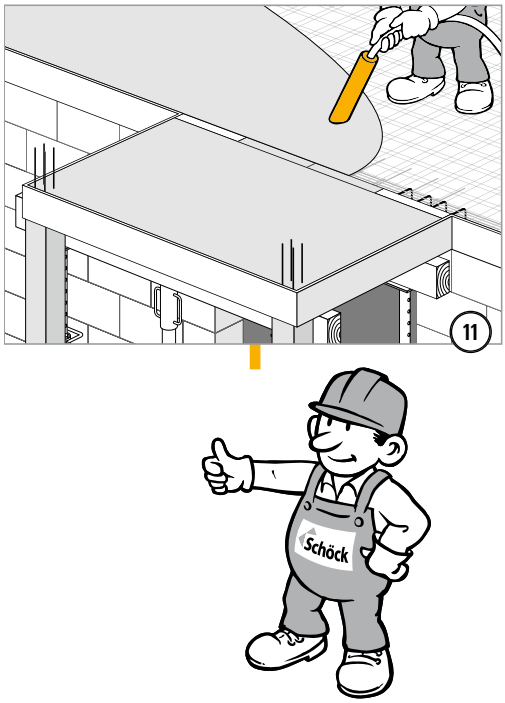








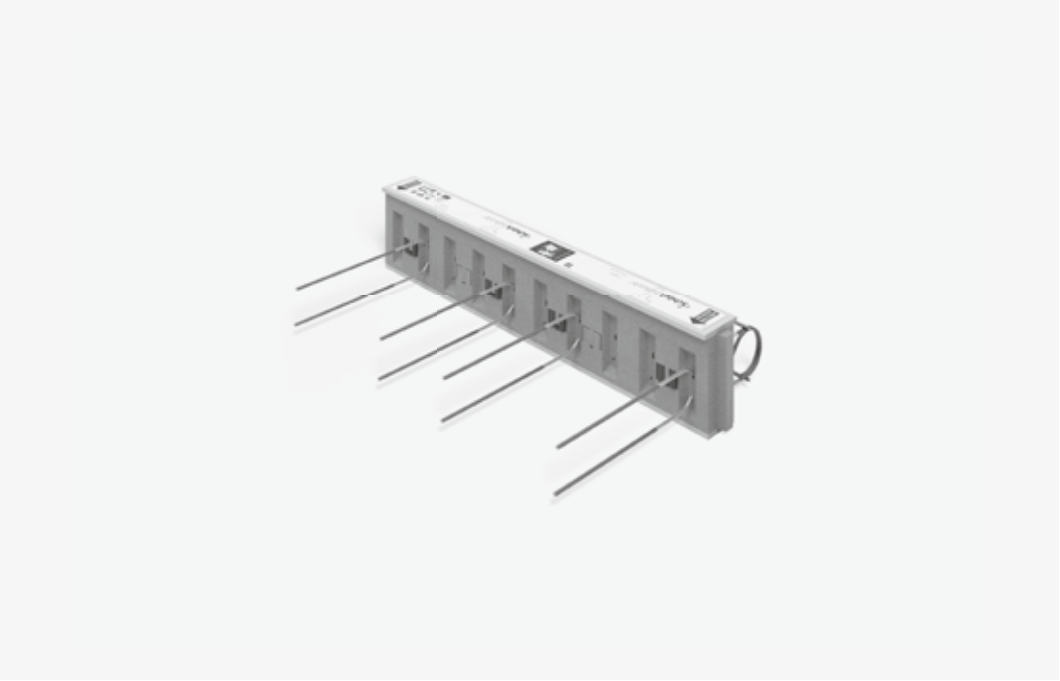
Installation instructions for the building site



Check list

- ☐ Is the same height level planned for the balcony and floor in relation to the upper edges of the shell?
- ☐ For fully precast balconies, are any necessary gaps for the frontal transport anchors and rainwater downpipes for internal drainage taken into account?
- ☐ Has the right type of Schöck Isokorb® been selected for the static system? T Type Q-E is a connection purely for shear force (moment joint).
- ☐ 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?
- ☐ Have the requirements for on-site reinforcement of connections been defined in each case?
- ☐ Have the maximum permitted expansion joint spacings been taken into account with regards to the fixed points?
- ☐ Has the danger warning regarding a missing support been included in the construction drawings?
- ☐ 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 required component geometry present with the connection to a floor or a wall? Is a special design required?
- ☐ Have existing horizontal loads e.g. from wind pressure been taken into account as planned? Are additional Schöck Isokorb® T type H or T type EQ required?
- ☐ Has a Schöck Isokorb® T type Q-E-Z been selected for a connection free of constraint forces for 2- or 3-sided support?
- ☐ Has a soft elastic joint been taken into account between the upper edge of the facing shell and the balcony?
- ☐ Is the length $e_L < b \leq e$ for the recessed balcony application example? Then the Schöck Isokorb® T type Q-E-Z without pressure bearings should be arranged on both sides of the tie member. The horizontal stability is to be verified, possibly with a Schöck Isokorb® T type H-VV-NN.

Schöck Isokorb® T type Q-E-VV, Q-E-W-VV



Schöck Isokorb® T type Q-E-VV, Q-E-W-VV
Suitable for supported balconies. It transfers positive and negative shear forces. Schöck Isokorb® length L in three variants. L250 and L500 are suitable for load peaks.

Element arrangement | Installation cross sections

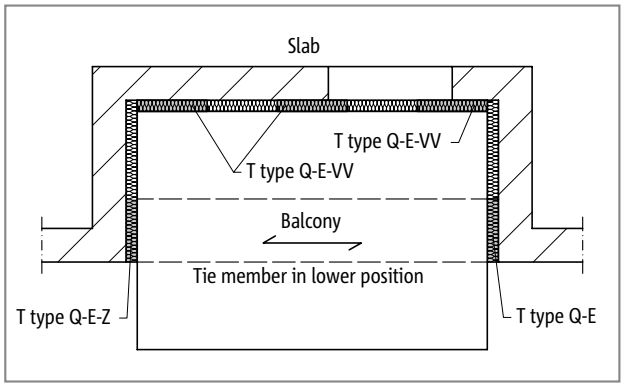


Fig. 123: Schöck Isokorb® T type Q-E, Q-E-Z and Q-E-VV: Recessed balcony supported on three sides with tie member

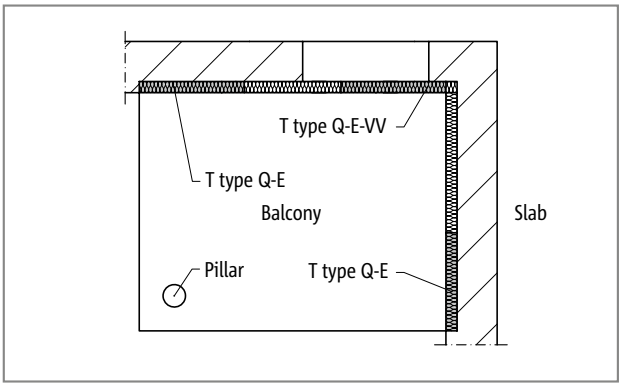


Fig. 124: Schöck Isokorb® T type Q-E, Q-E-VV: Balcony supported on two sides with pillar and positive shear forces

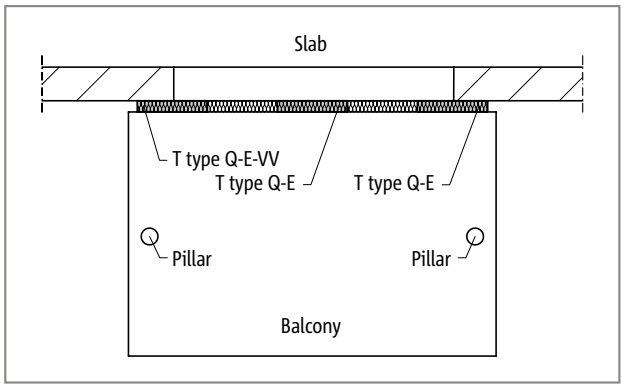


Fig. 125: Schöck Isokorb® T type Q-E, Q-E-VV: Balcony with pillar support

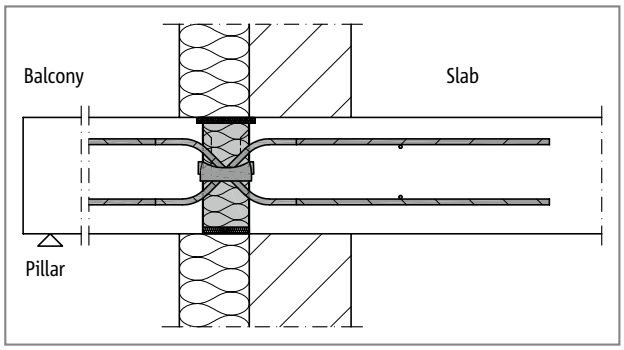


Fig. 126: Schöck Isokorb® T type Q-E-VV: Connection for exterior insulation

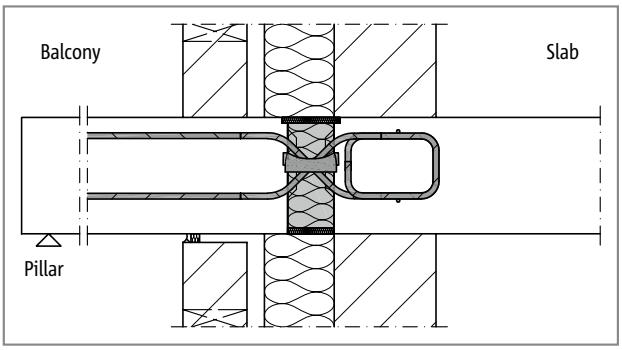


Fig. 127: Schöck Isokorb® T type Q-E-W-VV: Connection for core insulation

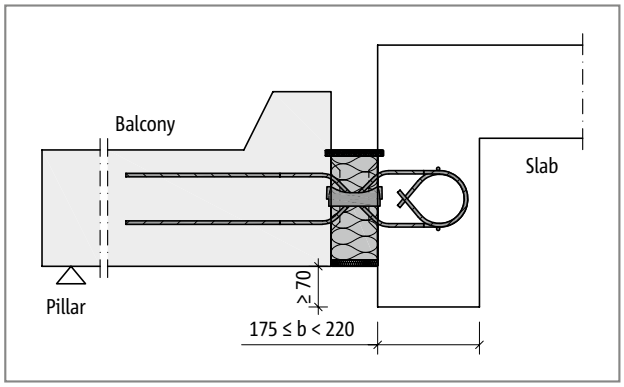


Fig. 128: Schöck Isokorb® T type Q-E-W-VV: Installation situation "pre-cast balcony slab" (e.g. T type Q-E-W-VV1 to VV3)

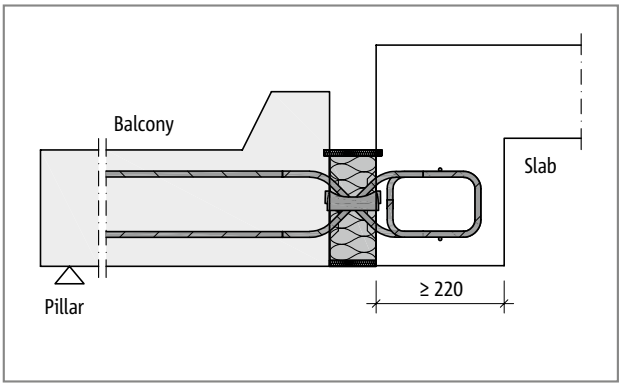


Fig. 129: Schöck Isokorb® T type Q-E-W-VV: Installation situation "pre-cast balcony slab"

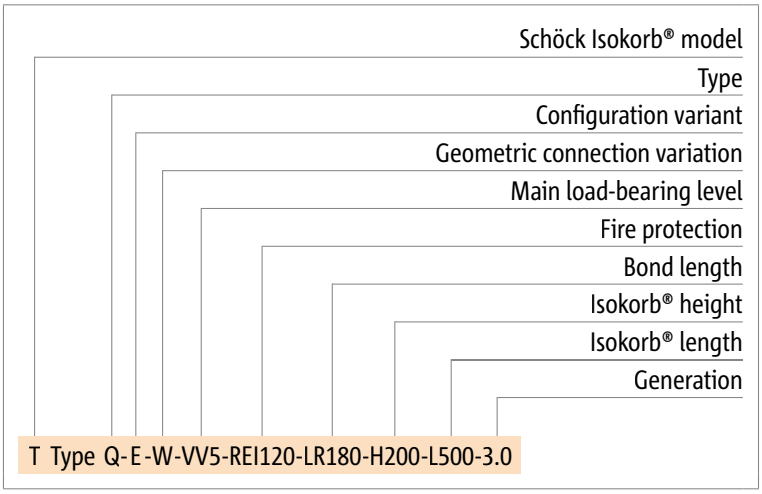
Product selection | Type designations | Special designs

Variants of Schöck Isokorb® T type Q-E-VV, Q-E-W-VV

Shear force bars for positive and negative shear forces for all variants. Shear force bar on balcony side straight The configuration of the Schöck Isokorb® T type Q-E can be varied as follows:
T type Q-E-VV, Q-E-W-VV: Shear force bars for positive and negative shear force, pressure bearings

- Geometric connection variation:
  W: Shear force bar on floor side bent, on balcony side straight
  -: Shear force bar on floor side straight, on balcony side straight
- Main load bearing level:
  VV1 to VV7: Shear force bar on floor side straight, on balcony side straight
- Fire resistance class:
  REI120 is standard, fire protection board projecting on both sides by 10 mm
  R0 is available as an option for improved thermal insulation and sound proofing
- Embedded length LR: Dimensions for Schöck Isokorb® T type Q-E-W-VV, see page 90
- Concrete cover of the shear force bars:
  bottom: CV ≥ 30 mm (depending on the type and height of the Isokorb®)
  top: CV ≥ 31 mm
- Isokorb® height:
  H = H_{min} up to 250 mm (note minimum slab height depending on load bearing capacity and fire protection)
- Isokorb® length:
  L250, L500, L1000, info in mm
- Generation:
  3.0

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).

Bond length

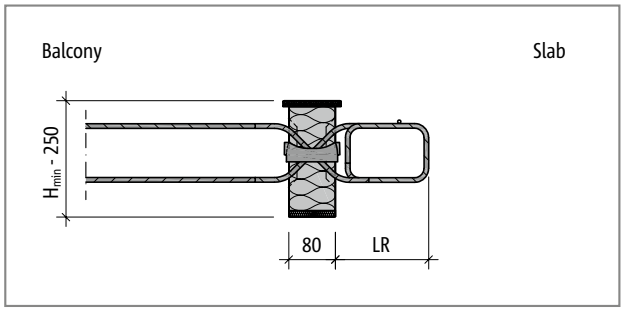


Fig. 130: Schöck Isokorb® type Q-E-W-VV: Product section, representation of bond length LR

Schöck Isokorb® T type Q-E-W		VV1 - VV3	VV4	VV5
Bond length		LR [mm]		
Isokorb® height H [mm]	H_{min} - 250	155	160	180

Design

Design table T type Q-E in length L1000

Schöck Isokorb® T type Q-E	VV1 W-VV1	VV2 W-VV2	VV3 W-VV3	VV4 W-VV4	VV5 W-VV5	VV6	VV7
Design values with	$v_{Rd,z}$ [kN/m]						
Concrete C25/30	±33.3	±50.0	±66.6	±118.5	±185.1	±266.6	±328.0

Isokorb® length [mm]	1000	1000	1000	1000	1000	1000	1000
Shear force bars	4 ⌀ 6 + 4 ⌀ 6	6 ⌀ 6 + 6 ⌀ 6	8 ⌀ 6 + 8 ⌀ 6	8 ⌀ 8 + 8 ⌀ 8	8 ⌀ 10 + 8 ⌀ 10	8 ⌀ 12 + 8 ⌀ 12	8 ⌀ 14 + 8 ⌀ 14
Pressure bearing (piece)	4	4	4	4	8	8	8
H_{min} for REI 60 [mm]	160	160	160	170	180	190	200
H_{min} width REI120 [mm]	160	160	160	170	180	190	200

Design table T type Q-E in length L250, L500

Schöck Isokorb® T type Q-E	VV4 W-VV4	VV5 W-VV5	VV6	VV7	VV4 W-VV4	VV5 W-VV5	VV6	VV7
Design values with	$V_{Rd,z}$ [kN/element]				$V_{Rd,z}$ [kN/element]			
Concrete C25/30	±29.6	±46.3	±66.6	±82.0	±59.2	±92.6	±133.3	±164.0

Isokorb® length [mm]	250	250	250	250	500	500	500	500
Shear force bars	2 ⌀ 8 + 2 ⌀ 8	2 ⌀ 10 + 2 ⌀ 10	2 ⌀ 12 + 2 ⌀ 12	2 ⌀ 14 + 2 ⌀ 14	4 ⌀ 8 + 4 ⌀ 8	4 ⌀ 10 + 4 ⌀ 10	4 ⌀ 12 + 4 ⌀ 12	4 ⌀ 14 + 4 ⌀ 14
Pressure bearing (piece)	2	2	2	2	4	4	4	4
H_{min} [mm]	170	180	190	190	170	180	190	200

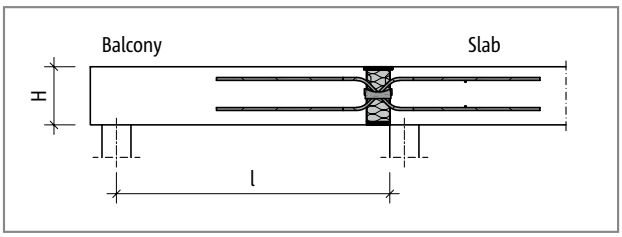


Fig. 131: Schöck Isokorb® T type Q-E-VV: Static system

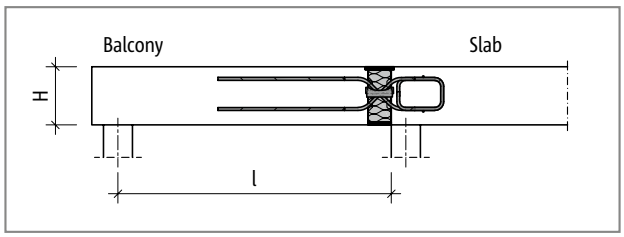


Fig. 132: Schöck Isokorb® T type Q-E-W-VV: Static system

Notes on design

- A static verification is to be provided for the adjacent reinforced concrete structural component on both sides of the Schöck Isokorb®.
- Due to the excentric force application of the Schöck Isokorb®, an offset moment is generated at the adjacent slab edges. This is to be taken into account with the design of the slabs.

Moments from excentric connection

Moments from excentric connection

Moments from excentric connection for the Schöck Isokorb® are to be taken into account for the design of the connection reinforcement for each balcony and slab side. These moments are respectively to be overlaid with the moments from the ordinary loading, if they have the same sign.
The following table values ΔM_{Ed} have been calculated for 100% utilisation of v_{Rd}.

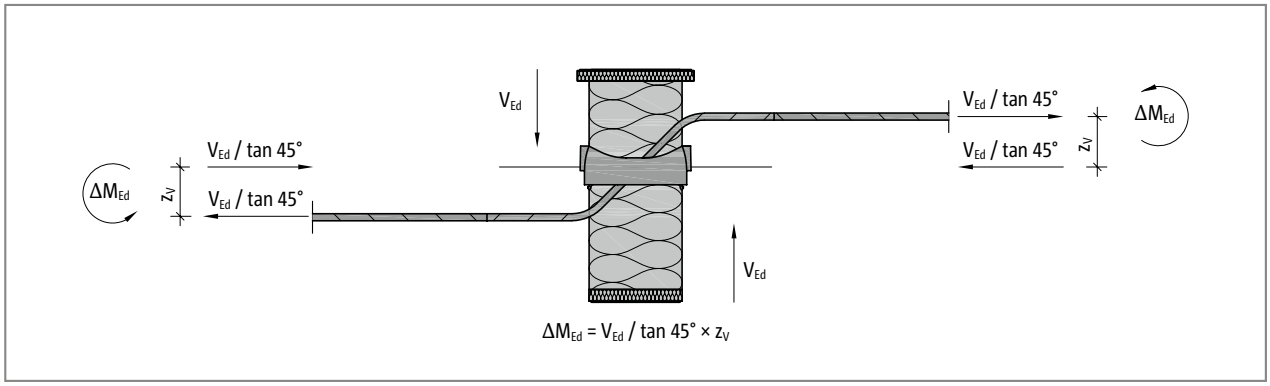


Fig. 133: Schöck Isokorb® T type Q-E, Q-E-W: Moments from excentric connection

Schöck Isokorb® T type Q-E	VV1 W-VV1	VV2 W-VV2	VV3 W-VV3	VV4 W-VV4	VV5 W-VV5	VV6	VV7
Isokorb® length [mm]	1000	1000	1000	1000	1000	1000	1000
Design values with	Δ M_{Ed} [kNm/Element]						
Concrete C25/30	1.7	2.6	3.3	6.0	10.4	15.2	20.5

Schöck Isokorb® T type Q-E	VV4 W-VV4	VV5 W-VV5	VV6	VV7	VV4 W-VV4	VV5 W-VV5	VV6	VV7
Isokorb® length [mm]	250	250	250	250	500	500	500	500
Design values with	Δ M_{Ed} [kNm/Element]				Δ M_{Ed} [kNm/Element]			
Concrete C25/30	1.5	2.6	3.8	5.1	3.0	5.2	7.6	10.3

Expansion joint spacing

Maximum expansion joint spacing

If the component length exceeds the maximum expansion joint spacing e, then expansion joints must be incorporated into the external concrete components at right angles to the insulating layer in order to limit the effect as a result of temperature changes. Because the layout of the Isokorb® is only possible along the side of the component due to the installation in conjunction with the external concrete precast element, corners of balconies, parapets and balustrades cannot form any fixed points.
The shear force transmission in the expansion joint can be ensured using a longitudinally displaceable shear force dowel, e.g. Schöck Dorn.

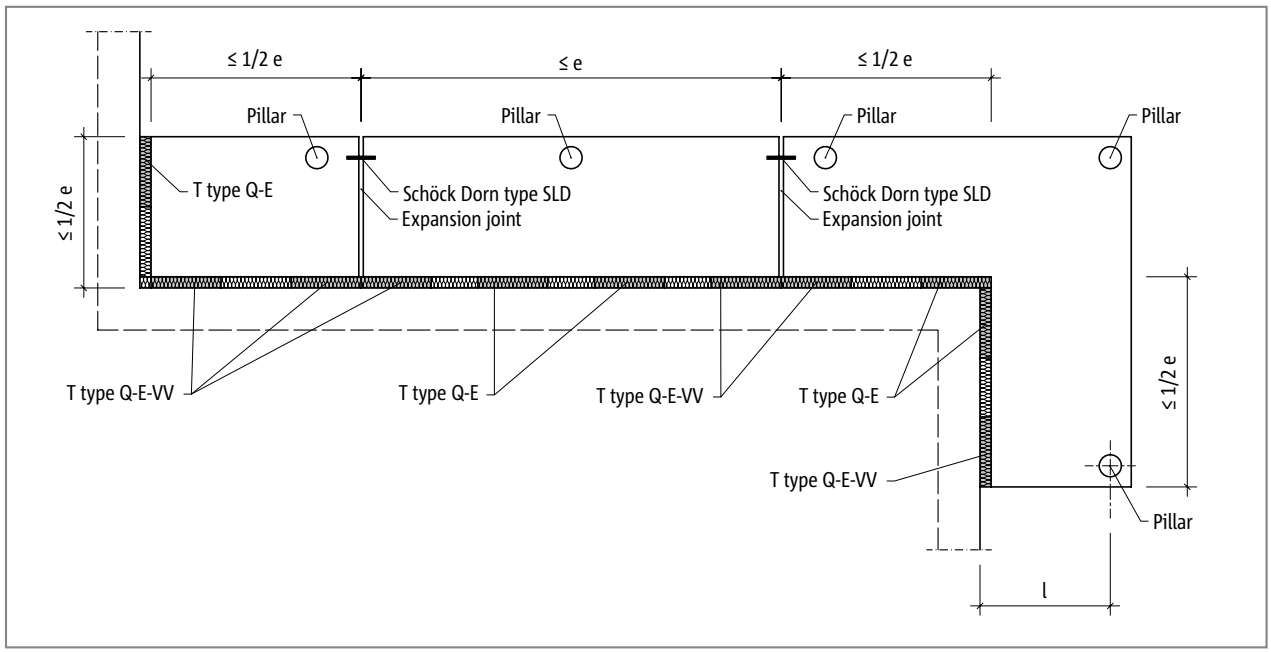


Fig.

Schöck Isokorb® T type Q-E, Q-E-W		VV1 - VV4	VV5	VV6	VV7
Maximum expansion joint spacing e		e [m]			
Insulating element thickness [mm]	80	13.5	13.0	11.7	10.1

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 bars from the free edge resp. exapansion joint: $e_R \geq 100$ mm applies.

Product description

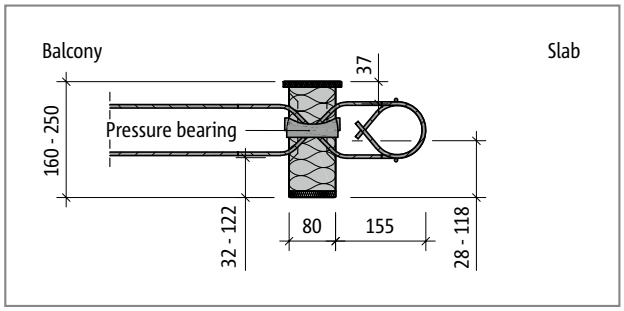


Fig. 134: Schöck Isokorb® T type Q-E-W-VV1 up to VV3: Product section

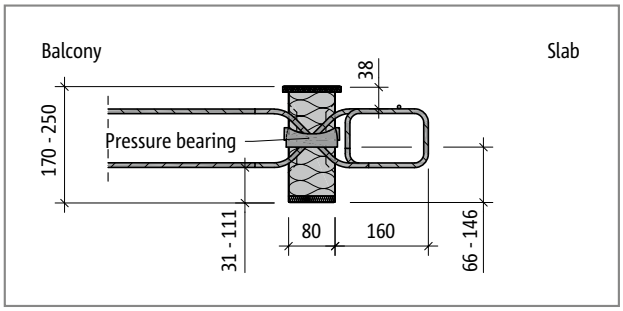


Fig. 135: Schöck Isokorb® T type Q-E-W-VV4: Product section

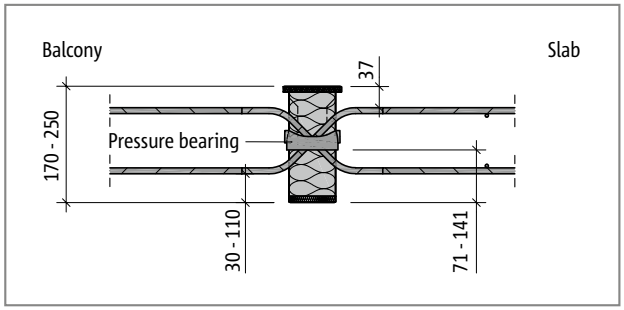


Fig. 136: Schöck Isokorb® T type Q-E-VV5: Product section

Product information

- Download additional 2D and 3D product drawings at www.schoeck.de/download
- Observe min. height H_{min} Schöck Isokorb® T type Q-E-VV, Q-E-W-VV.
- The upper fire protection slab projects on both sides of the Schöck Isokorb® by 10 mm.

Product description

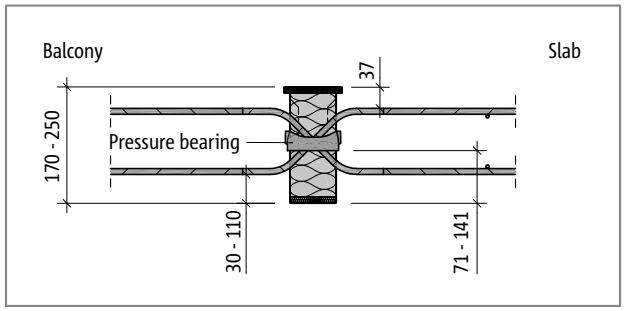


Fig. 137: Schöck Isokorb® T type Q-E-VV5: Product section

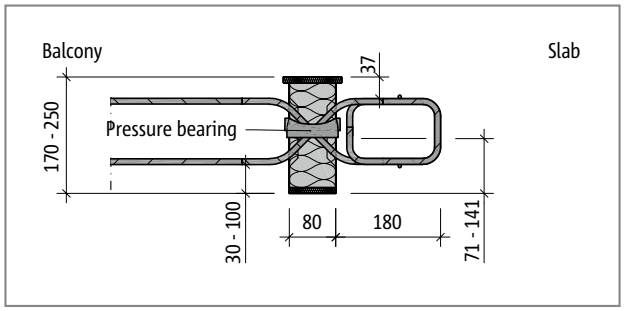


Fig. 138: Schöck Isokorb® T type Q-E-W-VV5: Product section

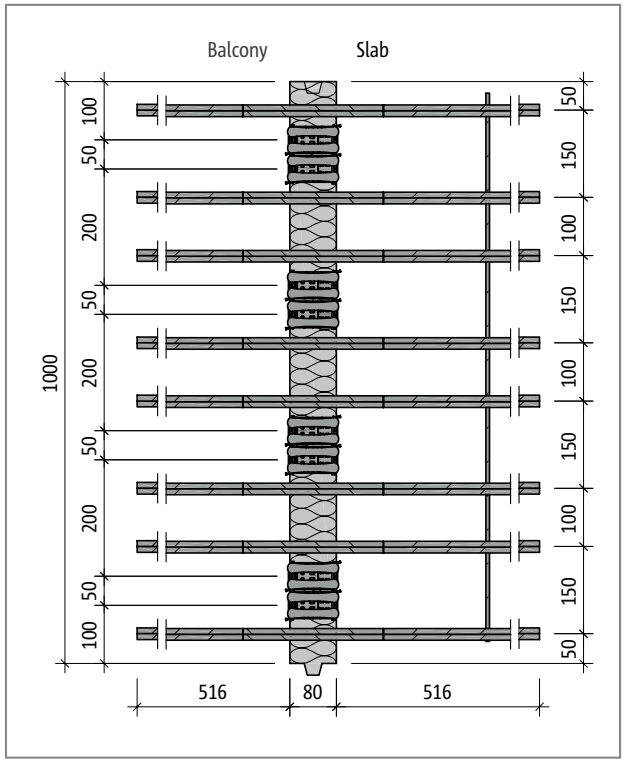


Fig. 139: Schöck Isokorb® T type Q-E-VV5: Product layout

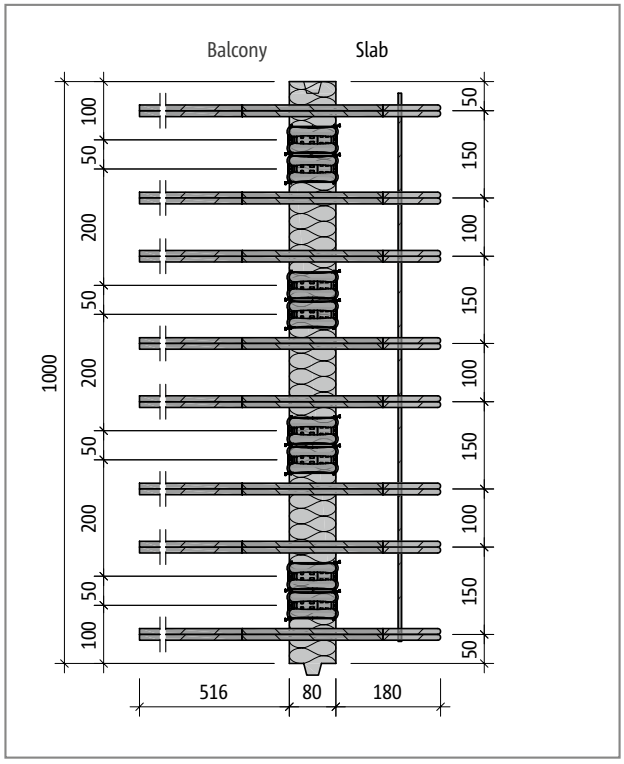


Fig. 140: Schöck Isokorb® T type Q-E-W-VV5: Product layout

Product description

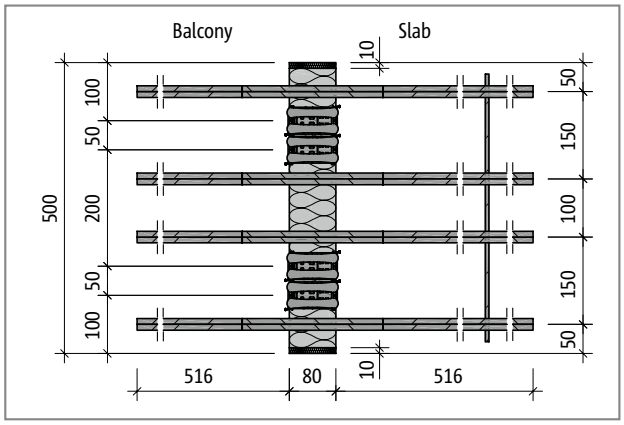


Fig. 141: Schöck Isokorb® T type Q-E-VV5: Product layout; lateral fire protection boards

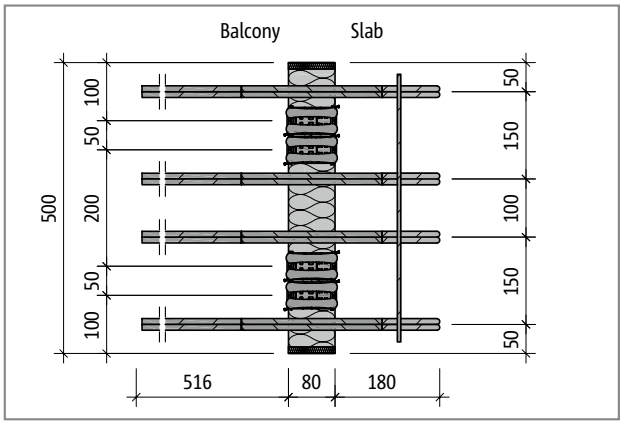


Fig. 142: Schöck Isokorb® type Q-E-W-VV5: Product layout

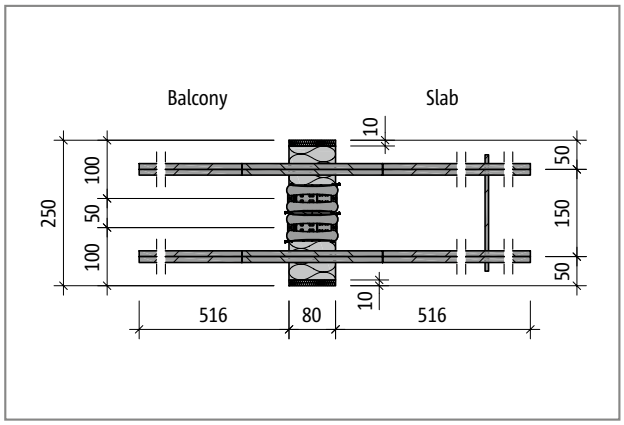


Fig. 143: Schöck Isokorb® T type Q-E-VV5: Product layout; lateral fire protection boards

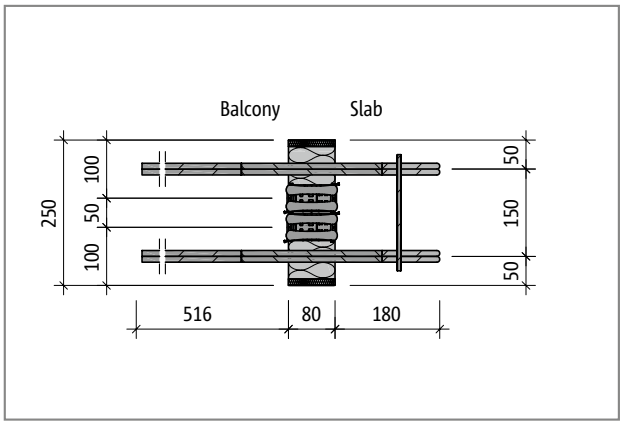


Fig. 144: Schöck Isokorb® T type Q-E-W-VV5: Product layout

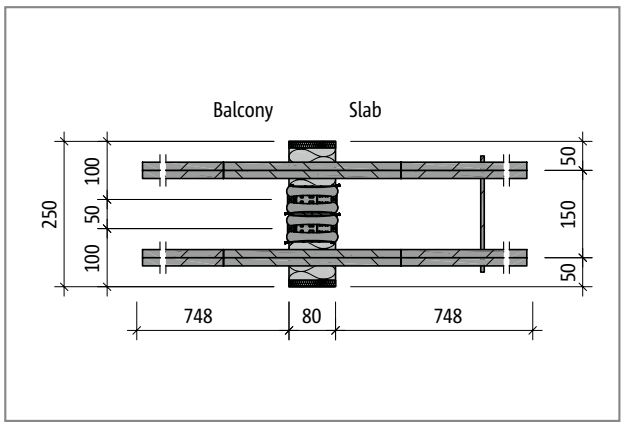


Fig. 145: Schöck Isokorb® T type Q-E-VV7: Product layout

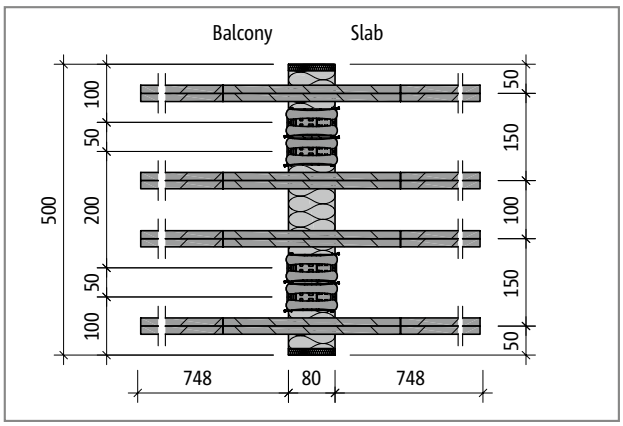


Fig. 146: Schöck Isokorb® T type Q-E-VV7: Product layout

Product information

- Download additional 2D and 3D product drawings at www.schoeck.de/download
- Observe min. height H_{min} Schöck Isokorb® T type Q-E-VV, Q-E-W-VV.
- Schöck Isokorb® T type Q-E in lengths L250 and L500 with lateral fire protection boards

Configuration without fire protection

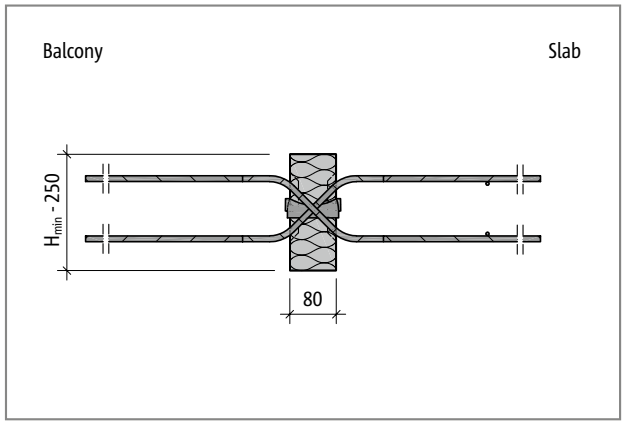


Fig. 147: Schöck Isokorb® T type Q-E-VV5: Product section

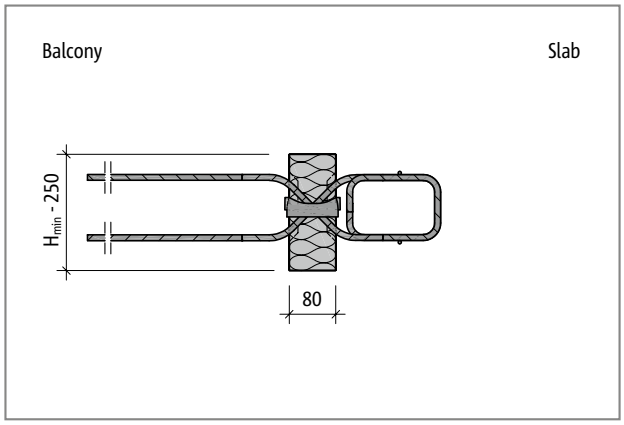


Fig. 148: Schöck Isokorb® T type Q-E-W-VV5: Product section

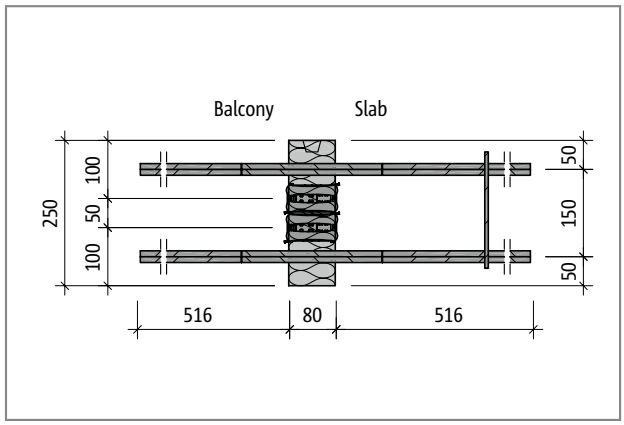


Fig. 149: Schöck Isokorb® T type Q-E-VV5: Product layout

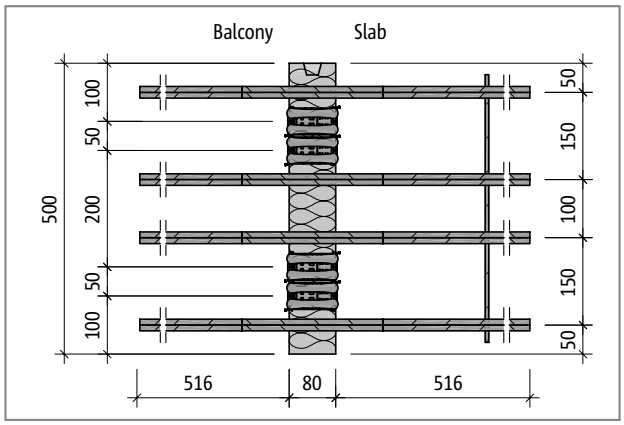


Fig. 150: Schöck Isokorb® T type Q-E-VV5: Product layout

Fire protection

- Observe min. height H_{min} Schöck Isokorb® T type Q-E-VV, Q-E-W-VV.

On-site reinforcement

Schöck Isokorb® T type Q-E-VV, Q-E-W-VV

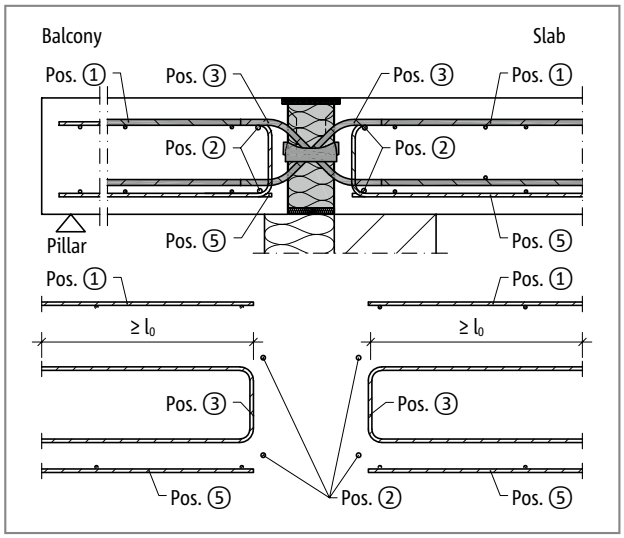


Fig. 151: Schöck Isokorb® T type Q-E-VV: On-site reinforcement

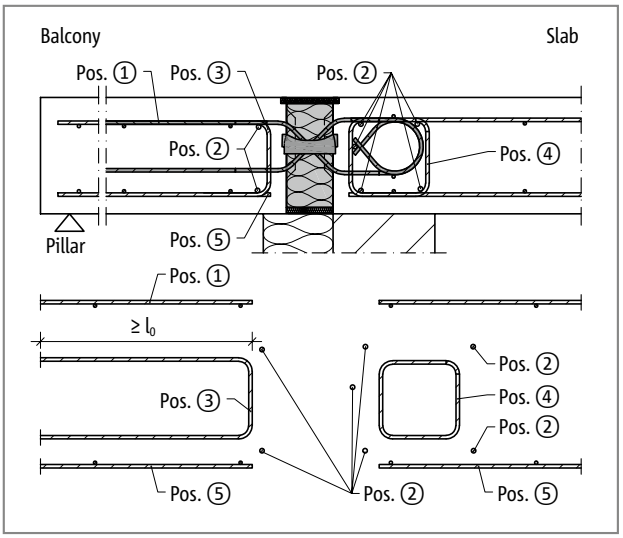


Fig. 152: Schöck Isokorb® type Q-E-W-VV: On-site reinforcement

Schöck Isokorb® T type Q-E-W		VV1	VV2	VV3	VV4	VV5
On-site reinforcement	**Location**	**Floor (XC1) concrete strength class ≥ C25/30 Balcony (XC4) 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**	acc. to the specifications of the structural engineer				
Pos. 3 Stirrup						
Pos. 3 [mm²/m]	**Balcony side**	80	120	160	284	444
Pos. 4 Stirrup (edge beam according to Z-15.7-240)						
Pos. 4	**Floor side**	acc. to the specifications of the structural engineer				
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 DS/EN 1992-1-1 (EC2), 9.3.1.4 (not pictured)				

Schöck Isokorb® T type Q-E		VV1	VV2	VV3	VV4
On-site reinforcement	**Location**	**Floor (XC1) concrete strength class ≥ C25/30 Balcony (XC4) 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	acc. to the specifications of the structural engineer			
Pos. 3 Stirrup					
Pos. 3 [mm²/m]	Balcony/floor side	80	120	160	284
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 DS/EN 1992-1-1 (EC2), 9.3.1.4 (not pictured)			

On-site reinforcement

Schöck Isokorb® T type Q-E		VV5	VV6	VV7
On-site reinforcement	**Location**	**Floor (XC1) concrete strength class ≥ C25/30 Balcony (XC4) 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	acc. to the specifications of the structural engineer		
Pos. 3 Stirrup				
Pos. 3 [mm²/m]	Balcony/floor side	444	640	834
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 DS/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 structural edging Pos. 6 should be selected so low that it can be arranged between the upper and lower reinforcement position.

Type of bearing: supported

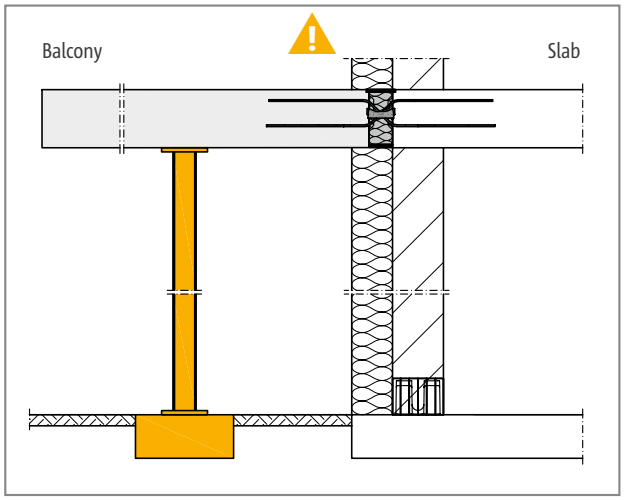


Fig. 153: Schöck Isokorb® T type Q-E-VV, Q-E-W-VV: Support required at all times

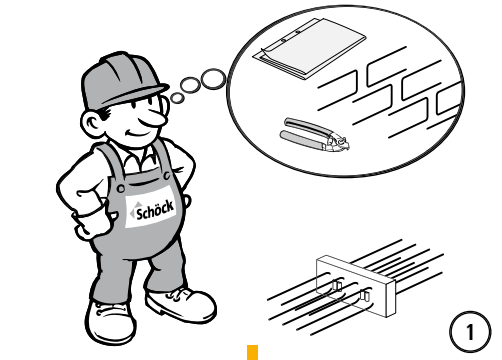
Supported balconies

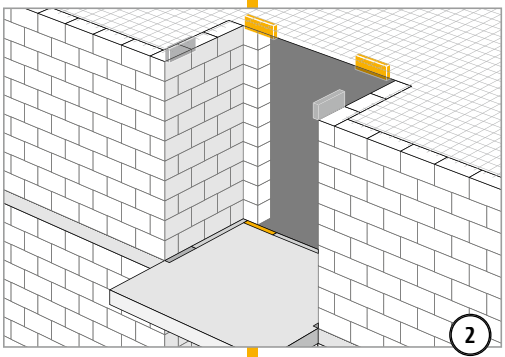
The Schöck Isokorb® T type Q-E is developed for supported balconies. It transfers exclusively shear forces, no bending moments.

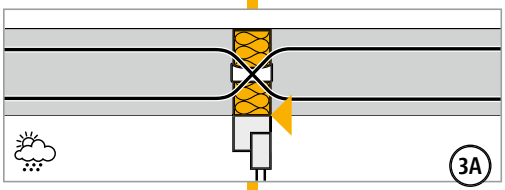
Warning - omitting the pillars

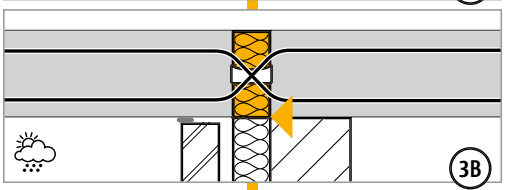
- The balcony will collapse if not supported.
- At all stages of construction, the balcony must be supported with statically suitable pillars or supports.
- Even when completed, the balcony must be supported with statically suitable pillars or supports.
- A removal of temporary support is permitted only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

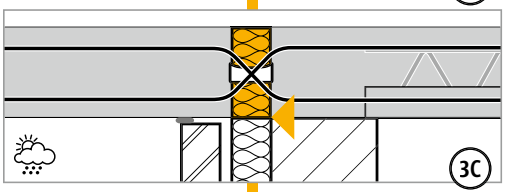
Installation instructions for the building site

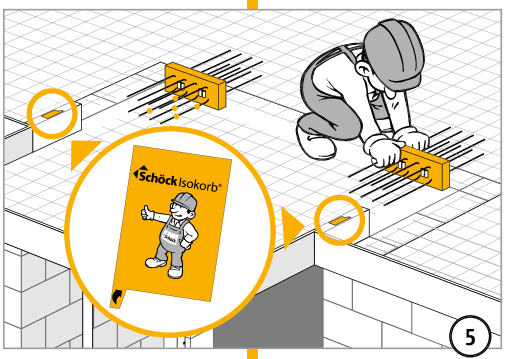


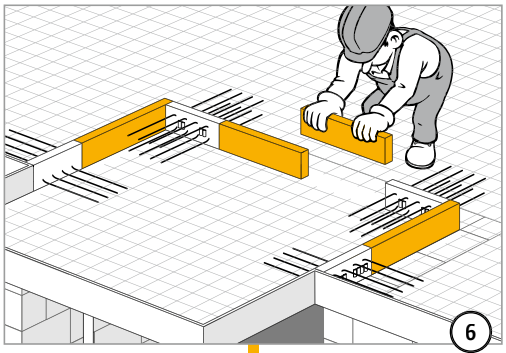


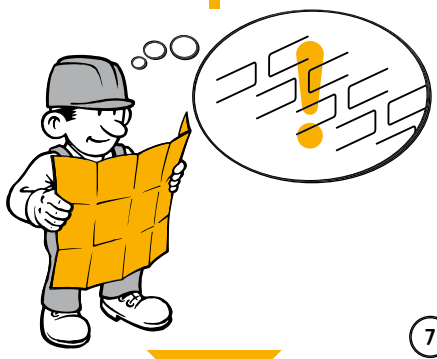


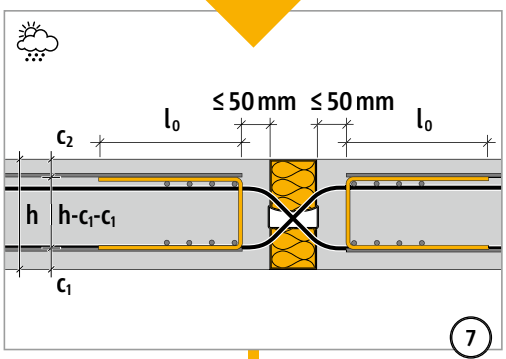


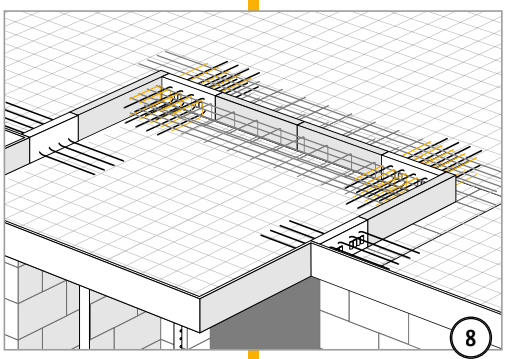


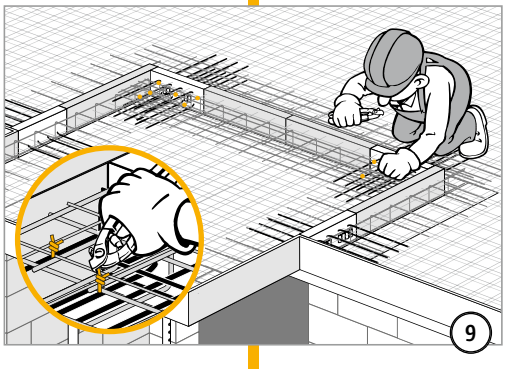




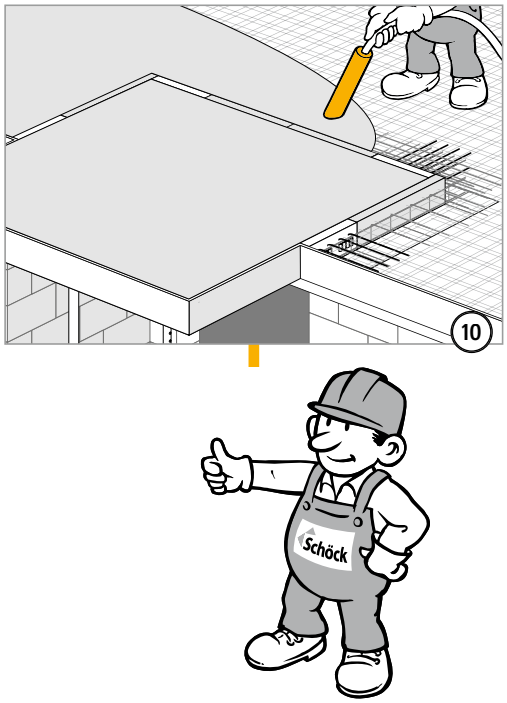




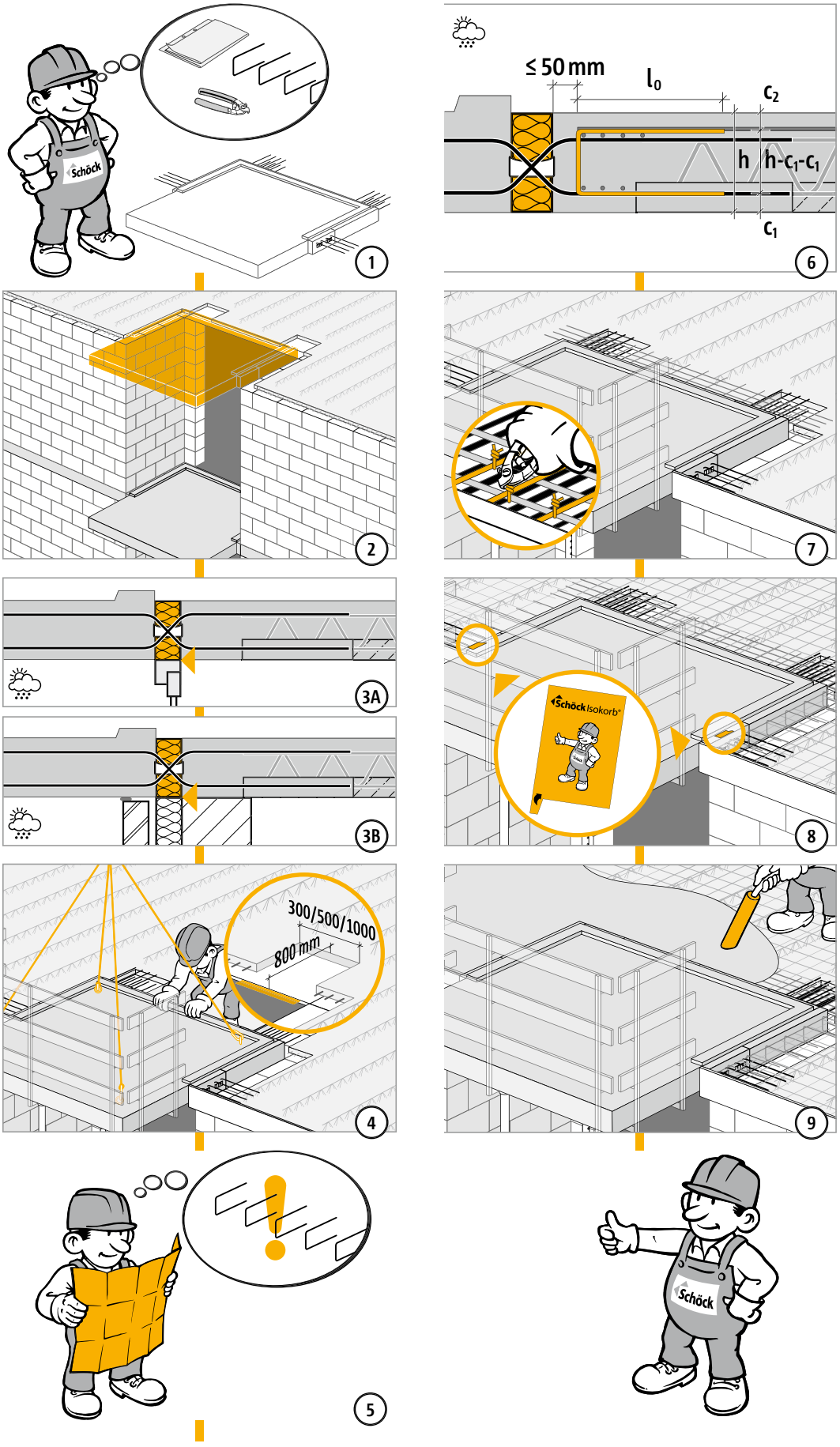




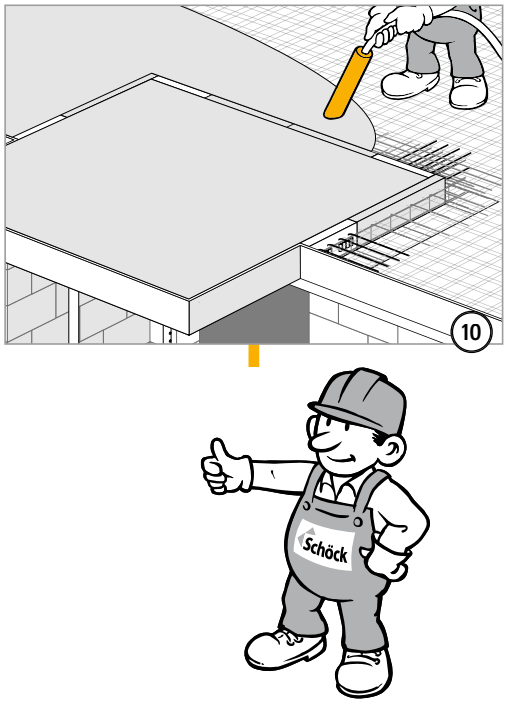
Installation instructions for the building site



Installation instructions for precast elements on building site



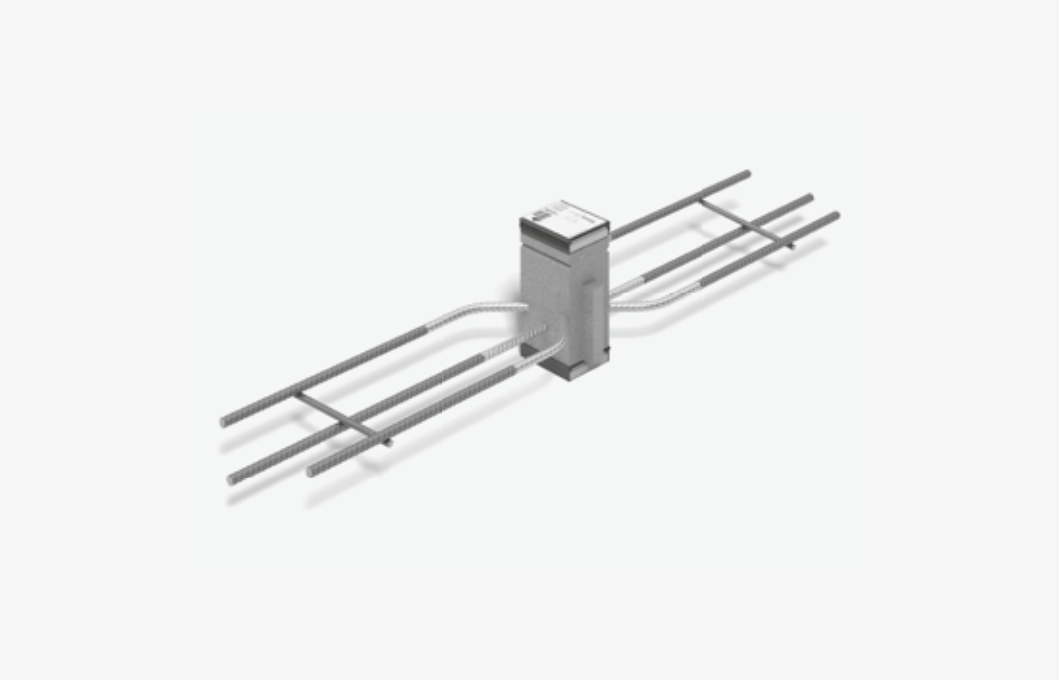
Installation instructions for precast elements on building site



Check list

- ☐ Are flush upper edges planned in the building structure for the balcony and the floor slab?
- ☐ Has the right type of Schöck Isokorb® been selected for the static system? T Type Q-E is a connection purely for shear force (moment joint).
- ☐ 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?
- ☐ Have the requirements for on-site reinforcement of connections been defined in each case?
- ☐ Have the maximum permitted expansion joint spacings been taken into account with regards to the fixed points?
- ☐ Has the danger warning regarding a missing support been included in the construction drawings?
- ☐ 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 required component geometry present with the connection to a floor or a wall? Is a special design required?
- ☐ Have existing horizontal loads e.g. from wind pressure been taken into account as planned? Are additional Schöck Isokorb® T type HP or T type EQ required ?
- ☐ For fully precast balconies, are any necessary gaps for the frontal transport anchors and rainwater downpipes for internal drainage taken into account?
- ☐ Has a soft elastic joint been taken into account between the upper edge of the facing shell and the balcony?
- ☐ Is the type designation of the Schöck Isokorb® explicit in the plans? - Example: Schöck Isokorb® T type Q-E-W-VV5-REI120-LR180-H200-L500

Schöck Isokorb® T type H



Schöck Isokorb® T type H
Suitable for ordinary existing horizontal forces.

The Schöck Isokorb® T type H-NN transfers forces at right angles to the insulation layer.
The Schöck Isokorb® T type H-VV-NN transfers forces both parallel and also at right angles to the insulation layer.

The Schöck Isokorb® T type H-VV-NN and/or T type H-NN is to be scheduled only in conjunction with other Isokorb® types that can transfer shear forces and if necessary, moments.

Element arrangement | Installation cross sections

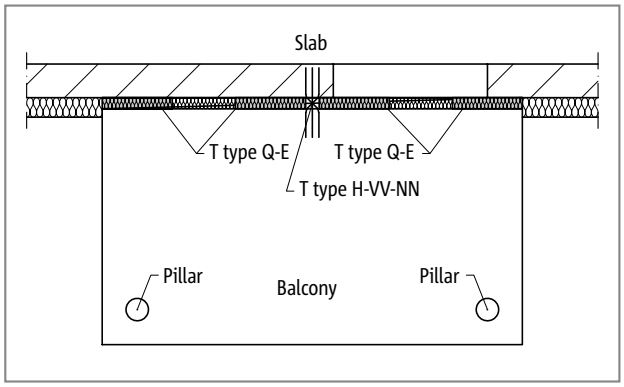


Fig. 154: Schöck Isokorb® T type H: Balcony with pillar support

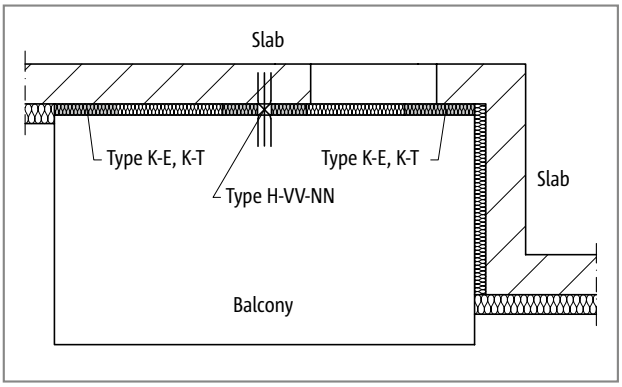


Fig. 155: Schöck Isokorb® T type H: Cantilevered balcony

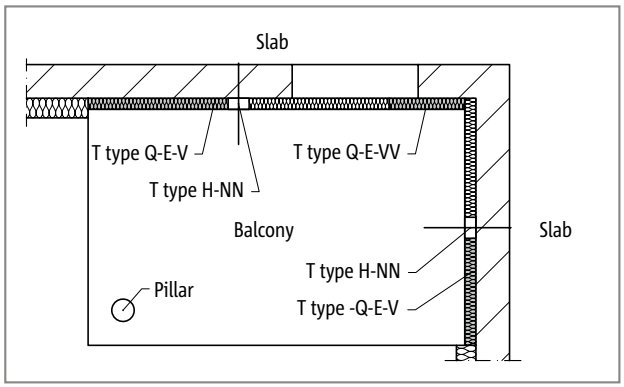


Fig. 156: Schöck Isokorb® T type H: Balcony supported on two sides with pillar

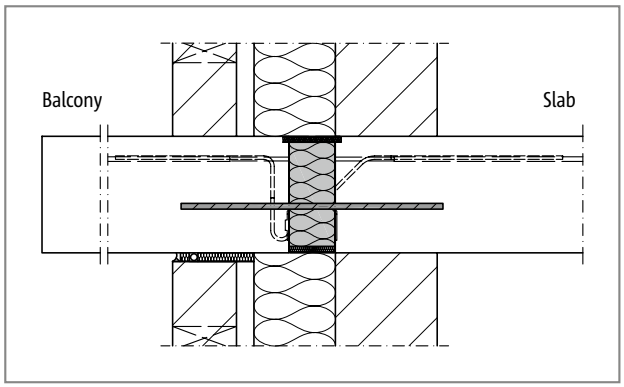


Fig. 157: Schöck Isokorb® T type H-NN: With T type K-E, K-T; connection for core insulation

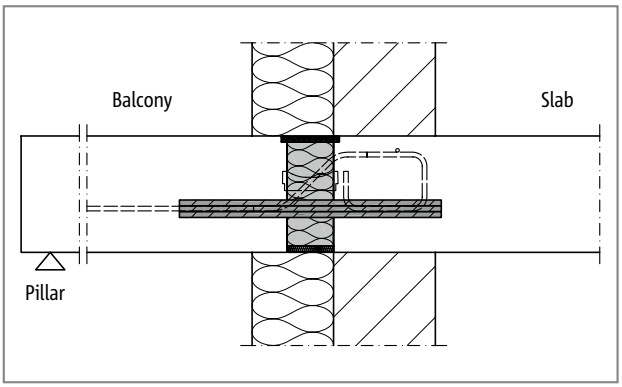


Fig. 158: Schöck Isokorb® T type H-VV-NN: With T type K-E, K-T; connection for exterior insulation

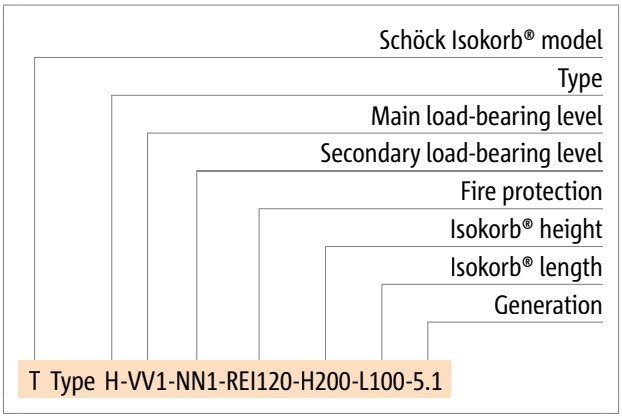
Product selection | Type designations | Special designs

Schöck Isokorb® T type H variants

The configuration of the Schöck Isokorb® T type H can be varied as follows:

- Main load-bearing level:
  VV1, VV2, NN1, NN2
- Secondary load-bearing level:
  NN1
  NN2 is available upon request
- Fire resistance class:
  REI120 (standard)
- Isokorb® height:
  H = 160 to 250 mm
- Isokorb® length:
  L = 100 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® T 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	±11.1	0.0	±47.1	±9.9	±11.1	±37.5	±47.1

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]	100	100	100	100
Isokorb® height H [mm]	160 - 250	160 - 250	160 - 250	160 - 250

Fig. 159: Schöck Isokorb® T type H: Type selection

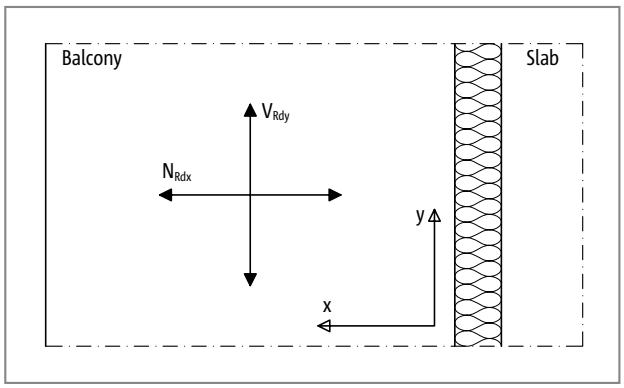


Fig. 160: Schöck Isokorb® T type H: Sign rule for the design

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. T type Q-E with L = 1.0 m and T type H with L = 0.1 m in regular exchange signifies a reduction by ca. 9 % of v_{Rd} of the linear connection using type T type Q-E).
- The required number of Schöck Isokorb® T type H-NN or H-VV-NN is to be laid down according to static requirements.

Expansion joint spacing

Maximum expansion joint spacing

If the component length exceeds the maximum expansion joint spacing e, then expansion joints must be incorporated 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, corners of balconies, or with the employment of the supplementary Schöck Isokorb® T types H half the maximum expansion joint spacing e/2 from the fixed point applies.
The shear force transmission in the expansion joint can be ensured using a longitudinally displaceable shear force dowel, e.g. Schöck Dorn.

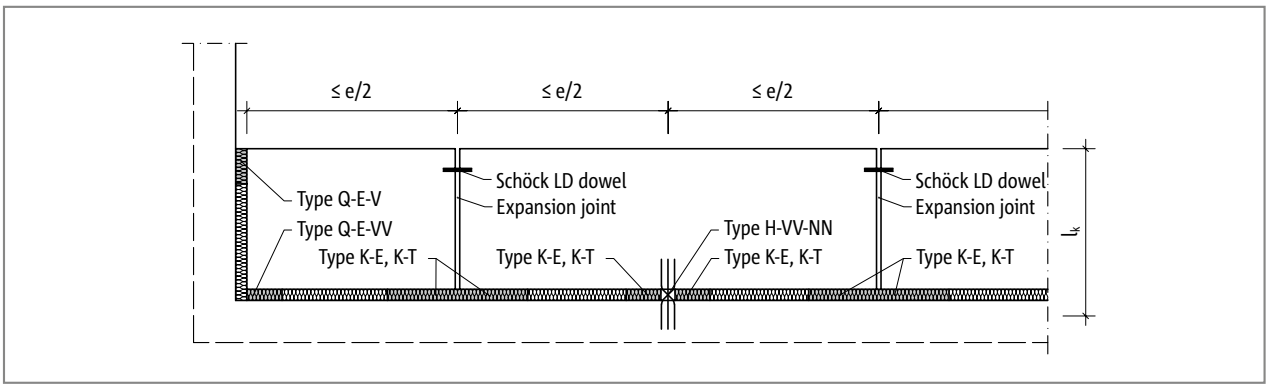


Fig. 161: Schöck Isokorb® T type H: Expansion joint spacing

Schöck Isokorb® T type H combined with T type	K-E, K-T	Q-E	Q-E-VV	D
maximum expansion joint spacing from fixed point e/2 [m]	≤ e/2 see p. 44	≤ e/2 see p. 69	≤ e/2 see p. 93	≤ e/2 see p. 124

Expansion joints

- A maximum of three Schöck Isokorb® T type H-VV-NNs 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® T type H-NNs are arranged on each edge of the expansion joint, then the following permitted expansion joint spacings must be maintained for T type H-NN:
  T type H-NN1: 13.0 m
  T type H-NN2: 11.7 m
  In addition, the combination of Schöck Isokorb® types being used should also be taken into account for determining the maximum expansion joint spacings.

Product description

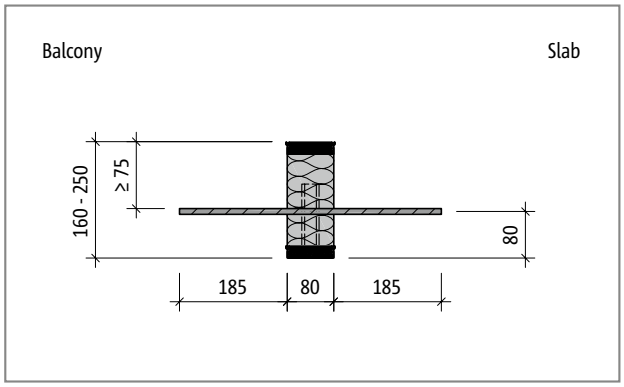


Fig. 162: Schöck Isokorb® T type H-NN1: Product section

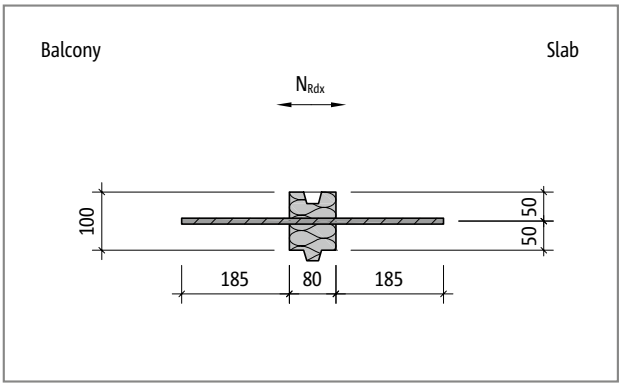


Fig. 163: Schöck Isokorb® T type H-NN1: Product layout

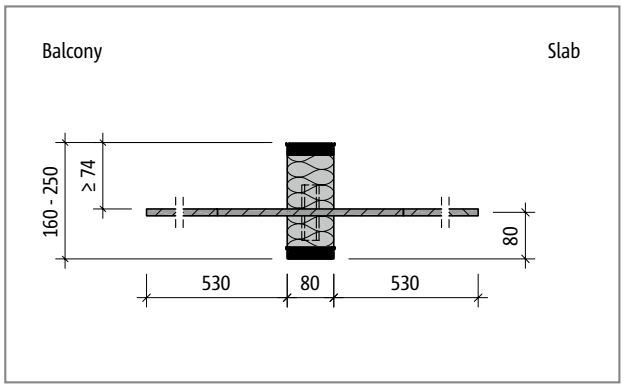


Fig. 164: Schöck Isokorb® T type H-NN2: Product section

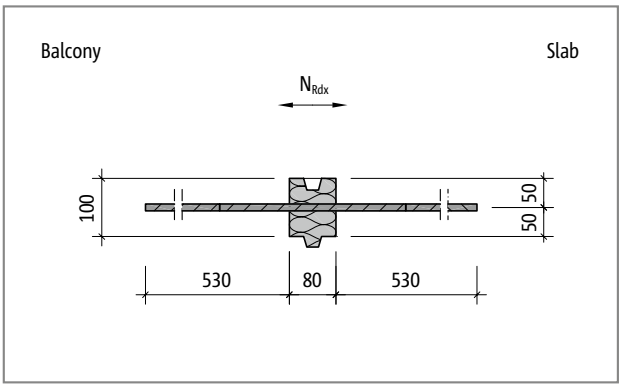


Fig. 165: Schöck Isokorb® T type H-NN2: Product layout

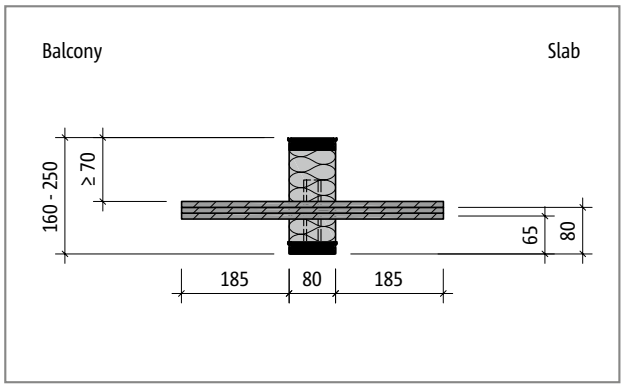


Fig. 166: Schöck Isokorb® T type H-VV1-NN1: Product section

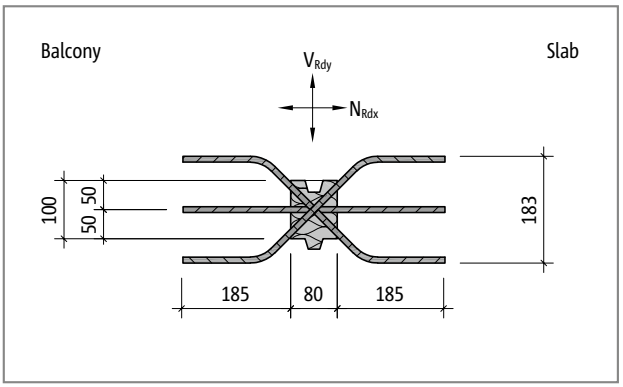


Fig. 167: Schöck Isokorb® T type H-VV1-NN1: Product layout

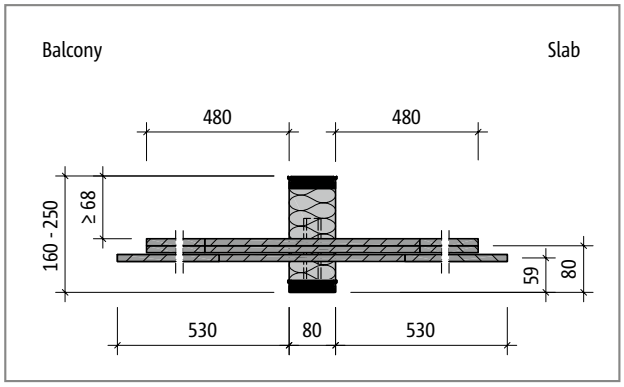


Fig. 168: Schöck Isokorb® T type H-VV2-NN1: Product section

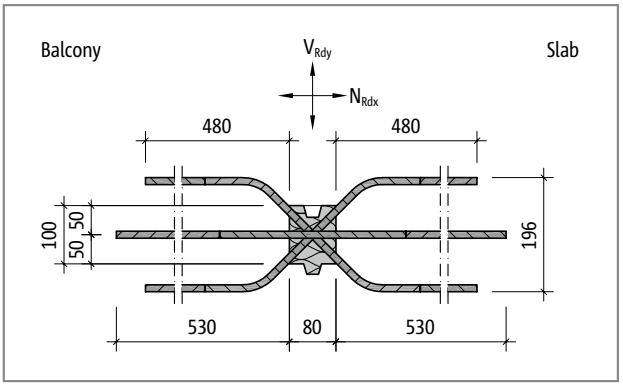


Fig. 169: Schöck Isokorb® T type H-VV2-NN1: Product layout

Design example

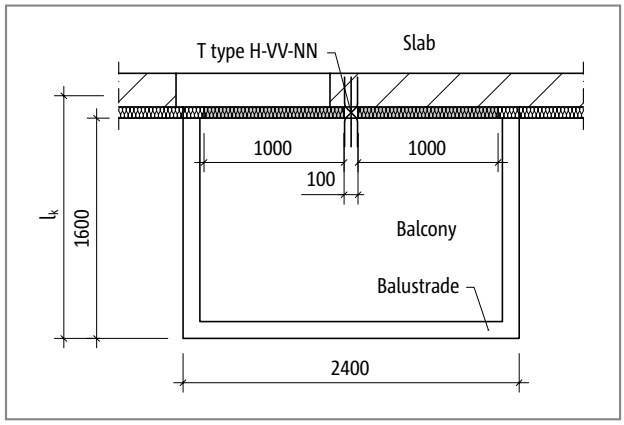


Fig. 170: Schöck Isokorb® T type K-E, K-T with type H: Static system, layout

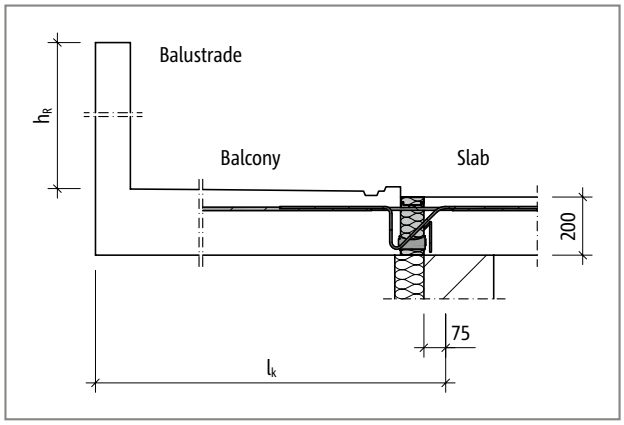


Fig. 171: Schöck Isokorb® T type K-E, K-T: Static system, cross-section

Static system and load assumptions

Geometry:	Schöck Isokorb® height	H= 200 mm
	cantilever length	l_k = 1.755 m
	average balcony slab thickness	h = 230 mm
	three-sided wraparound balustrade	h_R = 1.0 m
Load assumptions:	balcony slab	g = 5.75 kN/m²
	live load	q = 4.0 kN/m²
	Edge load (balustrade)	g_R = 3.0 kN/m
	wind pressure	w_e = 1.0 kN/m²
Exposure classes:	exterior XC 4	
	interior XC 1	
Selected:	concrete strength class C25/30 for the floor	
	concrete strength class C45/55 for the balcony	
	Concrete cover c_v = 35 mm for Schöck Isokorb® tension bars	
Connection geometry:	no height offset, no floor downstand beam, no balcony upstand	
Floor support:	floor slab edge indirectly supported	
Balcony support:	restraint of the cantilever slab using T type K-E	

Design example

Proof of limits of load-bearing capacity (moment stress and shear force)

The calculation takes into account the length of the connection with Schöck Isokorb® (= 2.40 m / 2.00 m) shown in the above drawing.

Internal forces:

m_{Ed} = -(0.5 • [2.40 • (γ_G • g + γ_Q • q) + 2 • γ_G • g_R] • l_k^2 + 2.40 • γ_G • g_R • l_k) / 2.00

m_{Ed} = -(0.5 • [2.40 • (1.0 • 5.75 + 1.5 • 2.5) + 2 • 1.0 • 3.0] • 1.755^2 + 2.40 • 1.0 • 1.0 • 1.755) / 2.00

= -28.5 kNm/m

v_{Ed} = +([2.40 • [(γ_G • g +γ_Q • q) + 2 • γ_G • g_R] • l_k + 2.40 • γ_G • g_R) / 2.00

v_{Ed} = +([2.40 • [(1.0 • 5.75 + 1.5 • 2.5) + 2 • 1.0 • 3.0] • 1.755 + 2.40 • 1.0 • 3.0) / 2.00

= +28.9 kN/m

Selected: **2 pieces of Schöck Isokorb® T type K-T-M5-V1-REI120-CV35-H200-L1000**

m_{Rd} = -32.4 kNm/m (see page 38) > m_{Ed}

v_{Rd} = +99.5 kN/m (see page 38) > v_{Ed}

$N_{Ed,x}$ = γ_Q • w_e • 2.40 • (h + h_R) = 1.5 • 1.0 • 2.40 • (0.23 + 1.0) = 4.4 kN (frontal wind)

$V_{Ed,y}$ = γ_Q • w_e • 2 • 1.6 • (h + h_R) = 1.5 • 1.0 • 2 • 1.60 • (0.23 + 1.0) = 5.9 kN (wind from the side)

Selected: **1 Schöck Isokorb® T type H-VV1-NN1-REI120-H200-L100**

$N_{Rd,x}$ = ±11.1 kN (see page 110) > $N_{Ed,x}$

$V_{Rd,y}$ = ±9.9 kN (see page 110) > $V_{Ed,y}$

Proof for the exceptional load case of earthquake

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

$F_{a,y}$ = ±15.0 kN/m (horizontal, perpendicular to the joint)

Internal forces:

$N_{EdA,x}$ = ±2.40 m • $F_{a,x}$ = ±2.40 m • 15.0 kN/m = 36.0 kN (force perpendicular to the joint)

$V_{EdA,y}$ = ±2.40 m • $F_{a,y}$ = ±2.40 m • 15.0 kN/m = 36.0 kN (force parallel to the joint)

Selected: **1 Schöck Isokorb® T type H-VV2-NN1-REI120-H200-L100**

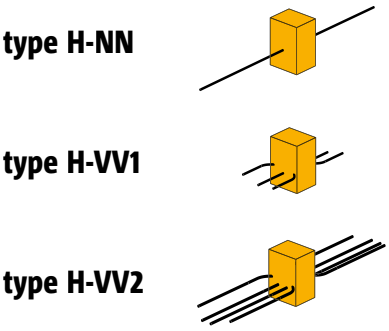
$N_{Rd,x}$ = ±47.1 kN (see page 110) > $N_{EdA,x}$

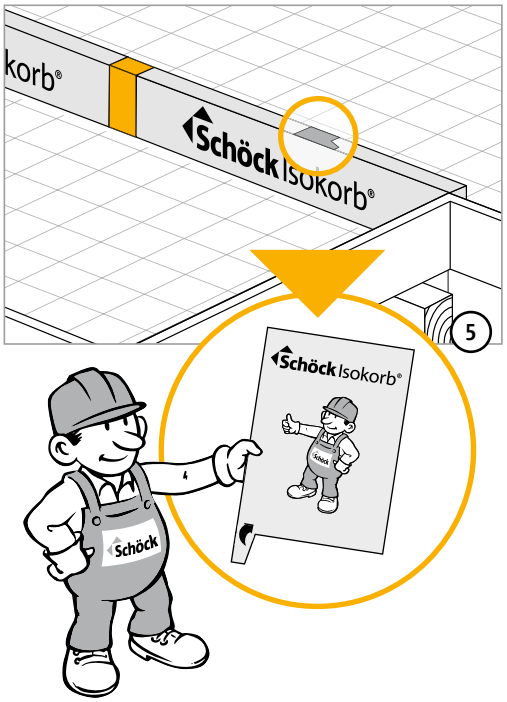
$V_{Rd,y}$ = ±37.5 kN (see page 110) > $V_{EdA,y}$

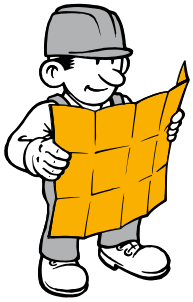
Design example

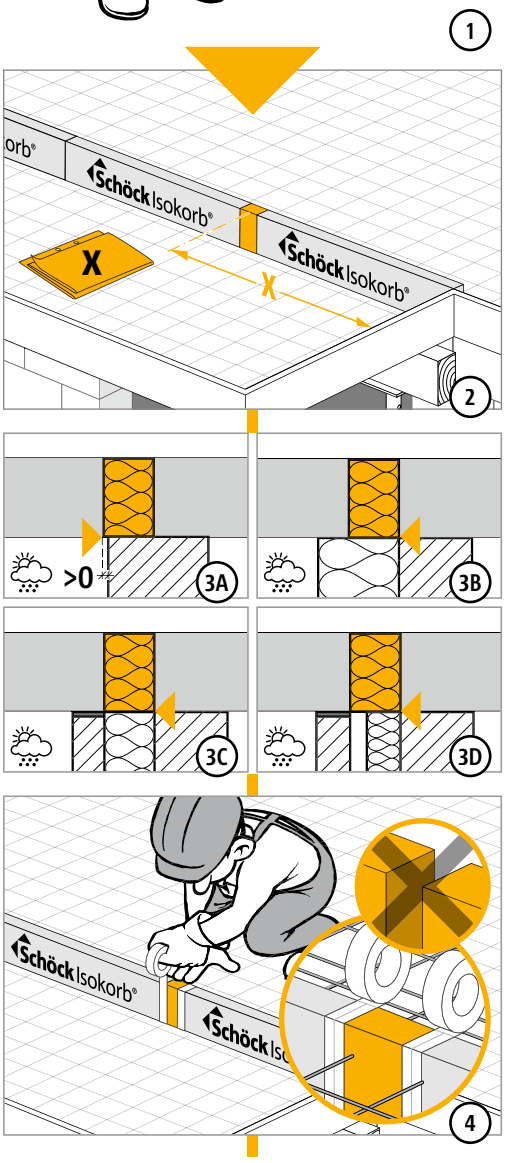
- The notes on expansion joint spacing are to be observed, see page 111.

Installation instructions





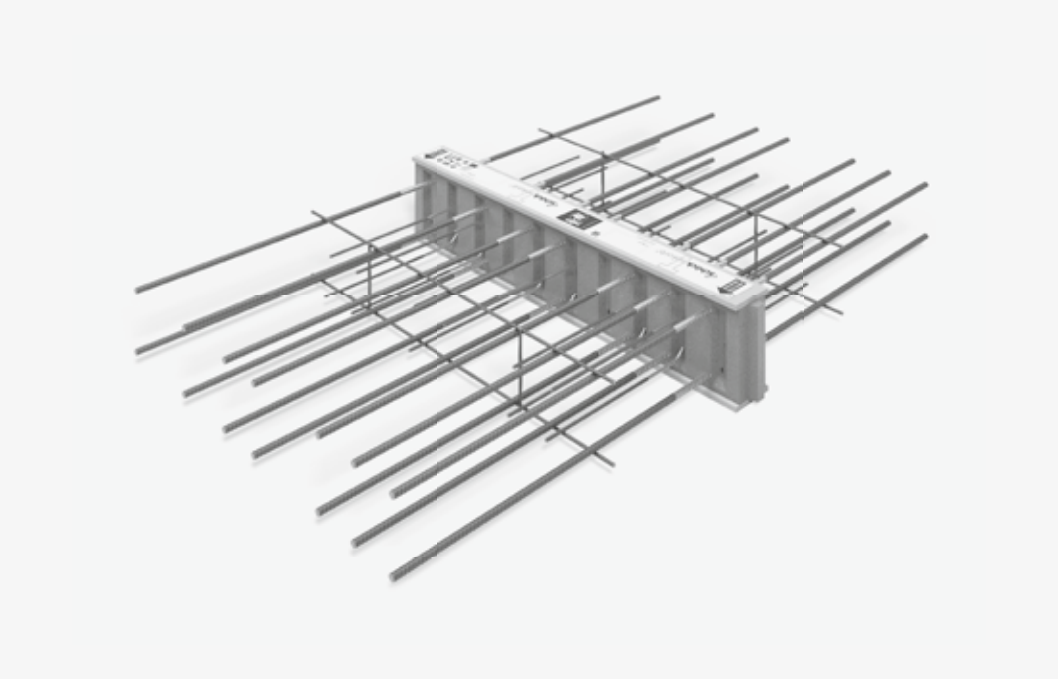




Check list

- ☐ Have the loads on the Schöck Isokorb® connection been specified at design level?
- ☐ Is the relevant concrete strength class taken into account when selecting the design and calculation table?
- ☐ 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® T type D



Schöck Isokorb® T type D
Suitable for continuous floors. It transfers the moments and shear forces with both positive or negative sign.

Element arrangement | Installation cross sections

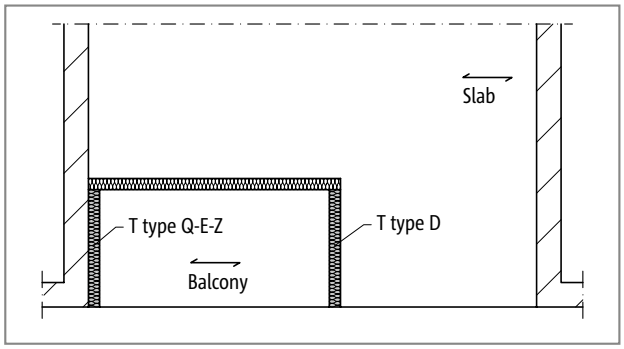


Fig. 172: Schöck Isokorb® T type D, Q-E-Z: One-way reinforced floor

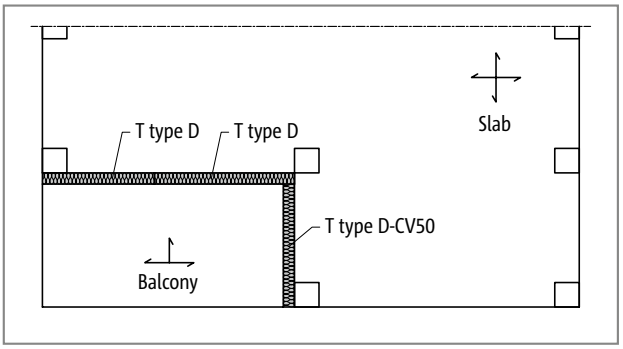


Fig. 173: Schöck Isokorb® T type D: Use in flat slabs

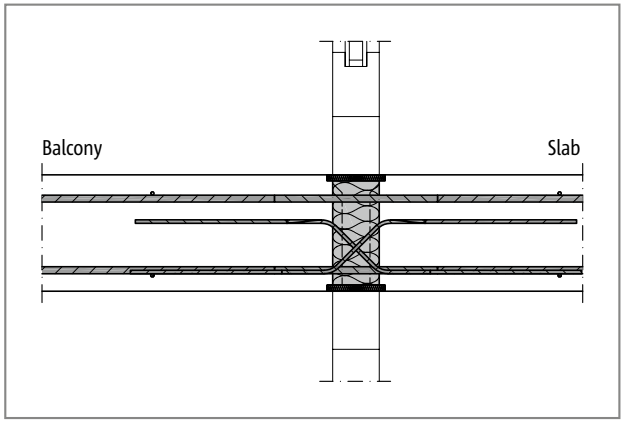


Fig. 174: Schöck Isokorb® T type D: Installation section; one-way reinforced floor

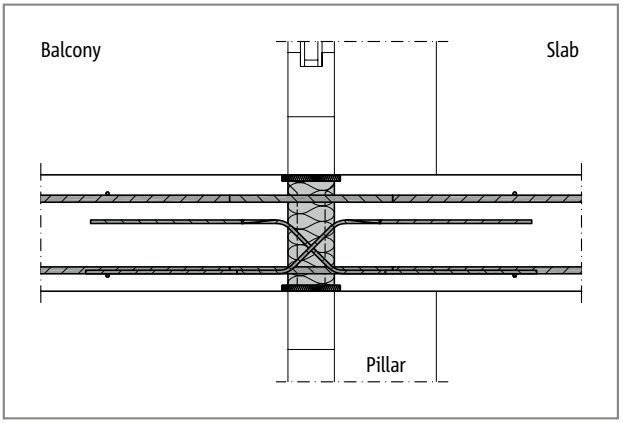


Fig. 175: Schöck Isokorb® T type D: Installation section; flat slab

Element arrangement

- When connecting across a corner with Schöck Isokorb® T type D, a type D-CV50 (2nd layer) is required in one axial direction. This results in a minimum slab thickness of 200 mm.

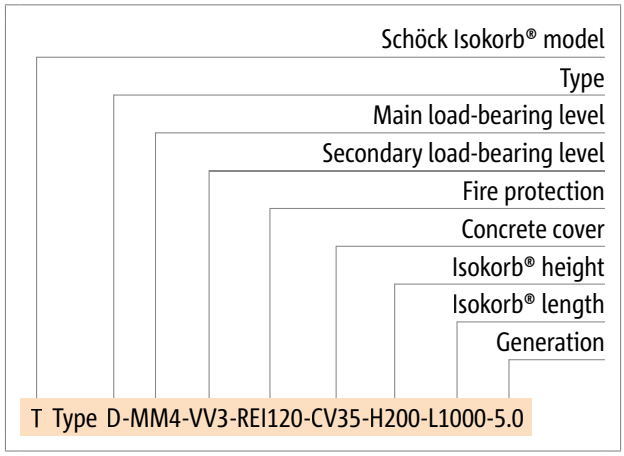
Product selection | Type designations | Special designs

Schöck Isokorb® T type D variants

The configuration of the Schöck Isokorb® T type D can be varied as follows:

- Main load-bearing level:
  MM1 to MM5
- Secondary load-bearing le:
  VV1 to VV3
- Fire resistance class:
  REI120 is standard; fire protection board projecting on both sides by 10 mm
  R0 is available as an option for improved thermal insulation and sound proofing
- Concrete cover on the tension bars:
  CV30: top CV = 30 mm, bottom CV = 30 mm
  CV35: top CV = 35 mm, bottom CV = 30 mm
  CV50: top CV = 50 mm, bottom CV = 50 mm
- Isokorb® height:
  H = H_{min} to 280 mm (H_{min} depends on the concrete cover and shear force load-bearing level, see page 121)
- Isokorb® length:
  MM1, MM4, MM5:
  L1000 = 1000 mm, L500 = 500 mm
  MM2, MM3:
  L1000 = 1000 mm
- Generation:
  5.0

Type designation in planning documents



Fire protection

- If the fire protection designation (R0) is left out when ordering, then fire protection configuration (REI120) is delivered by default.

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

Notes on design

- A static verification is to be provided for the adjacent reinforced concrete structural component on both sides of the Schöck Isokorb®.
- The Schöck Isokorb® T type D transfers bending moments $m_{Rd,y}$ and shear forces $v_{Rd,z}$. The Schöck Isokorb® does not transfer torsional moments

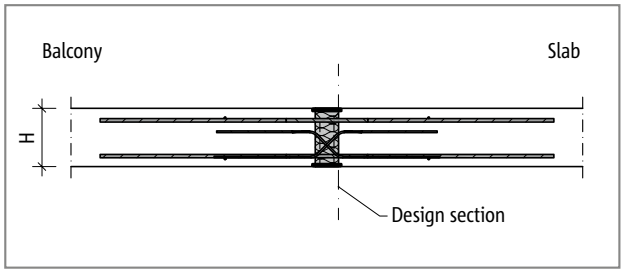


Fig. 176: Schöck Isokorb® T type D: Static system

C25/30 design

Schöck Isokorb® T type D				MM1-VV1	MM1-VV2	MM1-VV3	MM2-VV1	MM2-VV2	MM2-VV3	MM3-VV1	MM3-VV2	MM3-VV3
Design values with	Concrete cover CV [mm]			Concrete strength class ≥ C25/30								
	CV30	CV35	CV50	$m_{Rd,y}$ [kNm/m]								
Isokorb® height H [mm]		160		±14.3	±13.6	-	±17.5	-	-	±25.3	-	-
	160		200	±15.1	±14.4	-	±18.5	-	-	±26.8	-	-
		170		±16.0	±15.2	±13.4	±19.6	±17.8	-	±28.4	±26.6	-
	170		210	±16.9	±16.0	±14.1	±20.6	±18.7	-	±29.9	±28.0	-
		180		±17.7	±16.9	±14.8	±21.7	±19.7	±17.6	±31.4	±29.4	±27.4
	180		220	±18.6	±17.7	±15.6	±22.8	±20.7	±18.5	±32.9	±30.8	±28.7
		190		±19.4	±18.5	±16.3	±23.8	±21.6	±19.4	±34.5	±32.3	±30.0
	190		230	±20.3	±19.3	±17.0	±24.9	±22.6	±20.2	±36.0	±33.7	±31.3
		200		±21.1	±20.1	±17.7	±25.9	±23.5	±21.1	±37.5	±35.1	±32.7
	200		240	±22.0	±20.9	±18.5	±27.0	±24.5	±21.9	±39.0	±36.6	±34.0
		210		±22.9	±21.8	±19.2	±28.0	±25.4	±22.8	±40.6	±38.0	±35.3
	210		250	±23.7	±22.6	±19.9	±29.1	±26.4	±23.6	±42.1	±39.4	±36.7
		220		±24.6	±23.4	±20.6	±30.1	±27.4	±24.5	±43.6	±40.8	±38.0
	220		260	±25.4	±24.2	±21.3	±31.2	±28.3	±25.4	±45.1	±42.3	±39.3
		230		±26.3	±25.0	±22.1	±32.2	±29.3	±26.2	±46.7	±43.7	±40.6
	230		270	±27.2	±25.9	±22.8	±33.3	±30.2	±27.1	±48.2	±45.1	±42.0
		240		±28.0	±26.7	±23.5	±34.4	±31.2	±27.9	±49.7	±46.6	±43.3
	240		280	±28.9	±27.5	±24.2	±35.4	±32.1	±28.8	±51.2	±48.0	±44.6
		250		±29.7	±28.3	±24.9	±36.5	±33.1	±29.6	±52.8	±49.4	±46.0
	250			±30.6	±29.1	±25.7	±37.5	±34.1	±30.5	±54.3	±50.8	±47.3
		260		±31.5	±29.9	±26.4	±38.6	±35.0	±31.4	±55.8	±52.3	±48.6
	260			±32.3	±30.8	±27.1	±39.6	±36.0	±32.2	±57.4	±53.7	±49.9
		270		±33.2	±31.6	±27.8	±40.7	±36.9	±33.1	±58.9	±55.1	±51.3
	270			±34.0	±32.4	±28.5	±41.7	±37.9	±33.9	±60.4	±56.6	±52.6
		280		±34.9	±33.2	±29.3	±42.8	±38.8	±34.8	±61.9	±58.0	±53.9
	280			±35.8	±34.0	±30.0	±43.8	±39.8	±35.6	±63.5	±59.4	±55.3
Secondary load-bearing level				$v_{Rd,z}$ [kN/m]								
	VV1/VV2/VV3			±33.3	±50.0	±88.9	±50.0	±88.9	±128.8	±50.0	±88.9	±128.8

Schöck Isokorb® T type D	MM1-VV1	MM1-VV2	MM1-VV3	MM2-VV1	MM2-VV2	MM2-VV3	MM3-VV1	MM3-VV2	MM3-VV3
Isokorb® length [mm]	1000			1000			1000		
Tension bars/compression members	2 × 4 ⌀ 12			2 × 5 ⌀ 12			2 × 7 ⌀ 12		
Shear force bars	2 × 4 ⌀ 6	2 × 6 ⌀ 6	2 × 6 ⌀ 8	2 × 6 ⌀ 6	2 × 6 ⌀ 8	2 × 6 ⌀ 10	2 × 6 ⌀ 6	2 × 6 ⌀ 8	2 × 6 ⌀ 10
H_{min} with CV30 [mm]	160	160	170	160	170	180	160	170	180
H_{min} with CV35 [mm]	160	160	170	160	170	180	160	170	180
H_{min} with CV50 [mm]	200	200	210	200	210	220	200	210	220

C25/30 design

Schöck Isokorb® T 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					
	CV30	CV35	CV50	$m_{Rd,y}$ [kNm/m]					
Isokorb® height H [mm]		160		±37.1	-	-	±44.9	-	-
	160		200	±39.3	-	-	±47.6	-	-
		170		±41.5	±39.7	-	±50.3	±48.5	-
	170		210	±43.8	±41.8	-	±53.0	±51.1	-
		180		±46.0	±44.0	±41.9	±55.7	±53.7	±51.6
	180		220	±48.2	±46.1	±44.0	±58.4	±56.3	±54.2
		190		±50.5	±48.3	±46.0	±61.1	±58.9	±56.7
	190		230	±52.7	±50.4	±48.0	±63.8	±61.5	±59.2
		200		±54.9	±52.5	±50.1	±66.5	±64.1	±61.7
	200		240	±57.2	±54.7	±52.1	±69.2	±66.7	±64.2
		210		±59.4	±56.8	±54.1	±71.9	±69.3	±66.7
	210		250	±61.6	±58.9	±56.2	±74.6	±71.9	±69.2
		220		±63.8	±61.1	±58.2	±77.3	±74.6	±71.7
	220		260	±66.1	±63.2	±60.2	±80.0	±77.2	±74.2
		230		±68.3	±65.3	±62.3	±82.7	±79.8	±76.7
	230		270	±70.5	±67.5	±64.3	±85.4	±82.4	±79.2
		240		±72.8	±69.6	±66.4	±88.2	±85.0	±81.7
	240		280	±75.0	±71.7	±68.4	±90.9	±87.6	±84.2
		250		±77.2	±73.9	±70.4	±93.6	±90.2	±86.7
	250			±79.5	±76.0	±72.5	±96.3	±92.8	±89.2
		260		±81.7	±78.2	±74.5	±99.0	±95.4	±91.8
	260			±83.9	±80.3	±76.5	±101.7	±98.0	±94.3
		270		±86.2	±82.4	±78.6	±104.4	±100.6	±96.8
	270			±88.4	±84.6	±80.6	±107.1	±103.2	±99.3
		280		±90.6	±86.7	±82.6	±109.8	±105.8	±101.8
	280			±92.9	±88.8	±84.7	±112.5	±108.4	±104.3
Secondary load-bearing level				$v_{Rd,z}$ [kN/m]					
	VV1/VV2/VV3			±50.0	±88.9	±128.8	±50.0	±88.9	±128.8

Schöck Isokorb® T 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 × 6 ⌀ 6	2 × 6 ⌀ 8	2 × 6 ⌀ 10	2 × 6 ⌀ 6	2 × 6 ⌀ 8	2 × 6 ⌀ 10
H_{min} with CV30 [mm]	160	170	180	160	170	180
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

- A static verification is to be provided for the adjacent reinforced concrete structural component on both sides of the Schöck Isokorb®.

Torsional spring stiffness

Schöck Isokorb® T type D				MM1	MM2	MM3	MM4	MM5
Torsion spring stiffness for	Concrete cover CV [mm]			Concrete strength class ≥ C25/30				
	CV30	CV35	CV50	C [kNm/rad/m]				
Isokorb® height H [mm]		160		1247	1558	2182	3117	3740
	160		200	1401	1752	2452	3503	4204
		170		1565	1956	2739	3913	4695
	170		210	1738	2172	3041	4345	5214
		180		1920	2400	3360	4799	5759
	180		220	2111	2638	3694	5277	6332
		190		2311	2888	4044	5777	6932
	190		230	2520	3150	4409	6299	7559
		200		2738	3422	4791	6844	8213
	200		240	2965	3706	5188	7412	8894
		210		3201	4001	5602	8002	9603
	210		250	3446	4308	6031	8615	10338
		220		3700	4625	6476	9251	11101
	220		260	3964	4955	6936	9909	11891
		230		4236	5295	7413	10590	12708
	230		270	4517	5647	7905	11293	13552
		240		4808	6010	8414	12020	14423
	240		280	5107	6384	8938	12768	15322
		250		5416	6770	9478	13540	16247
	250			5733	7167	10033	14334	17200
		260		6060	7575	10605	15150	18180
	260			6396	7995	11192	15989	19187
		270		6740	8426	11796	16851	20221
	270			7094	8868	12415	17735	21283
		280		7457	9321	13050	18643	22371
	280			7829	9786	13701	19572	23487

Expansion joint spacing

Maximum expansion joint spacing

If the component length exceeds the maximum expansion joint spacing e, then expansion joints must be incorporated 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, corners of balconies, parapets and balustrades or with the employment of the supplementary Schöck Isokorb® T type H half the maximum expansion joint spacing e/2 from the fixed point applies.

Schöck Isokorb® T type D		MM1	MM2	MM3	MM4	MM5
Maximum expansion joint spacing e		e [m]				
Insulating element thickness [mm]	80	11.7				

Edge distances

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

- For centre distance of the tension bars from the free edge resp. from the expansion joint: $e_R \geq 50$ 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 compression bars from the free edge resp. exapansion joint: $e_R \geq 100$ mm applies.

Product description

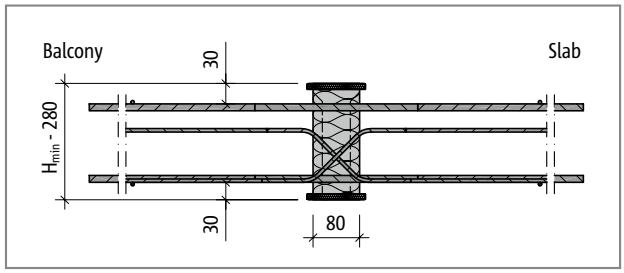


Fig. 177: Schöck Isokorb® T type D for CV30: Product section

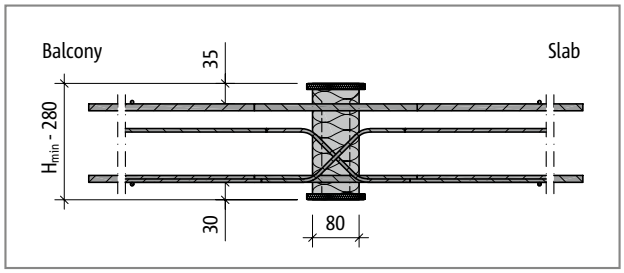


Fig. 178: Schöck Isokorb® T type D for CV35: Product section

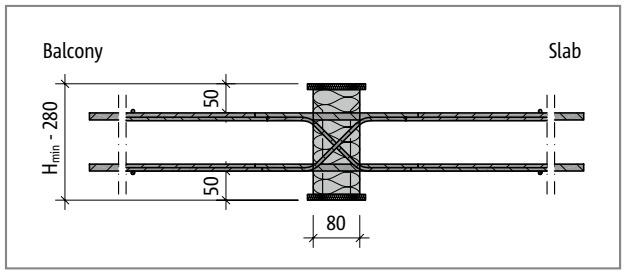


Fig. 179: Schöck Isokorb® T type D for CV50: Product section

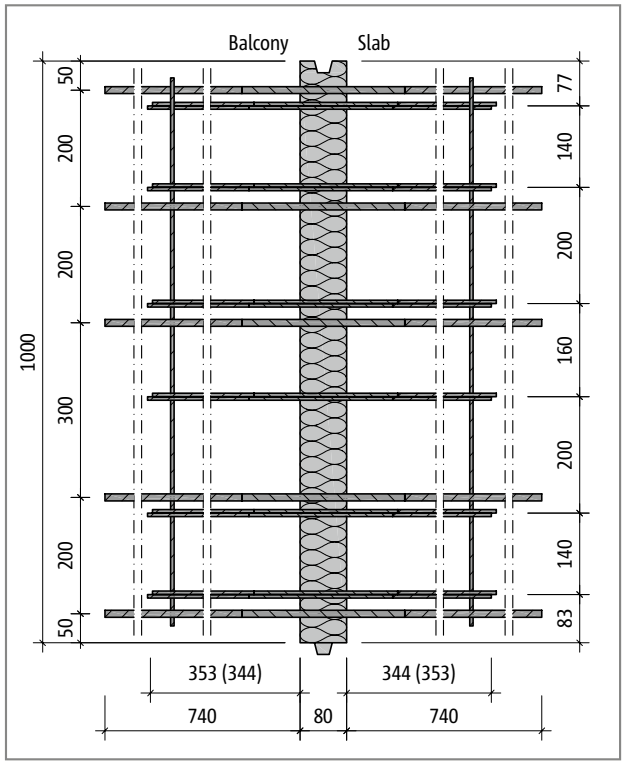


Fig. 180: Schöck Isokorb® T type D-MM2-VV1: Layout

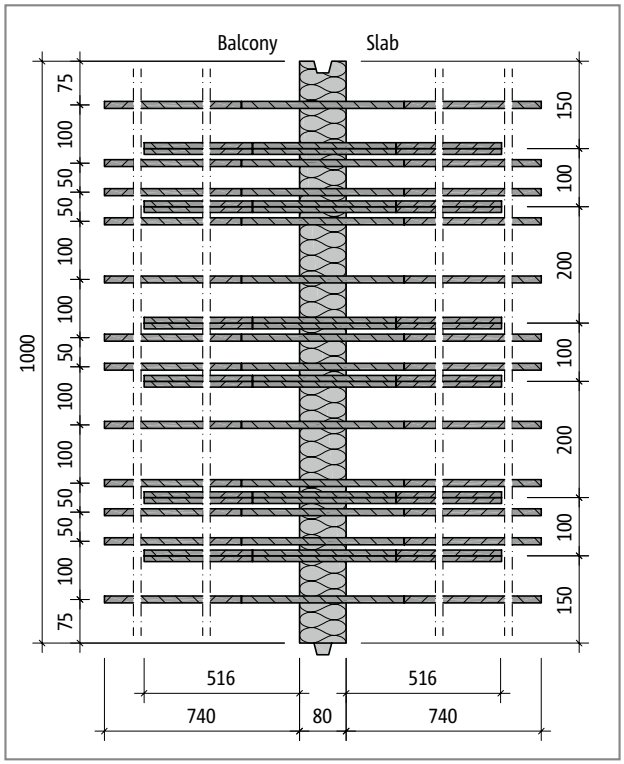


Fig. 181: Schöck Isokorb® T type D-MM5-VV3: Layout

Product information

- For additional 2D and 3D product drawings contact our Design Support department.

Product description | Configuration without fire protection

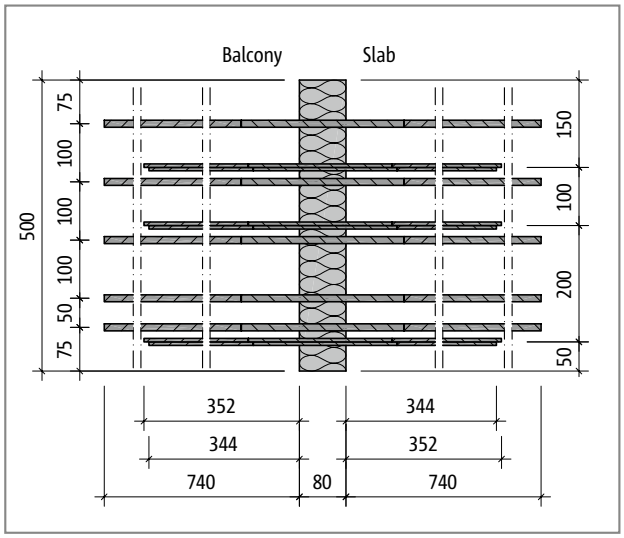


Fig. 182: Schöck Isokorb® T type D-MM4-VV1 in length L500: Layout

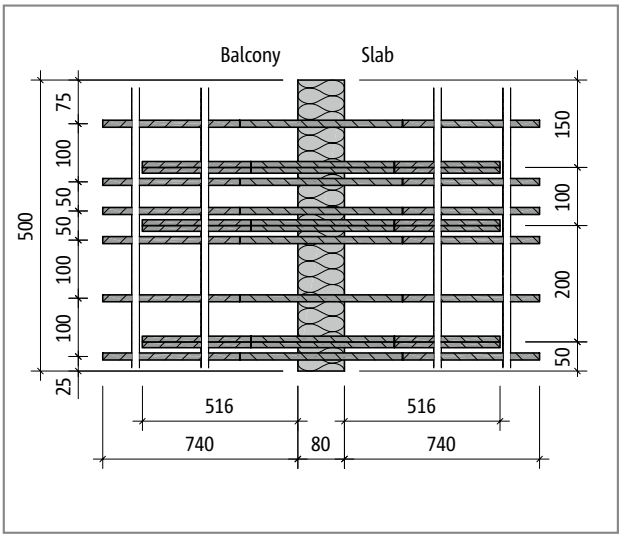


Fig. 183: Schöck Isokorb® T type D-MM5-VV3 in length L500: Layout

Product information

- For additional 2D and 3D product drawings contact our Design Support department.

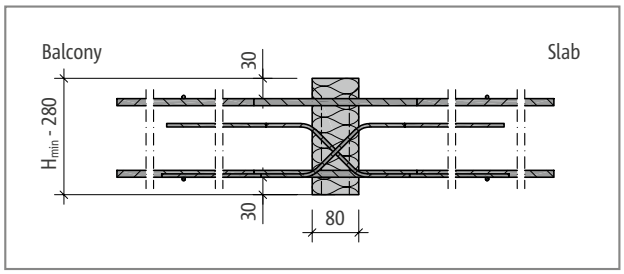


Fig. 184: Schöck Isokorb® T type D for R0: Product section

Fire protection

- If the fire protection designation (R0) is left out when ordering, then fire protection configuration (REI120) is delivered by default.

On-site reinforcement

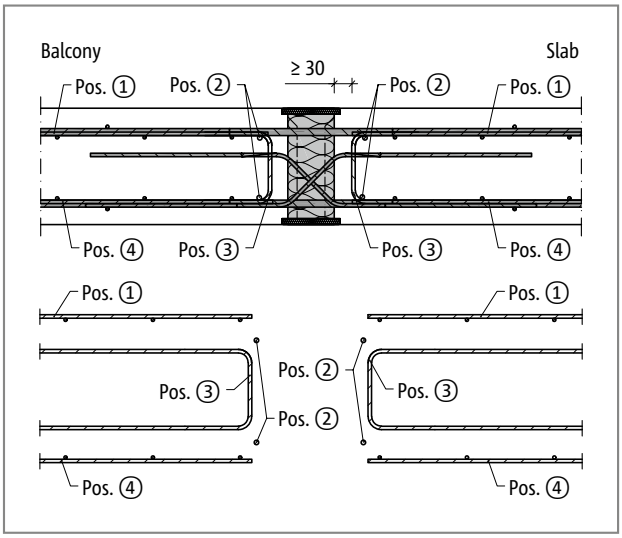


Fig. 185: Schöck Isokorb® T type D: On-site reinforcement

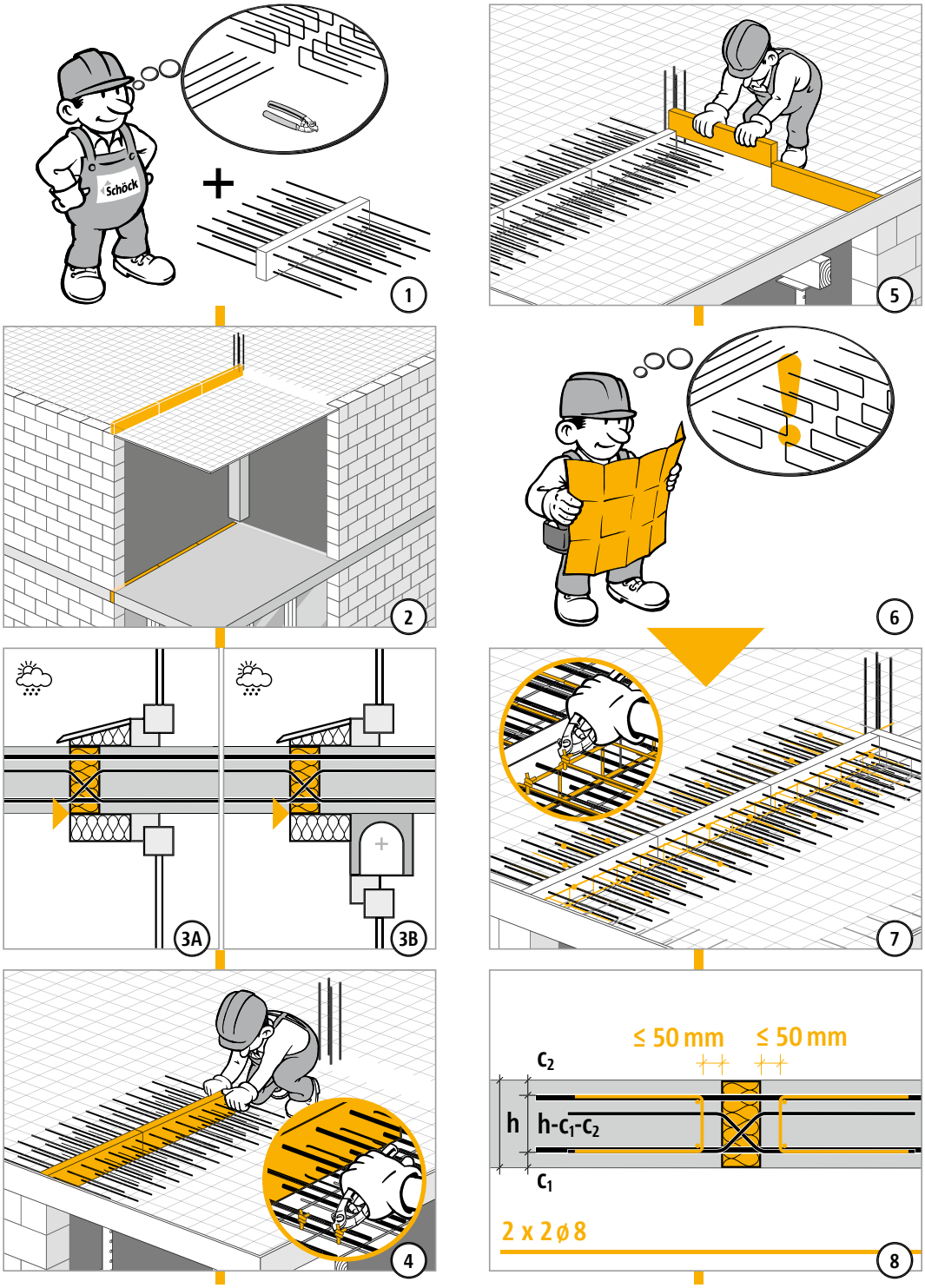
Schöck Isokorb® T type D	MM1-VV1	MM1-VV2	MM1-VV3	MM2-VV1	MM2-VV2	MM2-VV3	MM3-VV1	MM3-VV2	MM3-VV3
On-site reinforcement	Concrete strength class ≥ C25/30								
Pos. 1 Lapping reinforcement (required with negative moment))									
Pos. 1 [mm²/m]	453	453	453	565	565	565	792	792	792
Pos. 2 Steel bars along the insulation joint									
Pos. 2	acc. to the specifications of the structural engineer								
Pos. 3 Edge and suspension reinforcement									
Pos. 3	⌀ 6/250	⌀ 8/250	⌀ 8/150	⌀ 8/250	⌀ 8/150	⌀ 8/125	⌀ 8/250	⌀ 8/150	⌀ 8/125
Pos. 4 Lapping reinforcement (required with positive moment)									
Pos. 4 [mm²/m]	453	453	453	565	565	565	792	792	792

Schöck Isokorb® T 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]	1131	1131	1131	1357	1357	1357
Pos. 2 Steel bars along the insulation joint						
Pos. 2	acc. to the specifications of the structural engineer					
Pos. 3 Edge and suspension reinforcement						
Pos. 3	⌀ 8/250	⌀ 8/150	⌀ 8/125	⌀ 8/250	⌀ 8/150	⌀ 8/125
Pos. 4 Lapping reinforcement (required with positive moment)						
Pos. 4 [mm²/m]	1131	1131	1131	1357	1357	1357

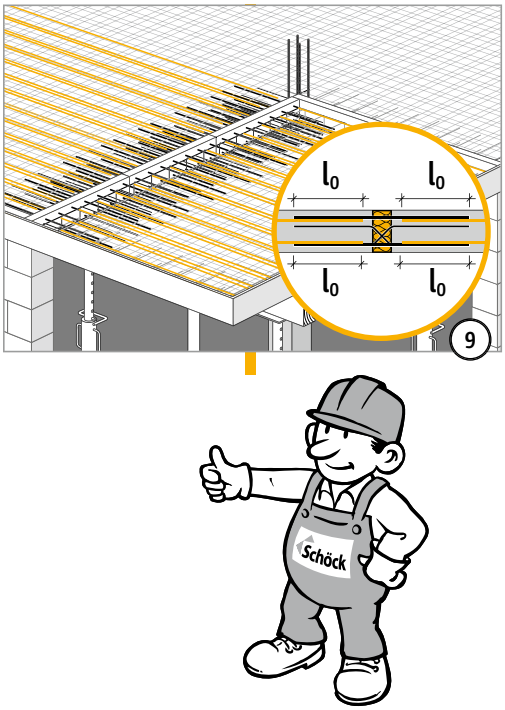
Information about on-site reinforcement

- The rules as per DS/EN 1992-1-1 (EC2) and DS/EN 1992-1-1/NA apply for calculating the lap length. A reduction of the required lap length with m_{Ed}/m_{Rd} is permitted. For the lapping (l) with Schöck Isokorb® a length of the tension bars of 710 mm is accounted for for type D
- Edge and suspension reinforcement (pos. 3) is to be arranged on both sides of the Isokorb® T type D. Details in the table apply for Schöck Isokorb® with a loading of 100% of the maimum design internal forces with C20/25 or C25/30.

Installation instructions



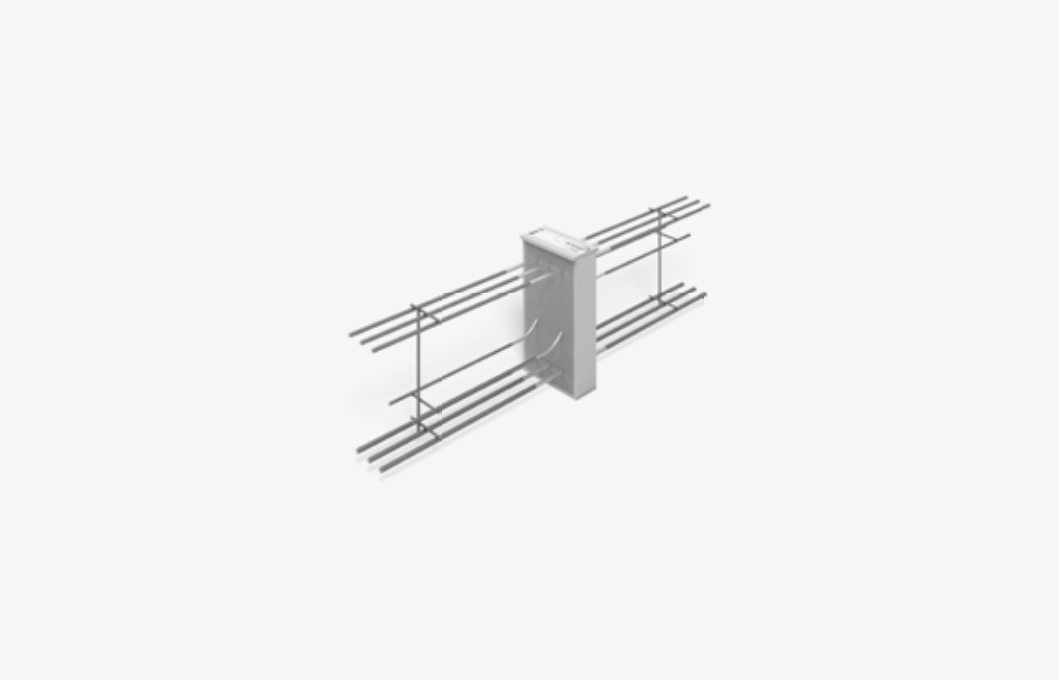
Installation instructions



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?
- ☐ 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?
- ☐ Has the minimum slab thickness (≥ 200 mm) and the required 2nd layer (CV50) been taken into account for a connection across a corner with Schöck Isokorb® T type D?
- ☐ Has the required cutout (width ≥ 760 mm from insulating element) been marked in the construction drawings for the T type D in conjunction with semi-precast balcony slabs and has the on site reinforcement been adjusted constructively?
- ☐ Has a Schöck Isokorb® T type Q-E-Z been selected for a connection free of constraint forces for 2- or 3-sided support?
- ☐ Have the requirements for on-site reinforcement of connections been defined in each case?
- ☐ Is there a statically undetermined construction for the design for which the stiffness of the Schöck Isokorb® must be taken into account?
- ☐ Does an impact load or another extraordinary load need to be taken into account for the design of the Schöck Isokorb®?
- ☐ Is there a situation in which the construction must be designed for an emergency situation or special load during construction?
- ☐ Has a soft elastic joint been taken into account between the upper edge of the facing shell and the balcony?
- ☐ Is the type designation of the Schöck Isokorb® explicit in the plans? - Example: Schöck Isokorb® T type D-MM4-VV2-REI120-CV30-H280-L500

Schöck Isokorb® T type B



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

Element arrangement | Installation cross sections

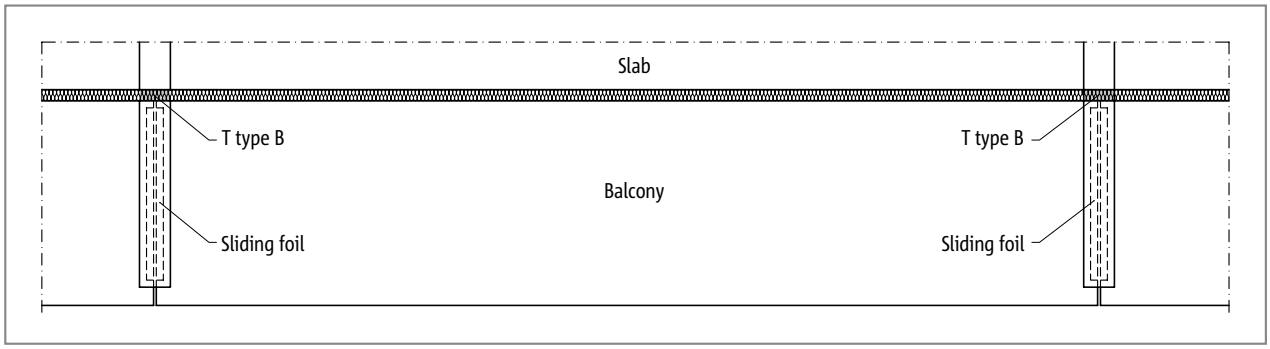


Fig. 186: Schöck Isokorb® T type B: Balcony construction with free cantilevered inner slab joists (precast balcony)

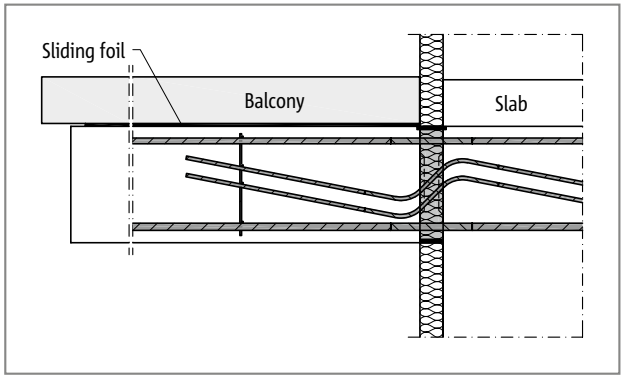


Fig. 187: Schöck Isokorb® T type B: Balcony structure with freely cantilevered downstand beams (precast balcony)

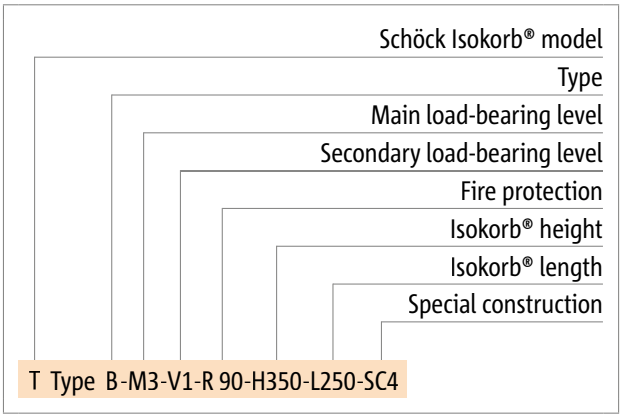
Product selection | Type designations | Special designs

Schöck Isokorb® T type B variants

The configuration of the Schöck Isokorb® T type B can be varied as follows:

- Main load capacity:
  M1 to M3
- Secondary load capacity:
  V1, V2
- Fire resistance class:
  R90 is standard, fire protection board projecting on both sides by 10 mm
  R0 is available as an option for improved thermal insulation and sound proofing
- Isokorb® height:
  H = 350 mm for secondary load capacity V1
  H = 400 mm, 450 mm for secondary load capacity V2
- Isokorb® length:
  L = 160 mm for main load capacity M1
  L = 200 mm for main load capacity M2
  L = 250 mm for main load capacity M3
  L is the horizontal Isokorb® length across the building envelope
- Special construction:
  4

Type designations in planning documents



Fire protection

- If the designation -R0- is left out when ordering, then fire protection (R90) is delivered by default.

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 | Torsional spring stiffness

Schöck Isokorb® T type B		M1	M2	M3
Design values with		Concrete strength class ≥ C25/30		
		$M_{Rd,y}$ [kNm/element]		
Isokorb® height H [mm]	350	-63.0	-107.9	-144.5
	400	-76.2	-132.9	-178.1
	450	-89.2	-155.4	-208.2
Secondary load-bearing level		$V_{Rd,z}$ [kN/element]		
V1		61.2	83.3	108.8
V2		83.3	139.1	189.3

Schöck Isokorb® T type B	M1	M2	M3
Isokorb® length [mm]	160	200	250
Tension bars	2 ⌀ 20	3 ⌀ 20	4 ⌀ 20
Shear force bars V1	2 ⌀ 12	2 ⌀ 14	2 ⌀ 16
Shear force bars V2	2 ⌀ 14	4 ⌀ 12	4 ⌀ 14
Compression bars	2 ⌀ 25	3 ⌀ 25	4 ⌀ 25
Isokorb® height H for V1 [mm]	350	350	350
Isokorb® height H for V2 [mm]	400	400	400
Isokorb® height H for V2 [mm]	450	450	450

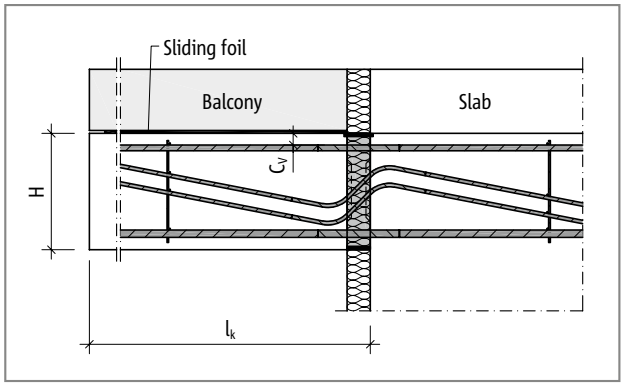


Fig. 188: Schöck Isokorb® T type B: Static system

Schöck Isokorb® T type B		M1	M2	M3
Torsion spring stiffness for		Concrete strength class ≥ C25/30		
		C [kNm/rad]		
Isokorb® height H [mm]	350	12285	18427	24570
	400	17811	26716	35622
	450	24360	36540	48720

Fatigue/Temperature effect

Sliding foil for the fatigue resistance

Balcony slabs, passageway walks and canopy constructions expand when heated and contract when cooled. The changes in length associated with this temperature stress can transmit horizontal forces to the substructure. This can affect cantilevered beams that are connected to the building with the Schöck Isokorb®. In order to prevent material fatigue and cantilever beam failure over the planned service life, sliding foil should be used. The sliding foil must be installed between the cantilevered beam and the balcony slab in order to limit the lateral deflection of the Schöck Isokorb® bars due to temperature stress to the fatigue-proof area.

The balcony slab lying on the cantilevered beam must be secured against excessive horizontal displacement in order to secure its position and stability.

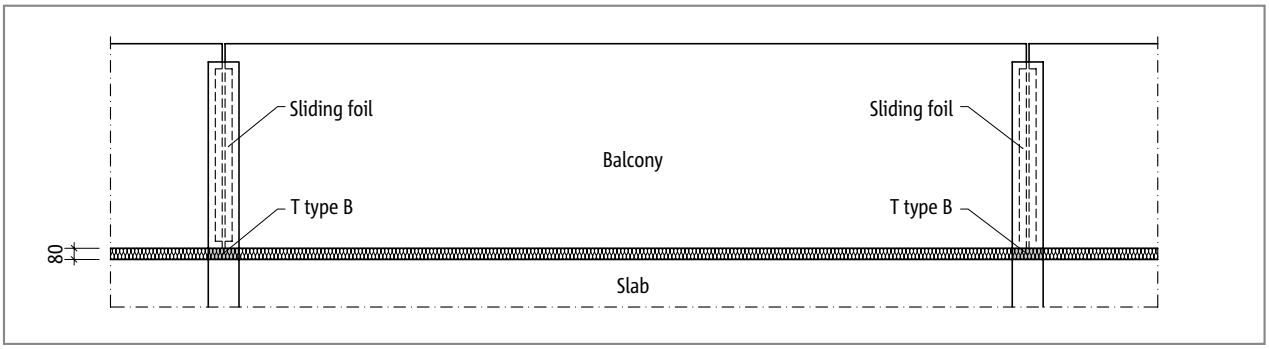


Fig. 189: Schöck Isokorb® T type B: Layout; fatigue resistance due to the sliding foil between the balcony slab and cantilevered beams

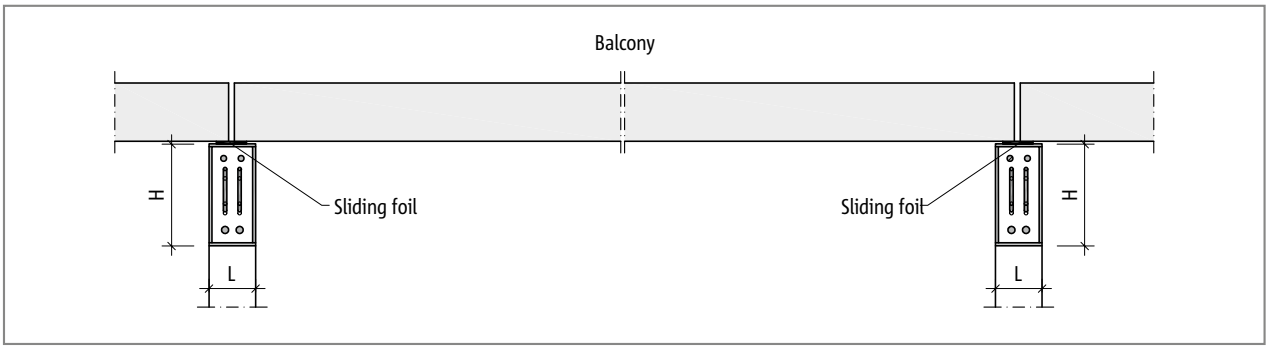


Fig. 190: Schöck Isokorb® T type B: Cross-section; fatigue resistance via the sliding foil between the balcony slab and cantilevered beams

Sliding foil

- Sliding foil: Dynamic friction coefficient $\mu_G \leq 0.03$

Product description

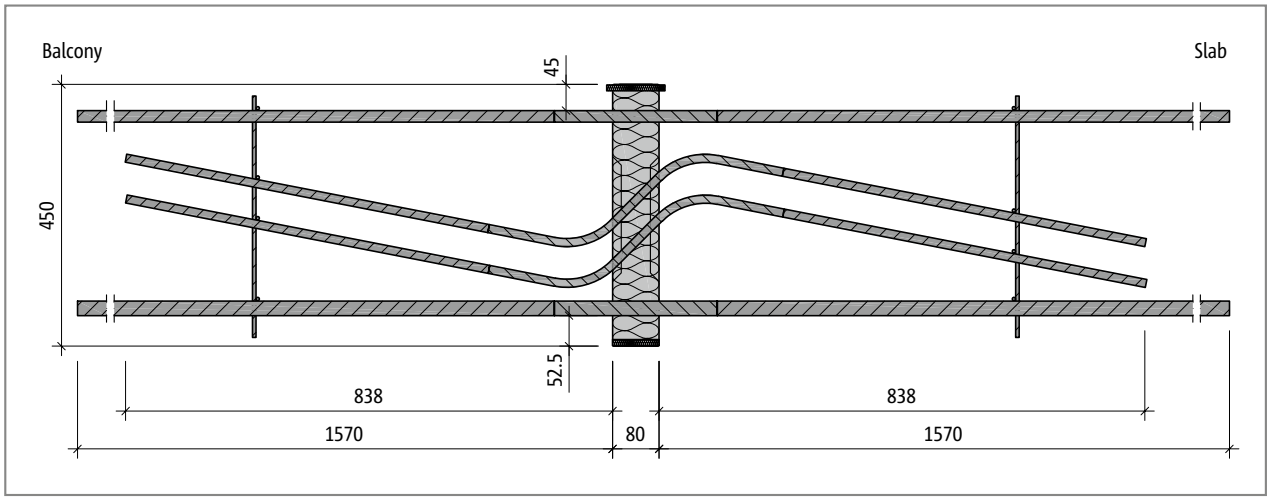


Fig. 191: Schöck Isokorb® T type B-M3-V2 in height H450: Product section

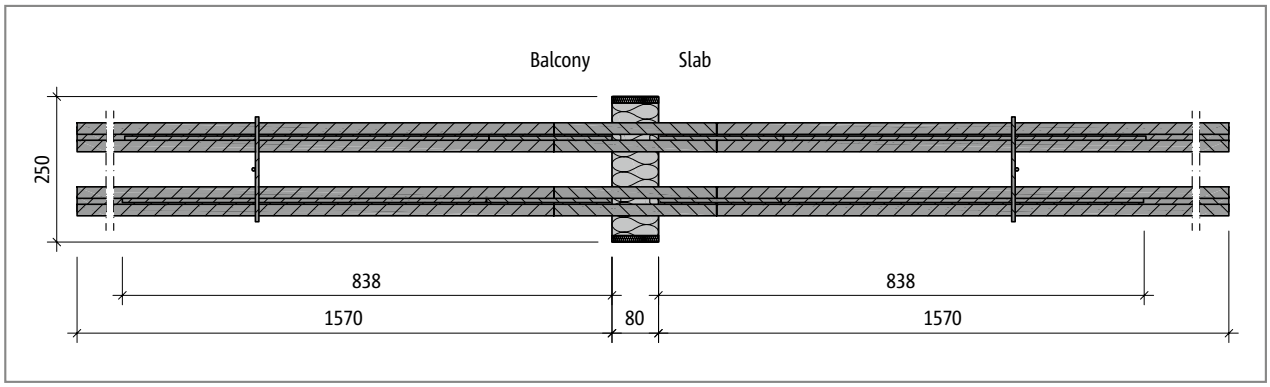


Fig. 192: Schöck Isokorb® T type B-M3-V2: Product layout

Product description

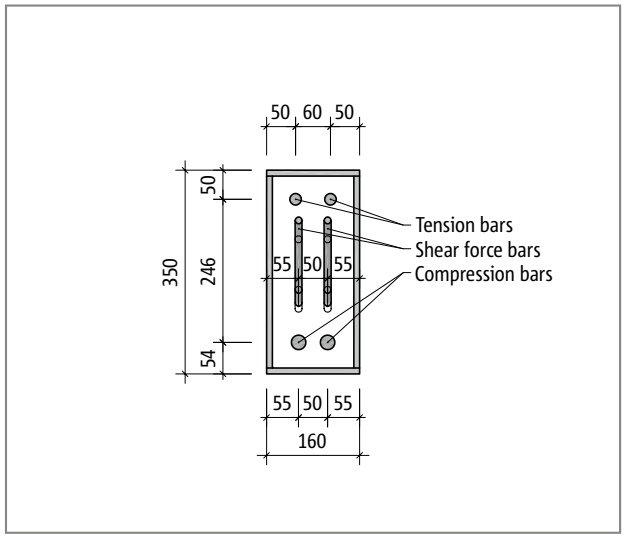


Fig. 193: Schöck Isokorb® T type B-M1-V1 in height H350: Product view

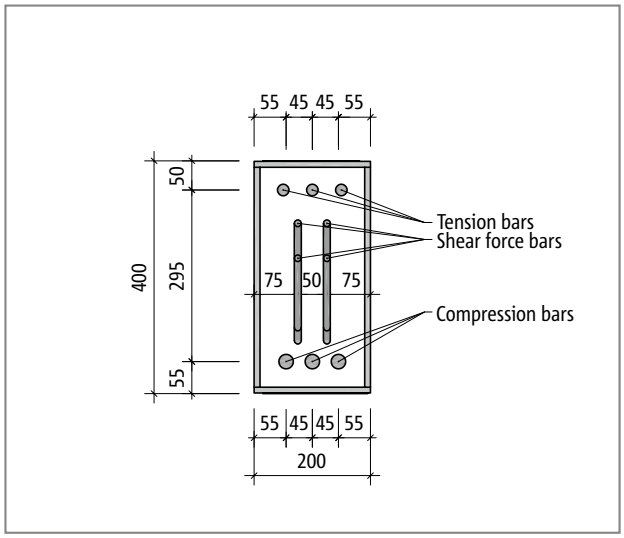


Fig. 194: Schöck Isokorb® T type B-M2-V2 in height H400: Product layout

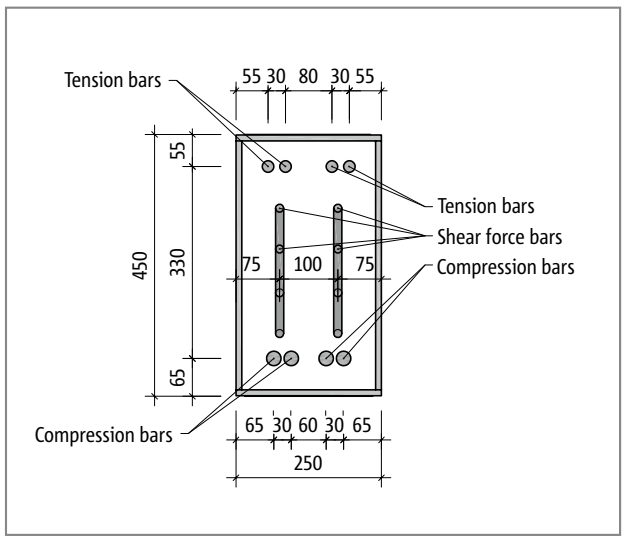


Fig. 195: Schöck Isokorb® T type B-M3-V2 in height H450: Product layout

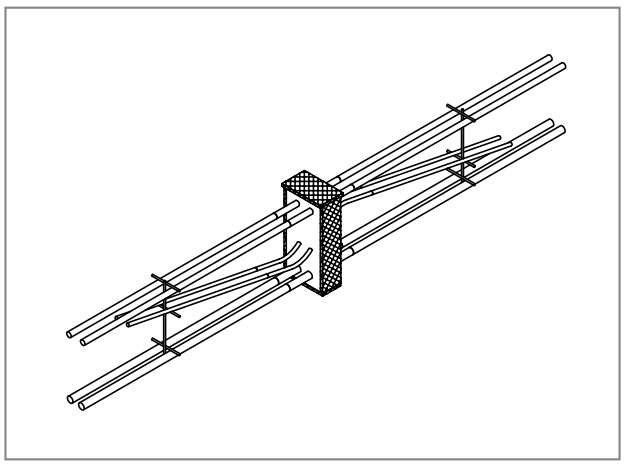


Fig. 196: Schöck Isokorb® T type B: Perimeter fire protection boards

Product information

- For additional 2D and 3D product drawings contact our Design Support department.

Configuration without fire protection

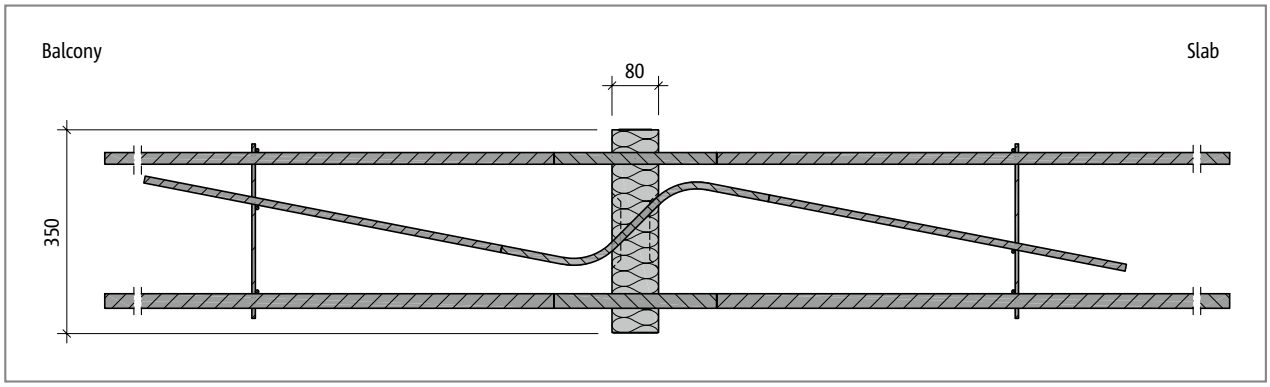


Fig. 197: Schöck Isokorb® T type B-M1-V1 for R0: Product section

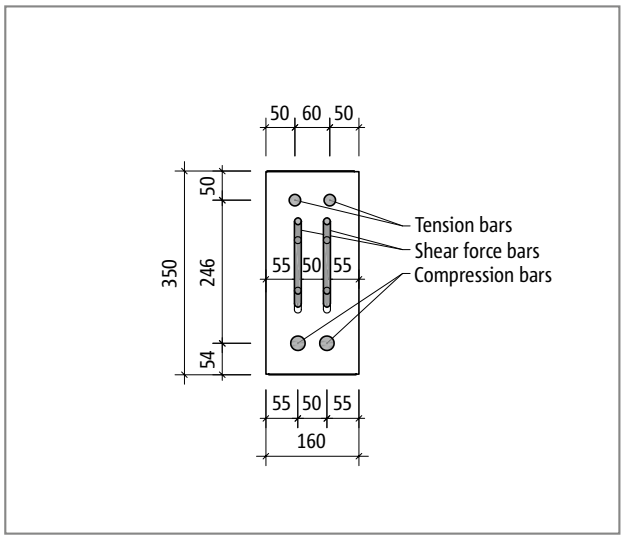


Fig. 198: Schöck Isokorb® T type B-M1-V1 for R0: Product layout

Fire protection

- If the designation -R0- is left out when ordering, then fire protection (R90) is delivered by default.

On-site reinforcement

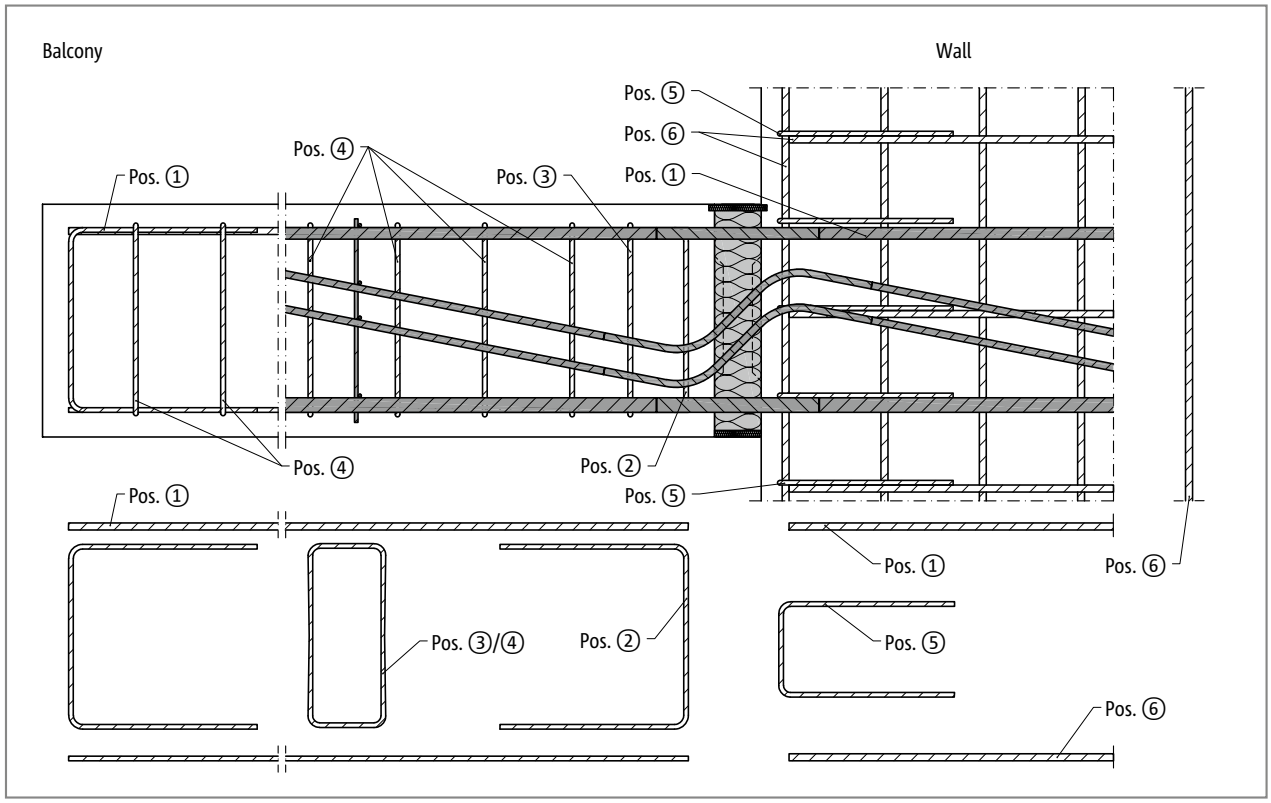


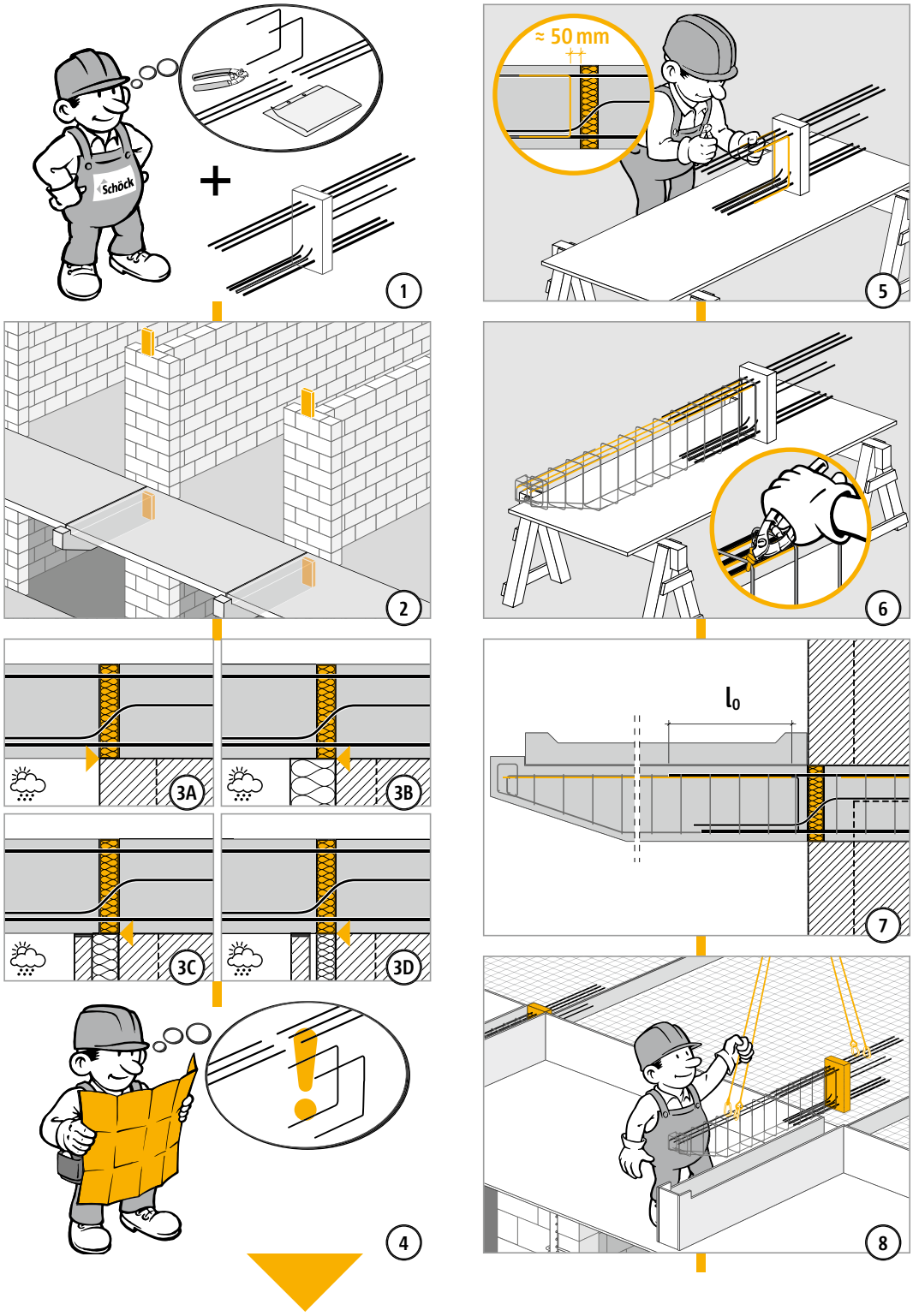
Fig. 199: Schöck Isokorb® T type B: On site reinforcement (cross-section)

Suggestion for on site reinforcement

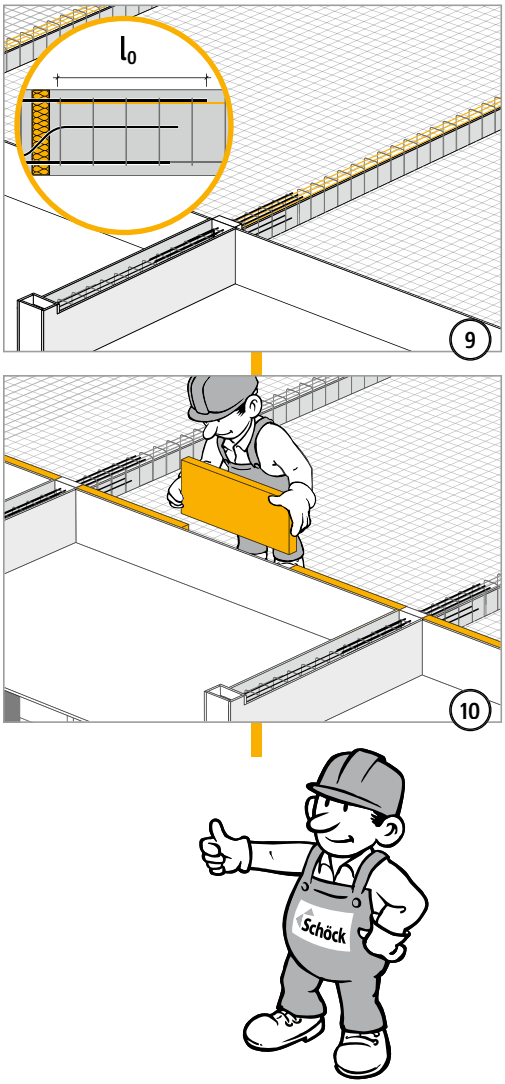
Details of the on-site reinforcement for Schöck Isokorb® with a loading of 100 % of the maximum design moment with concrete strength classC25/30

Schöck Isokorb® T type B		M1	M2	M3
On-site reinforcement	**Isokorb® height H [mm]**	**Concrete strength class ≥ C25/30**		
Pos. 1 Lapping reinforcement				
Pos. 1	**350 - 450**	acc. to the specifications of the structural engineer		
Pos. 2 Suspension reinforcement				
Pos. 2 [mm²]	**350**	71	96	125
Pos. 2 [mm²]	**400, 450**	96	160	218
Pos. 3 suspension reinforcement				
Pos. 3 [mm²]	**350**	71	96	125
Pos. 3 [mm²]	**400, 450**	96	160	218
Pos. 4 Stirrup				
Pos. 4	**350 - 450**	acc. to the specifications of the structural engineer		
Pos. 5 supplementary edge reinforcement				
Pos. 5	**350 - 450**	acc. to the specifications of the structural engineer		
Pos. 6 wall reinforcement				
Pos. 6	**350 - 450**	acc. to the specifications of the structural engineer		

Installation instructions



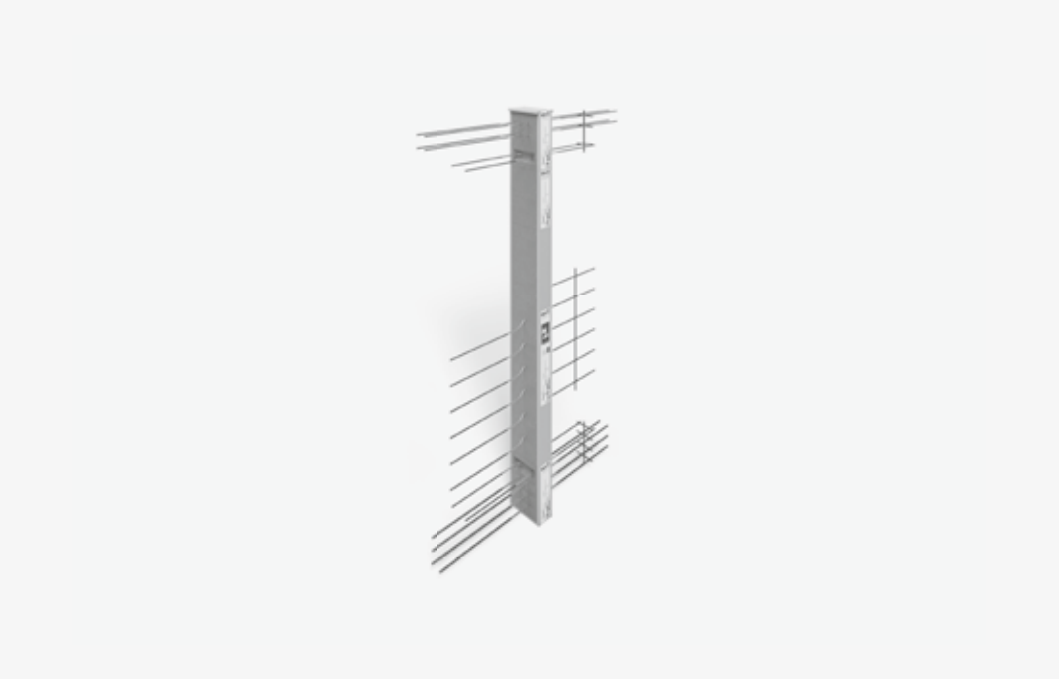
Installation instructions



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?
- ☐ Is the relevant concrete strength class taken into account when selecting the design and calculation table?
- ☐ 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?
- ☐ Have the requirements for on-site reinforcement of connections been defined in each case?
- ☐ 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 a sliding foil with the dynamic friction coefficient $\mu_G \leq 0.03$ specified for between the balcony slabs and the cantilevered supports?
- ☐ Is the balcony supported on the cantilevered beams secured against horizontal displacement?
- ☐ Is there a situation in which the construction must be designed for an emergency situation or special load during construction?
- ☐ Is the type designation of the Schöck Isokorb® explicit in the plans? - Example: Schöck Isokorb® T type B-M3-V2-R90-H400-L250-SC4

Schöck Isokorb® T type W



Schöck Isokorb® T type W
Suitable for projecting shear walls. It transfers negative moments and positive shear forces. In addition horizontal shear forces are transferred.

Element arrangement | Installation cross section

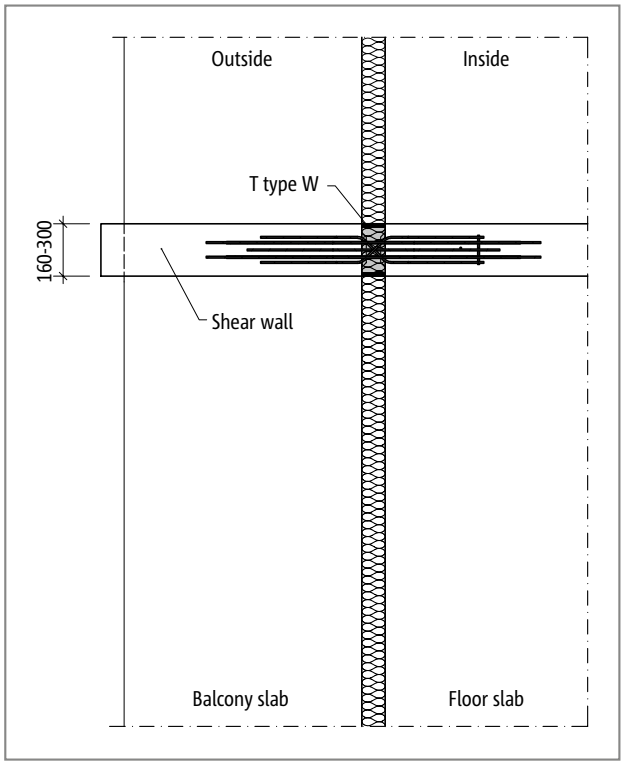


Fig. 200: Schöck Isokorb® T type W: Layout; Balcony structure with thermally insulated load-bearing shear walls

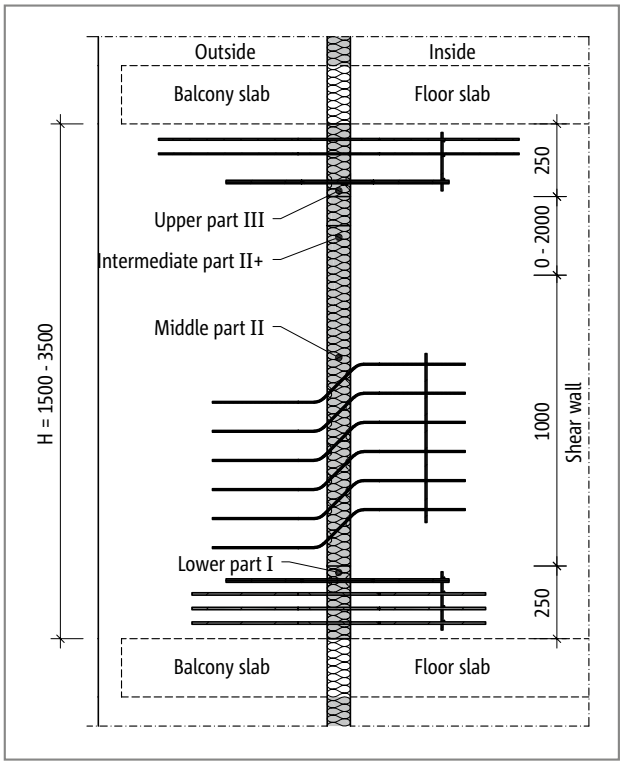


Fig. 201: Schöck Isokorb® T type W: Balcony structure with thermal insulated load-bearing shear walls

Element arrangement

- The Schöck Isokorb® T type W consists of at least 3 parts: Bottom section I, middle section II, top section III. Depending on height an insulation spacer II+ is additionally required.

Product selection | Type designations | Special designs

Schöck Isokorb® T type W variants

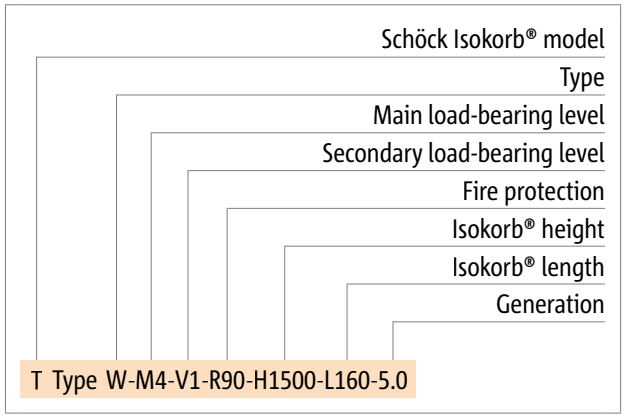
The configuration of the Schöck Isokorb® T type W can be varied as follows:

- Main load-bearing level: M1 to M4
- Secondary load-bearing level: V1
- Fire resistance class:
  R90 is standard, fire protection board projecting on both sides by 10 mm
  R0 is available as an option for improved thermal insulation and sound proofing
- Isokorb® height:
  H = 1500 - 3500 mm
- Isokorb® length:
  L = 150 - 300 mm for R0
  L = 160 - 300 mm for R90
- 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 | Torsional spring stiffness

Schöck Isokorb® T type W		M1	M2	M3	M4
Design values with		Concrete strength class ≥ C25/30			
		$M_{Rd,y}$ [kNm/element]			
Isokorb® height H [mm]	1500 - 1990	-85.3	-143.0	-212.1	-294.5
	1500 - 2490	-109.6	-178.7	-263.4	-363.6
	2500 - 3500	-132.3	-214.4	-314.5	-432.7

Isokorb® height H [mm]		$V_{Rd,z}$ [kN/element]			
	1500 - 3500	50.0	88.8	138.9	199.9
		$V_{Rd,y}$ [kN/element]			
	1500 - 3500	±16.7	±16.7	±16.7	±16.7

Schöck Isokorb® T 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

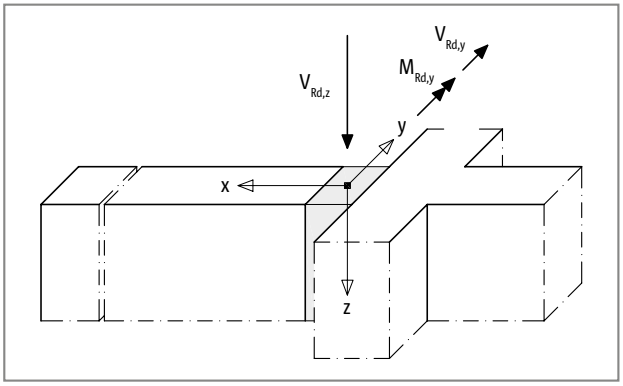


Fig. 202: Schöck Isokorb® T type W: Sign rule for the design

Notes on design

- Moments from wind loading are to be absorbed by the stiffening effect of the balcony slabs. If this is not possible,then $M_{Ed,z}$ can be transferred by the additional layout of a Schöck Isokorb® T type D. The T type D in this case is installed in a vertical position in place of the insulating spacer.
- Poor bonding conditions (bonding range II) are the basis for the determination of the tension bar anchoring lengths.

Schöck Isokorb® T type W		M1	M2	M3	M4
Torsion spring stiffness for		Concrete strength class ≥ C25/30			
		C [kNm/rad]			
Isokorb® height H [mm]	1500 - 1990	158845	238506	323733	412913
	1500 - 2490	301348	452474	614160	783345
	2500 - 3500	489089	734369	996786	1271373

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.

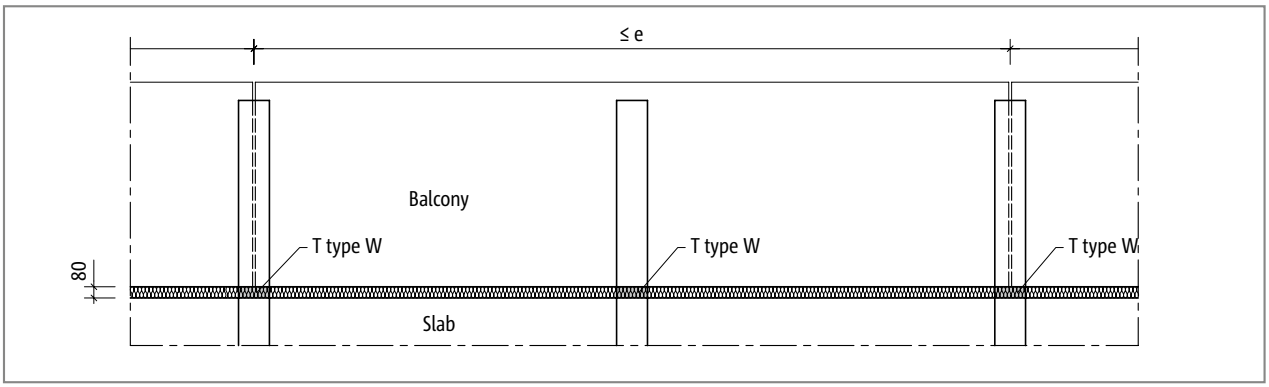


Fig. 203: Schöck Isokorb® T type W: Expansion joint spacing

Schöck Isokorb® T type W		M1	M2	M3	M4
Maximum expansion joint spacing e		e [m]			
Insulating element thickness [mm]	80	13.5	13.0	11.7	10.1

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

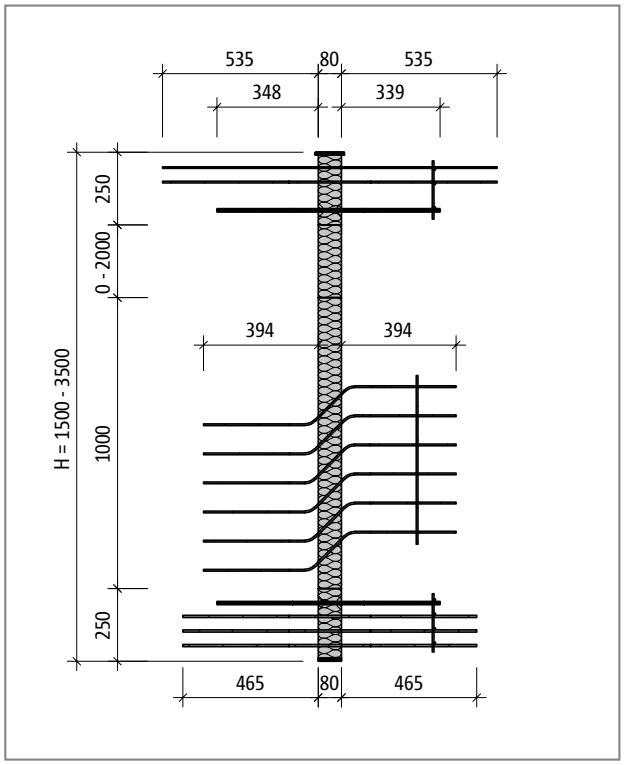


Fig. 204: Schöck Isokorb® T type W-M1: Product section

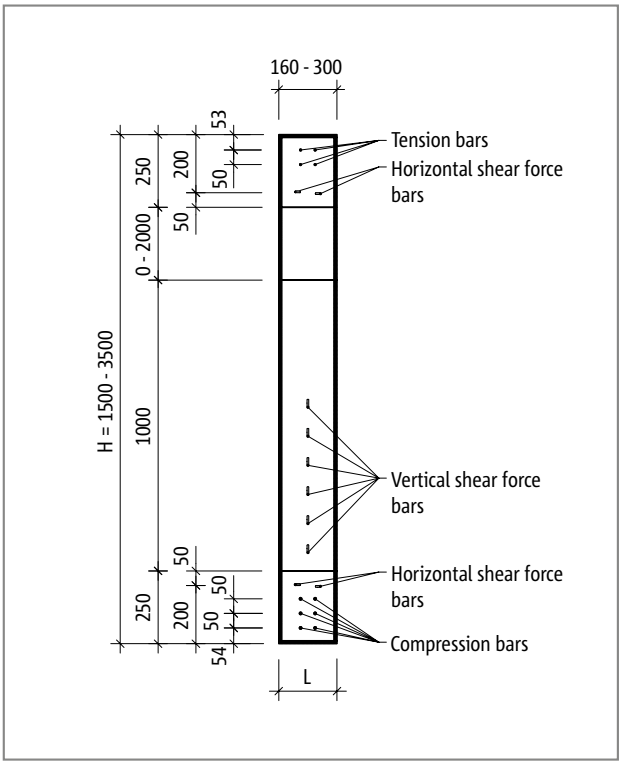


Fig. 205: Schöck Isokorb® T type W-M1: Product layout

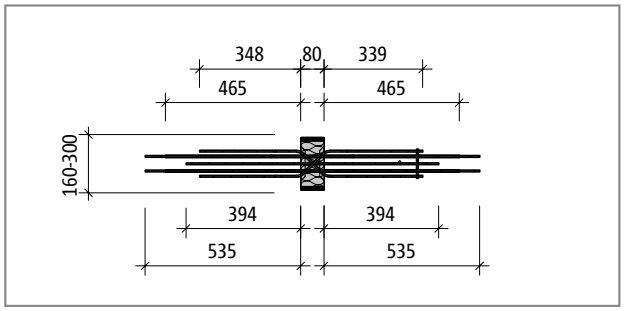


Fig. 206: Schöck Isokorb® T type W-M1: Product layout

Product information

- For additional 2D and 3D product drawings contact our Design Support department.

Product description

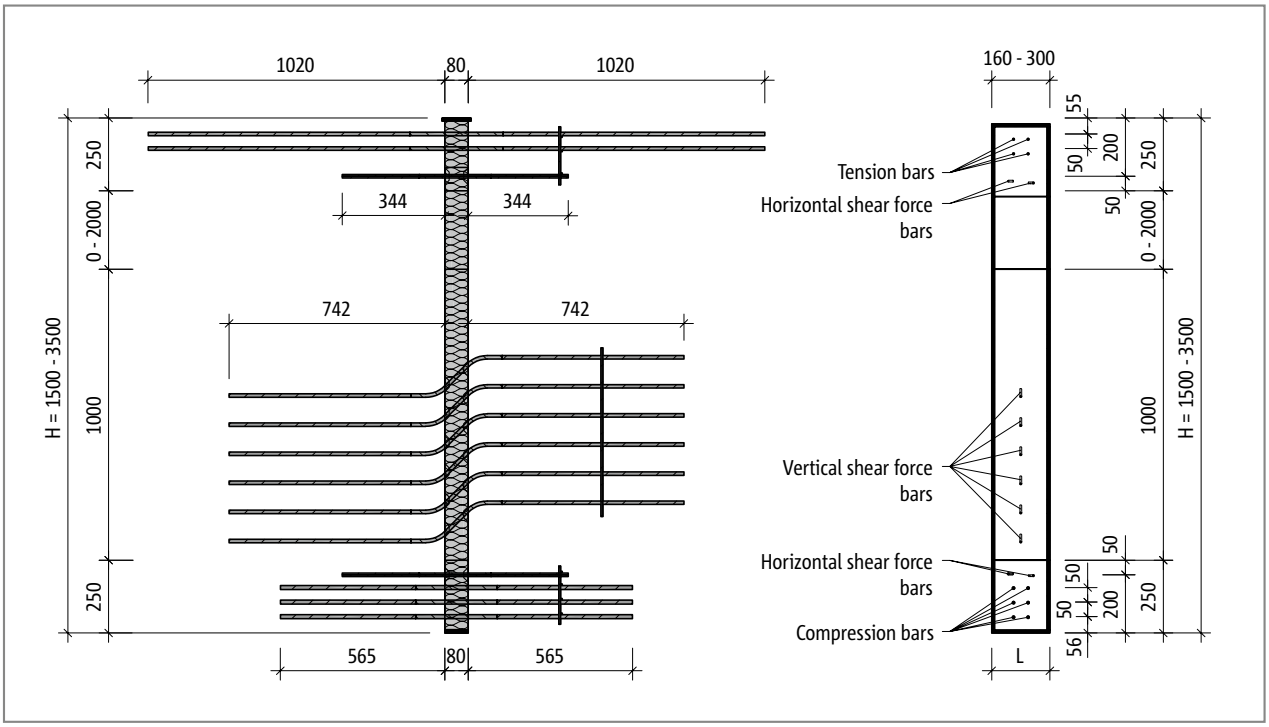


Fig. 207: Schöck Isokorb® T type W-M4: Poduct section and layout

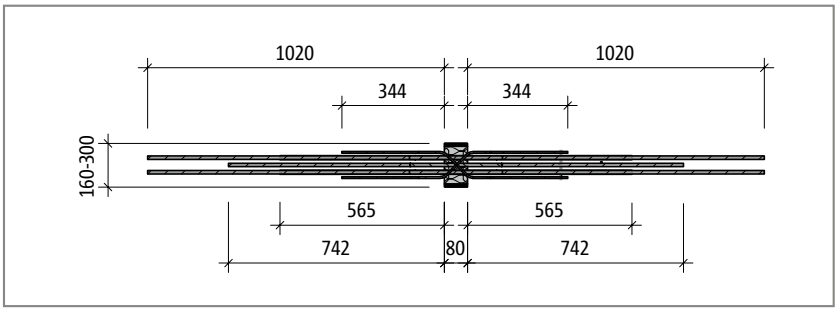


Fig. 208: Schöck Isokorb® T type W-M4: Product layout

Product information

- For additional 2D and 3D product drawings contact our Design Support department.

Configuration without fire protection

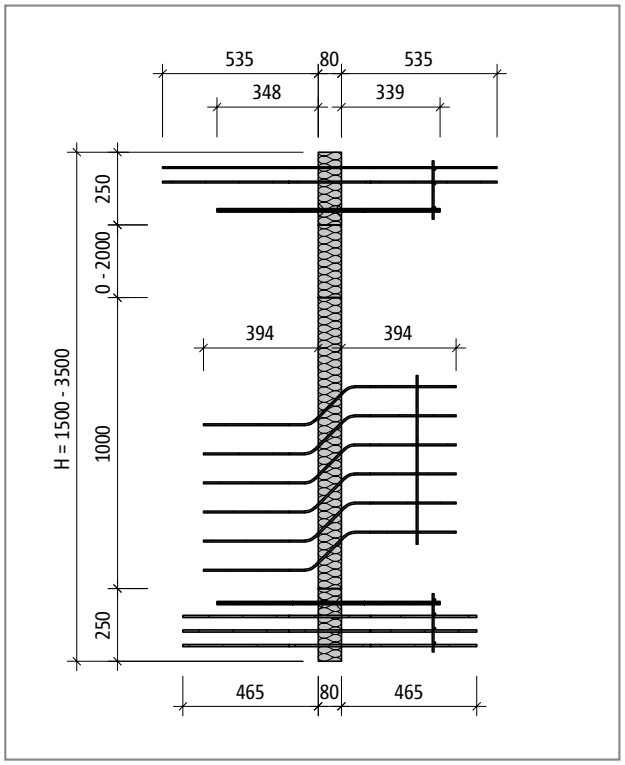


Fig. 209: Schöck Isokorb® T type W for R0: Product layout; Fire protection board top and bottom

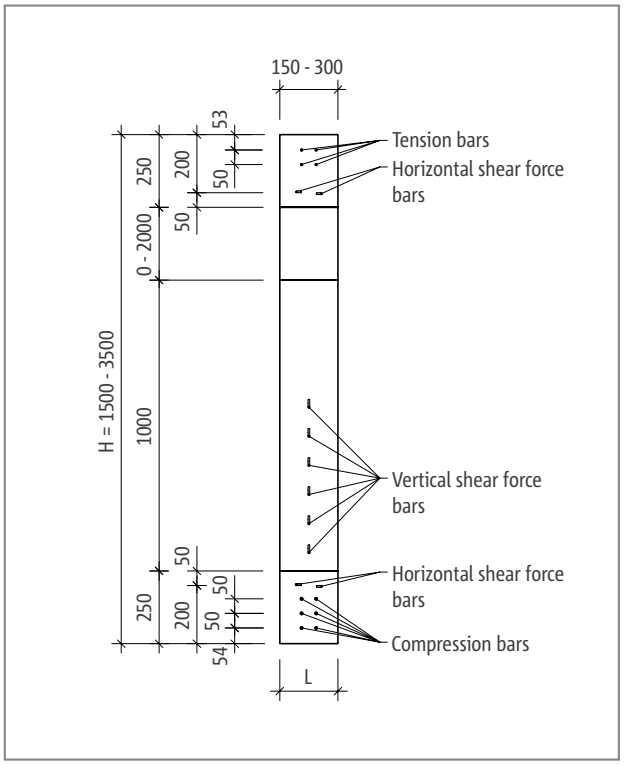


Fig. 210: Schöck Isokorb® T type W for R0: Product layout; perimeter fire protection boards

Fire protection

- If the designation -R0- is left out when ordering, then fire protection (R90) is delivered by default.

On-site reinforcement

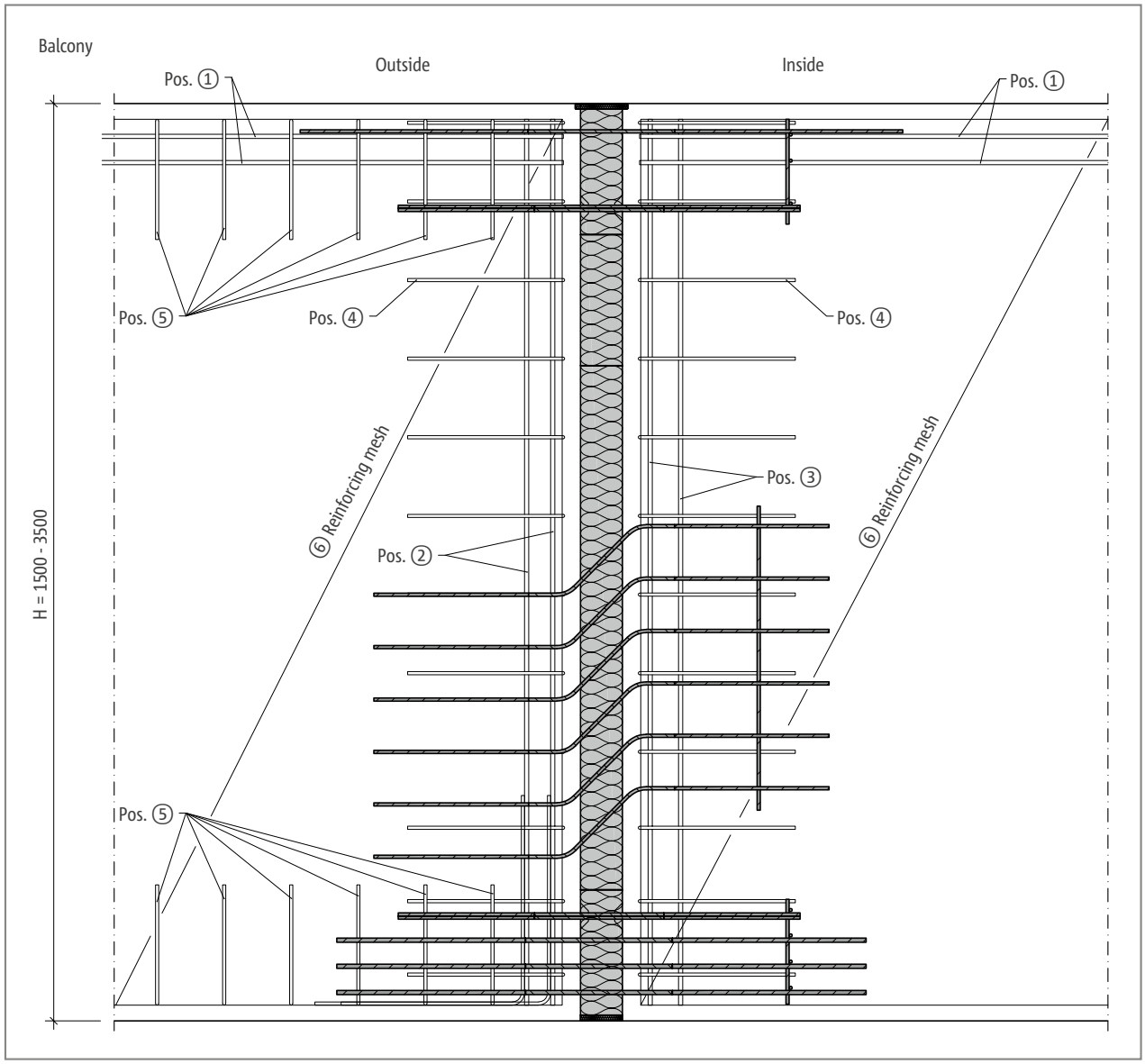


Fig. 211: Schöck Isokorb® T type W: On site reinforcement (cross-section)

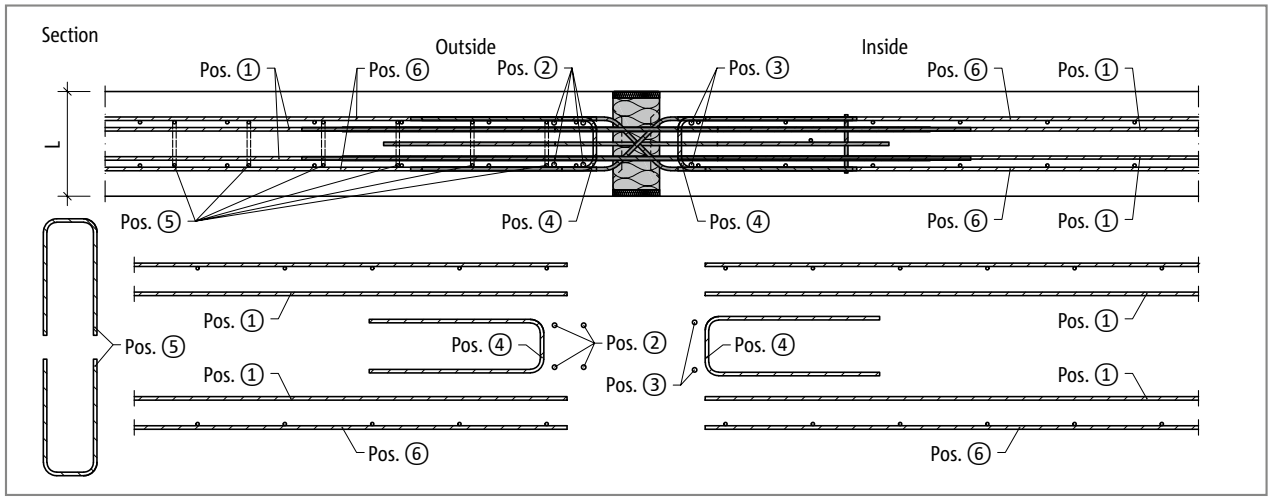


Fig. 212: Schöck Isokorb® T type W: On site reinforcement (layout)

On-site reinforcement | Installation

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® T type W	M1	M2	M3	M4
On-site reinforcement	**Concrete strength class ≥ C25/30**			
Pos. 1 Lapping reinforcement				
Pos. 1	4 ⌀ 6	4 ⌀ 8	4 ⌀ 10	4 ⌀ 12
Lap length l0 [mm]	481	641	801	961
Pos. 2 and Pos. 3 edge reinforcement				
Pos. 2 and Pos. 3	2 × 2 ⌀ 10	2 × 2 ⌀ 10	2 × 2 ⌀ 12	2 × 2 ⌀ 14
Pos. 4 and Pos. 5 edging				
Pos. 4 and Pos. 5	acc. to the specifications of the structural engineer			
Pos. 6 wall reinforcement and lapping reinforcement of shear force bars				
Pos. 6	acc. to the specifications of the structural engineer			

Information about on-site reinforcement

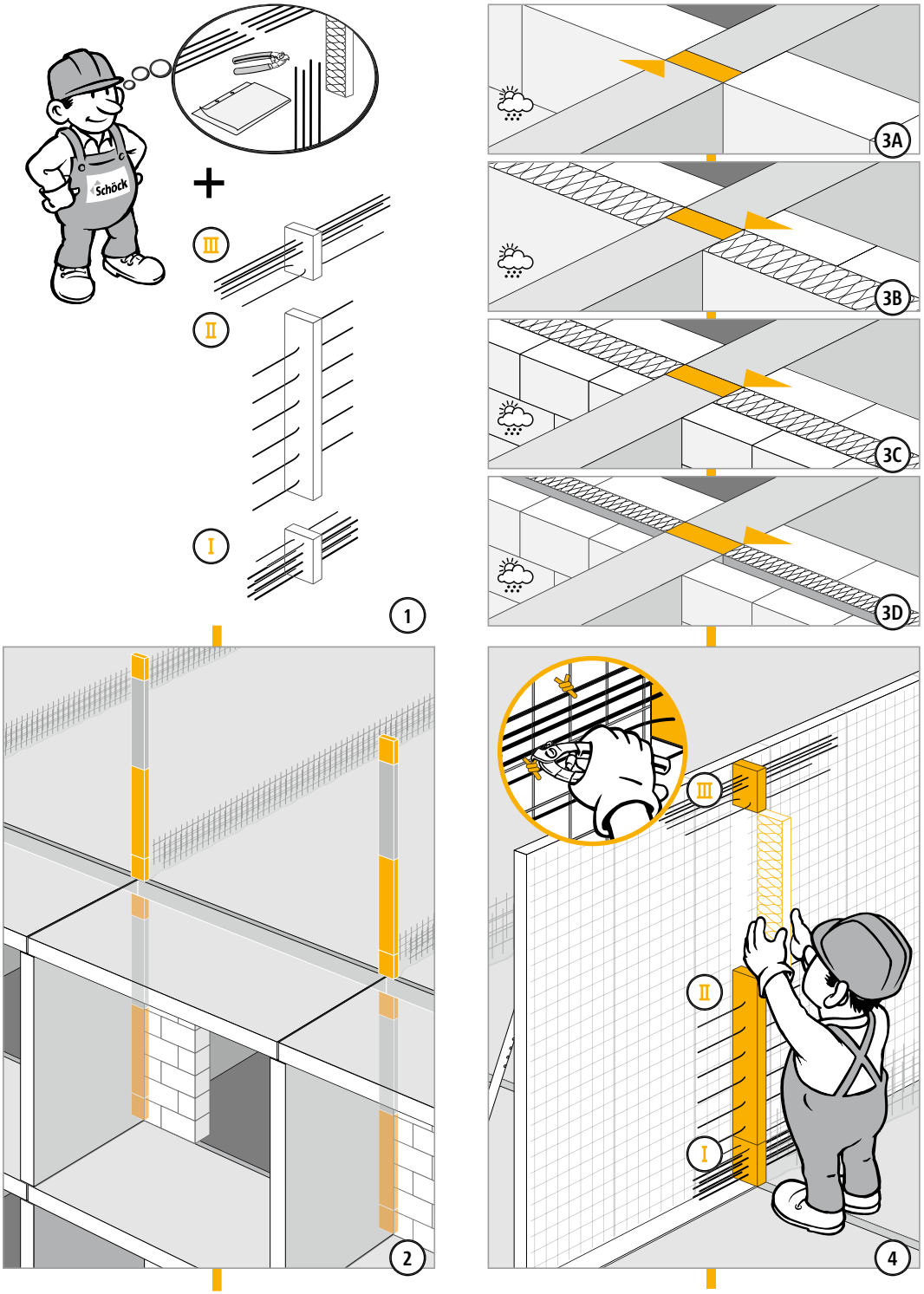
- Alternative connection reinforcements are possible. The rules as per DS/EN 1992-1-1 (EC2) and DS/EN 1992-1-1/NA apply for calculating the lap length. A reduction of the required lap length using m_{Ed}/m_{Rd} is permitted.

Installation

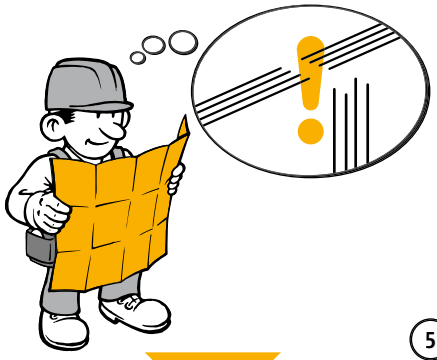
The Schöck Isokorb® T type W is delivered in various components (bottom section, middle section, intermediate section, upper section).

- Depending on the quantity ordered, similar components will be on one pallet for purposes of transport safety.
- The assignment of components takes place on the building site in accordance with installation instructions.

Installation instructions



Installation instructions



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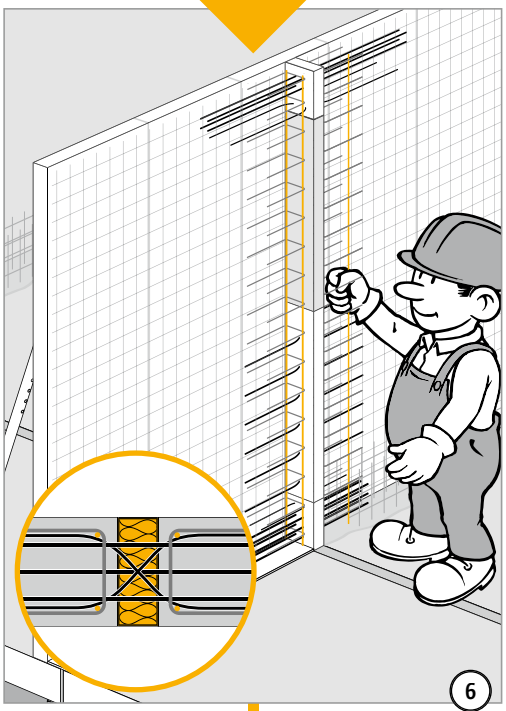

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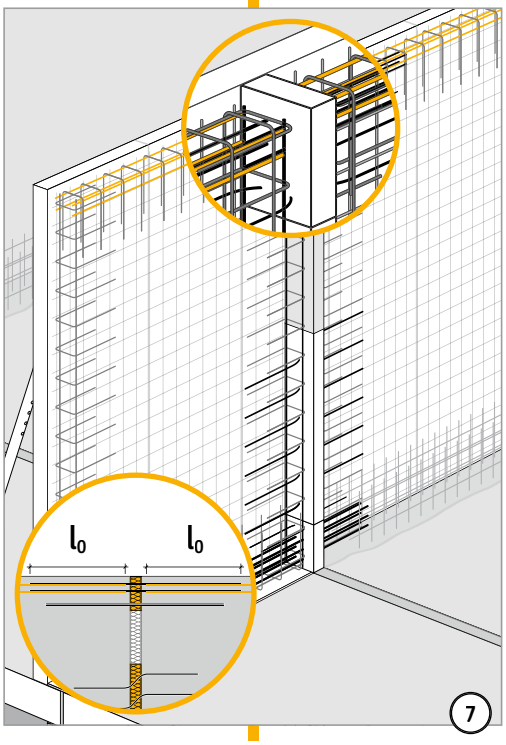

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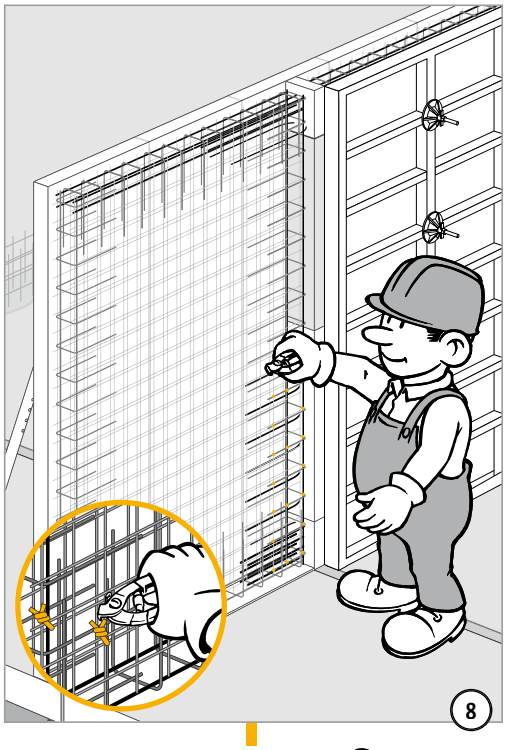

8

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?
- ☐ Is the relevant concrete strength class taken into account when selecting the design and calculation table?
- ☐ With the selection of the design table is the relevant concrete cover 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?
- ☐ Does an impact load or another extraordinary load need to be taken into account for the design of the Schöck Isokorb®?
- ☐ Is there a situation in which the construction must be designed for an emergency situation or special load during construction?
- ☐ Is a sliding felt with the dynamic friction coefficient $\mu_G \leq 0.03$ specified for between the balcony slabs and the cantilevered walls?
- ☐ Is the balcony supported on the cantilevered wall secured against horizontal displacement?
- ☐ Is the type designation of the Schöck Isokorb® explicit in the plans? - Example: Schöck Isokorb® T type W-M4-V1-R90-H2500-L200

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