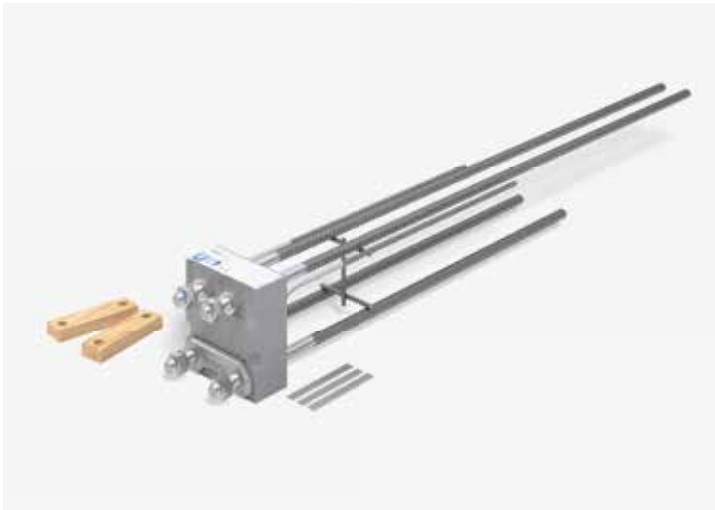
Schöck Isokorb®



Best Practice Installation Guideline

Schöck Isokorb® type KS

December 2018

Symbols

In this guide, the following symbols are used in order to emphasise certain information for the processing of the product:

Info/Tip
The square with i denotes useful information or a tip.

Note
The square with triangle indicates important information, which is to be noted implicitly, in order that, for example, an action can be carried out successfully.

Safety information

Safety information

- It is essential that the installation instructions applicable for the respective country are read before installation.
- This guide illustrates graphically the required installation steps for the respective product. In addition, also shown are the necessary theoretical conditions for the installer.
- All details apply for both the Schöck Isokorb® type KS as well as for the Schöck Isokorb® type QS.

1. The Schöck Isokorb® type KS

1.1 General benefits

The Schöck Isokorb® type KS is a load-bearing thermal insulation element for free cantilevered steel balconies, steel canopies as well as for shading and facade structures.

Thermal separation:

- Effective thermal separation
- Avoidance of condensation, mould and structural damage
- Minimisation of energy loss

Planning reliability

- BBA (British Board of Agreement) approval
- Simple and secure transmission of vertical forces through contact between the butt-stop at the end plate of the steel beam and the butt-stop on the product.

1.2 Ease of Installation

- Insertion of the product into the on-site reinforcement through straight tension and compression bars
- Simple securing and alignment using optional installation aids

1.3 Benefits for steel construction

- Flexible adjustment of vertical structural tolerances of up to 20mm possible on the product
- Simple bolted connection, low torques serve solely for positional security

2. The thermal bridge

2.1 Definition

Thermal bridges are local areas of structural components in the building shell, with which an increased heat loss is present.

Causes:

- Geometric thermal bridges can occur when the heat-emitting surface is larger than the heat absorbing surface
- Local materials with increased thermal conductivity ("material-induced thermal bridge").

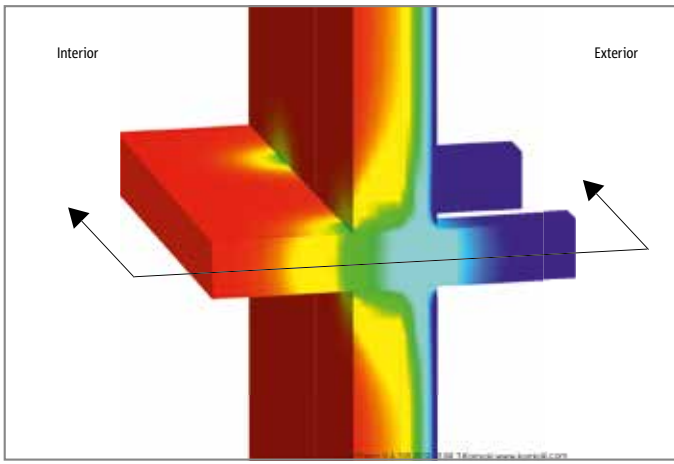


Fig. 1: Illustration of a local thermal bridge on a point balcony connection

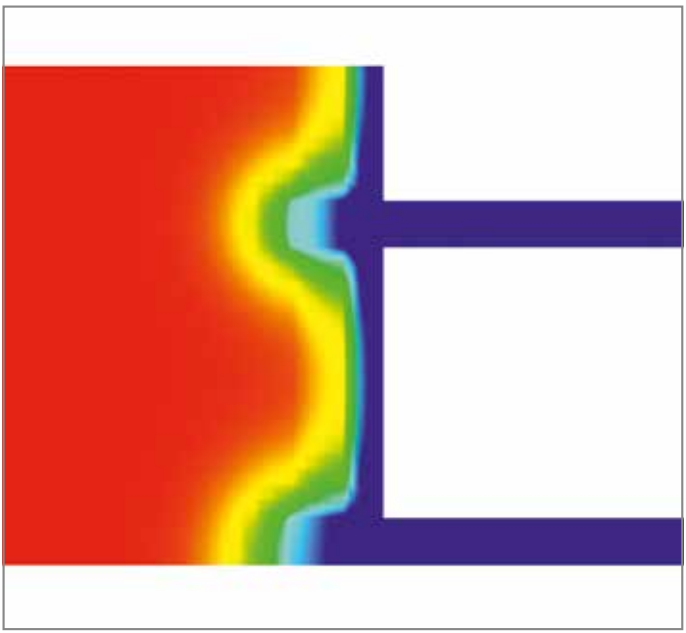


Fig. 2: Detail: Cross-section through the balcony slab

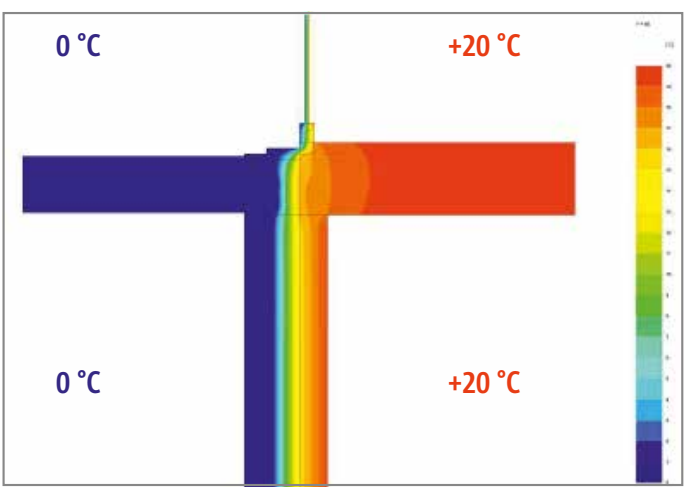


Fig. 3: Section: Temperature distribution

By incorporating the Schöck Isokorb® type KS in the thermal zone between the internal reinforced concrete floor and the steel cantilever beam, the very thermally conductive carbon steel is replaced by a minimised stainless steel (1/3 thermal conductivity of carbon steel) cross-section with optimised load bearing capacity and use of a superior heat insulating material made from EPS insulation material, provides a very effective insulation of the cantilever element.

2.2 Consequences of thermal bridges

The increased heat loss at thermal bridges means:

- Danger of condensation
- Danger of mould formation
- Danger of potential structural degradation and associated repair costs
- Danger of damage to health (allergies etc.)
- Increased loss of heat

The decisive factor in order to avoid these dangers is to keep the minimum internal surface temperature as high as possible, thereby keeping the difference between the room temperature and the surface temperature as small as possible. The installation of a Schöck Isokorb® reduces the thermal bridge and thus keeps the surface temperature above a critical value for the formation of mould and condensation.

Fig. 4: Formation of mould

2.3 Requirements

Part L refer to avoid thermal bridges in the insulation layer. In order to prevent negative effects, it is essential that the requirements for condensation control are met. For the building fabric, the main parameter that indicates surface condensation risk is the Temperature factor, which is governed by values contained within BRE IP 1/06. E.g. the critical temperature factor for avoiding mould growth in dwellings is $f_{Rsi} = 0.75$.
For further information see also: Technical Information Schöck Isokorb® type KS

3. Product description

3.1 Schöck Isokorb® type KS

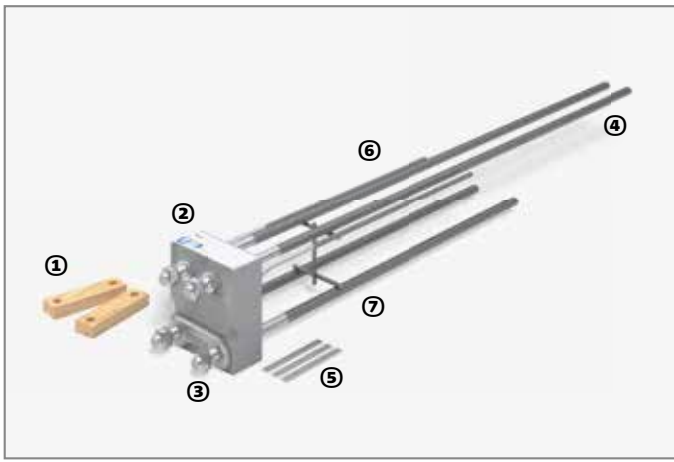


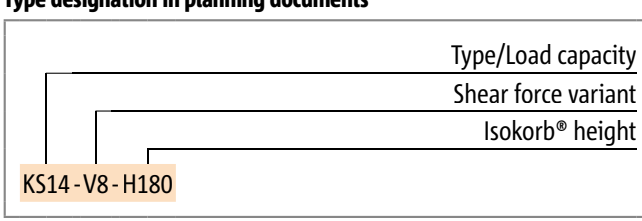
Fig. 5: Schöck Isokorb® type KS20 with timber transport blocks and levelling shims

① Transport blocks
② Insulation element
③ Load plate
④ Tension bars
⑤ Levelling shims
⑥ Shear bars
⑦ Compression bar

Product selection

- Insulating material thickness: 80 mm
- Element length: 180 mm
- Element heights: h = 180-280 mm (in intermediate heights of 10 mm)
- Load-bearing levels: KS14-V8/V10/VV, KS20-V10/V12

Type designation in planning documents



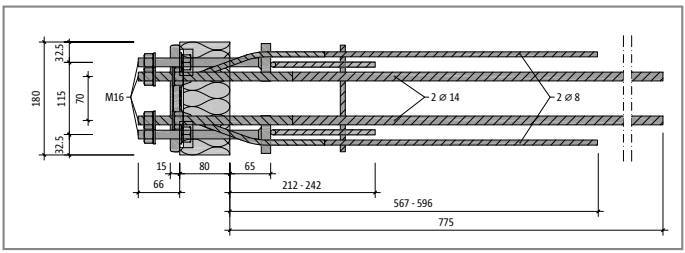


Fig. 6: Schöck Isokorb® type KS14-V8: Plan view

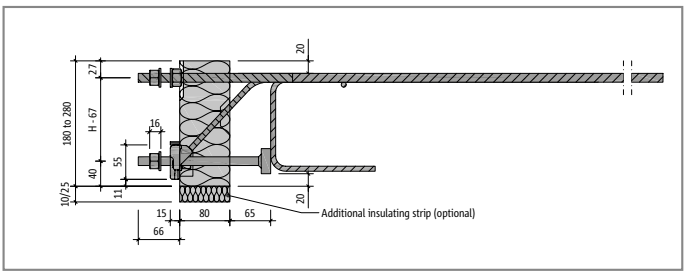


Fig. 7: Schöck Isokorb® type KS14: Product cross section

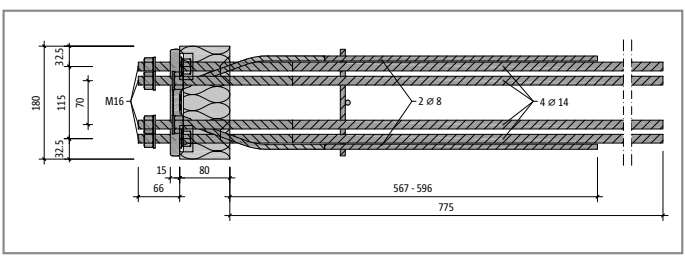


Fig. 8: Schöck Isokorb® type KS14-VV: Plan view

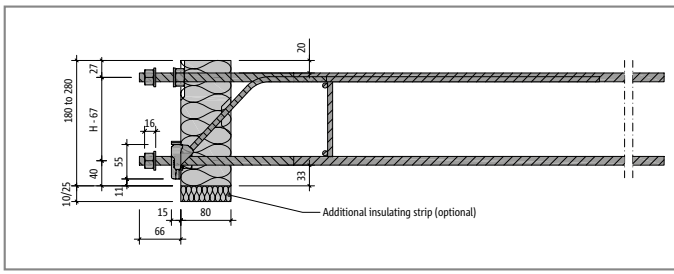


Fig. 9: Schöck Isokorb® type KS14-VV: Product cross section

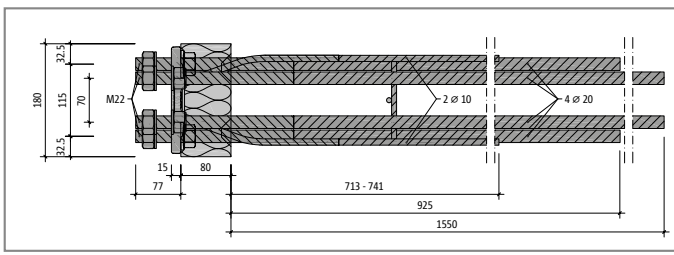


Fig. 10: Schöck Isokorb® type KS20-V10: Plan view

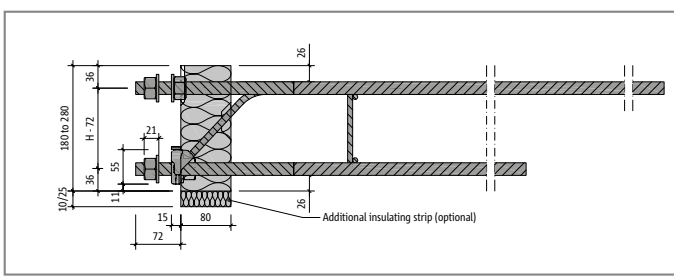


Fig. 11: Schöck Isokorb® type KS20: Product cross section

Note:

In addition to the Schöck Isokorb® type KS for free cantilevered structures dealt with in this guide, the Schöck Isokorb® type QS is also available as solution for supported structures (shear force only), see current Schöck Isokorb® Technical Information.

4. Installation of Schöck Isokorb® type KS

4.1 Preparation

The Schöck Isokorb® type KS represents the connection between a steel structural component and a reinforced concrete component. Therefore installation accuracy of the Schöck Isokorb® type KS is particularly important. This is to be agreed ahead of planning. At the same time, bear in mind that steel construction engineers cannot remedy excessive dimensional deviations without considerable extra work.

Note:
For the dimensionally stable installation and for the positional security of the product during the concreting process the use of a positional steel jig is strongly recommended.
The product must, however, in any case be integrated stably into the slab edge formwork. This jig can be reused.

4.2 Position product

The product is typically placed in line with the insulation layer of the external wall, see examples for cavity wall. Detailed information see project specific architectural drawings.

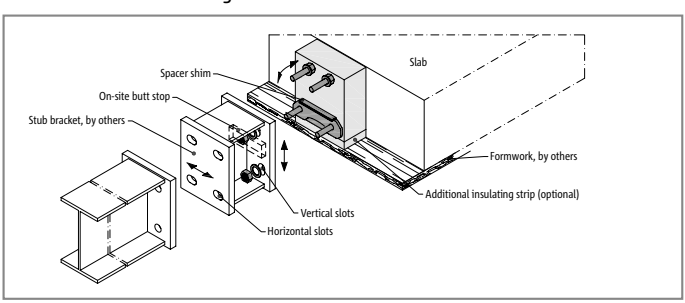


Fig. 12: Usage of a stub bracket to overcome the facade thickness and to allow for horizontal and vertical tolerances

1. Create stable base for the positioning of the product.
   Depending on the height position the product directly on the masonry or on the external formwork or shim it adequately.
2. Position the Schöck Isokorb® type KS.

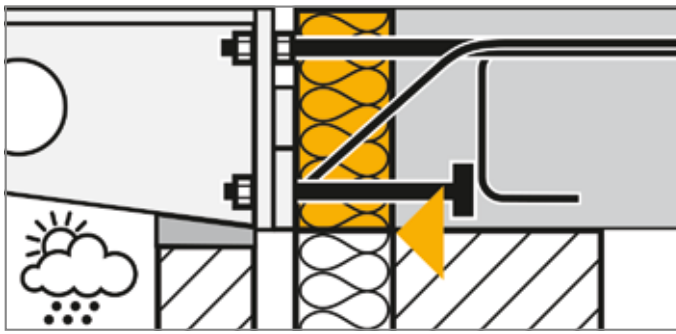


Fig. 13: Positioning of the product in cavity walls

Information with cavity-wall structure:
The rear edge of the product must be flush with the inside edge of the inner block work.

4.3 Integrating the product into slab reinforcement

Note:
The structural engineer must coordinate the position of the product bars and the position of the floor reinforcement together.

4.3.1 Option product bars in 1st reinforcement layer

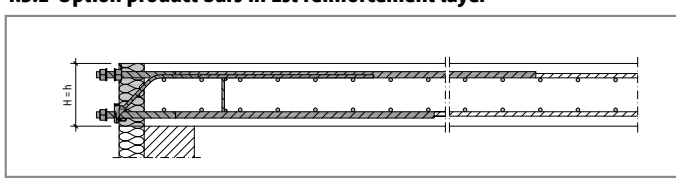


Fig. 14: Option product bars placed in 1st reinforcement layer

Recommended order of installation

1. Install and align the Schöck® Isokorb type KS.
2. Install lower and upper slab reinforcement.

4.3.2 Option product bars in 2nd reinforcement layer

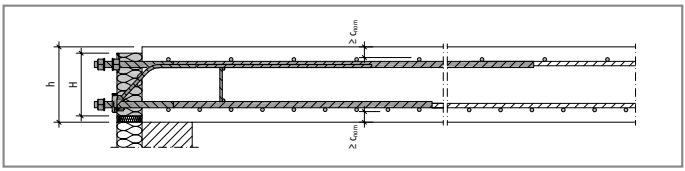


Fig. 15: Option product bars in 2nd reinforcement layer

Recommended order of installation

1. Install lower reinforcement on floor side.
2. Install and align product.
3. Install upper reinforcement on floor side.

Fig. 16: Option product bars in 2nd reinforcement layer

4.4 Installation of on-site reinforcement

Eventually required on-site reinforcement has to designed by the structural engineer.

Note:
For detailed information for on-site reinforcement, see Schöck Isokorb® Technical Information. The on-site reinforcement is necessary for the onward transmission of loads from the product into the slab. Please check the layout drawings for potentially required lap splice reinforcement.

4.5 Align Schöck Isokorb® type KS with steel jigs

Fig. 17: Opening in slab edge formwork with integrated Schöck Isokorb® type KS and installation jig behind

1. Produce edge form in the slab edge formwork to the width of the Schöck Isokorb® (180 mm for Schöck Isokorb® type KS).
2. Unscrew the outer nuts and remove the transport timber blocks.
3. Insert and bolt together the installation aid to the Schöck Isokorb® type KS.
4. Secure the steel positional jig to floor formwork.

Note

Always assemble the steel jig parallel to the insulating element.

The use of continuous steel jigs for each individual balcony enables a very high horizontal and vertical dimensional accuracy. The jig can be reused over several storeys and thus guarantees a dimensional accuracy over several storeys.

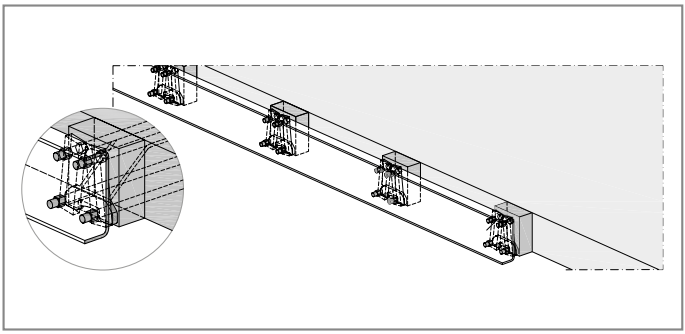


Fig. 18: Principle use of a continuous steel jig

Fig. 19: Use of a continuous steel jig

Fig. 20: Use of a continuous steel jig

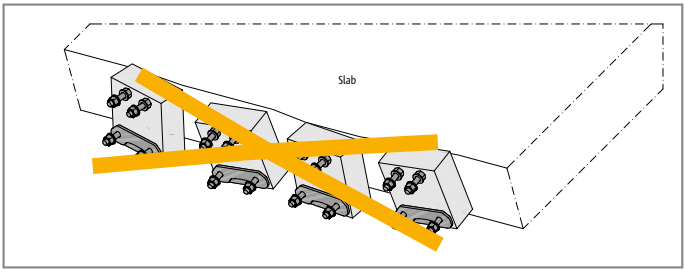


Fig. 21: Schöck Isokorb® type KS: Twisted and displaced elements that were poorly secured while the concrete was being poured

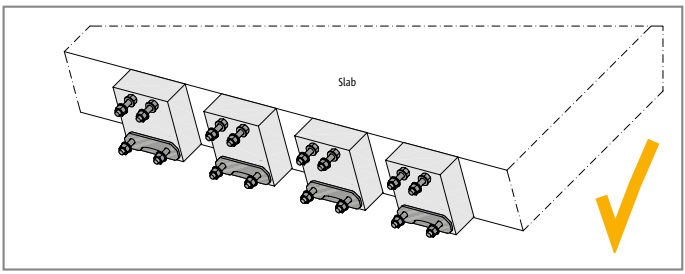


Fig. 22: Schöck Isokorb® type KS: Reliable and correct setting while pouring the concrete ensures the tolerance accuracy is maintained.

4.6 Secure product to the on-site reinforcement

Tip:
Secure the Schöck Isokorb® type KS to the on-site reinforcement, e. g. using tying wire.

5. Assemble steel construction

5.1 Use stub bracket for the bridging of the facade insulation

The bridging of the facade insulation by planning a steel on-site stub bracket enables a connection for the steel balcony, independent of the construction process.

Note:
At the same time the stub bracket enables the implementation of horizontal tolerances on the front side of the adapter

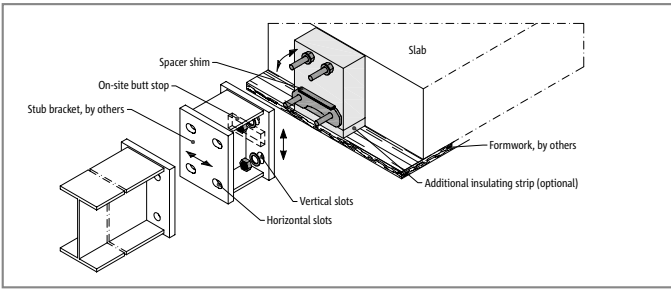


Fig. 23: Usage of a stub bracket to overcome the facade thickness and to allow for horizontal and vertical tolerances

5.2 Aligning the level of the steel construction

1. Measure the level of the exterior steel beam.
2. If required, raise steel construction and insert suitable shims at the product for the height adjustment.

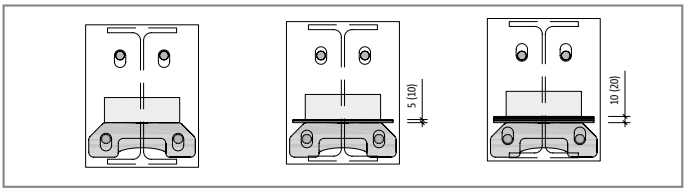


Fig. 24: Adjusting the height of the steel member of up to 20mm, see information below

Note:

As a standard, shims are attached to the product (1 × 3 mm + 2 × 2 mm) in order to implement level adjustments.

The illustrated elongated holes allow an uplifting of the endplate of up to 10 mm. The values shown in brackets allow to increase the tolerances of up to 20 mm for each type except of Schöck Isokorb® KS20 height 180 mm.

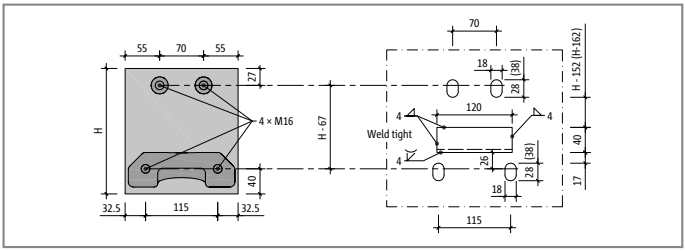


Fig. 25: Sizes of the slotted holes in the end plate for the implementation of the vertical tolerances with the Schöck Isokorb® KS14

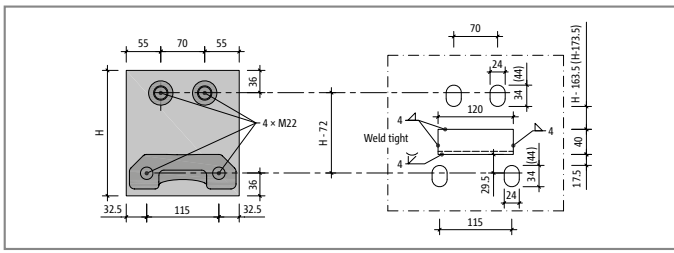


Fig. 26: Sizes of the slotted holes in the end plate for implementation of vertical tolerances for Schöck Isokorb® type KS20

Note:

The shown centrelines are related to the bolts, not to the slots.

Fig. 27: Placing of the steel construction using the shims on the product to overcome vertical tolerances

Fig. 28: Vertical slots to allow for vertical tolerances up to 20 mm

Note:
First, insert the steel beam until the end plate butts onto the product loading plate and then insert the shims to overcome vertical tolerances.

5.3 Place steel beam with butt-stop on product loading plate

Note:

- It is advisable to always carry out a survey of installed units before the production of the parts for the steel construction.
- For a correct transmission of shear forces the on-site butt-stop on the end plate of the steel beam or the slab bracket is absolutely necessary.

1. Install steel beam or the stub bracket of the balcony construction on the bolt connection of the Schöck Isokorb® type KS and place on product loading plate. The butt-stop should bear directly on the compression block of the Schöck Isokorb® type KS and can be levelled using the provided levelling shins.
2. Slightly tighten nuts.

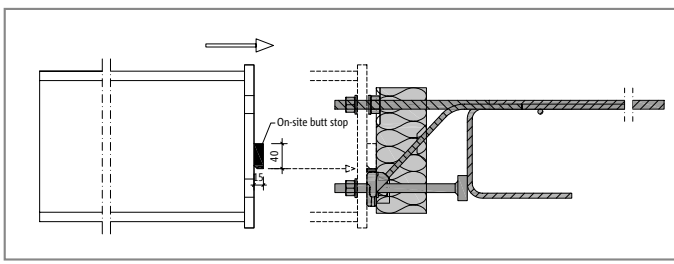


Fig. 29: Schöck Isokorb® type KS: Assembly of steel beam with on-site butt-stop

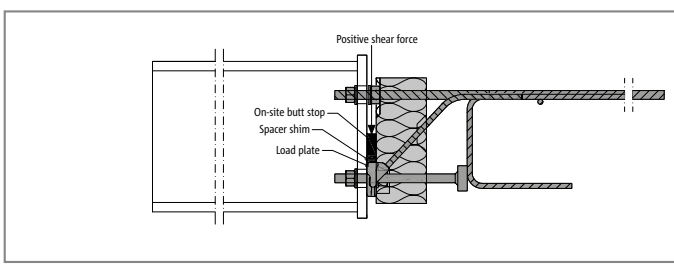


Fig. 30: Schöck Isokorb® type KS: On-site butt stop for transferring shear forces

5.4 Precambering the steel beam at upper bolts

If required, precambering the steel beam can be achieved by turning back the inner nut. This allows the presetting of the balcony dead load deflection.

Note:

- The required precambering has to be are determined by the structural engineer.
- Precambering also allows for adjustments to non perfectly plumbed cast slab egdes.

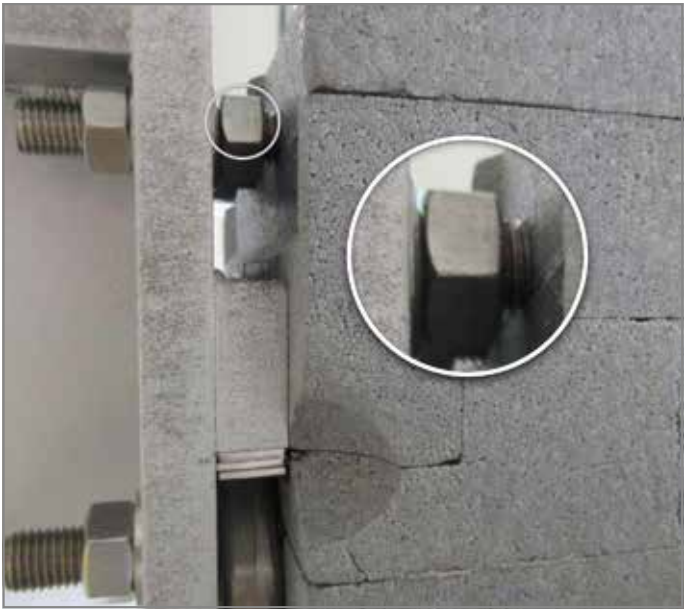


Fig. 31: Inner nut on the upper bolts for the adjustment of a camber

5.5 Tighten bolts

Tighten the bolts using a torque wrench wiith 80 Nm (M22) or 50 Nm (M16).

Note:
This is not a prestressed bolt connection. The construction requires no prestressing of the bolts for the transmission of forces.

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Schöck Ltd
Staniford House
4 Wedgwood Road
Bicester
Oxfordshire
OX26 4UL
Telephone: 01865 290 890
design@schoeck.co.uk
www.schoeck.co.uk

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