Schöck Isokorb® type RQS

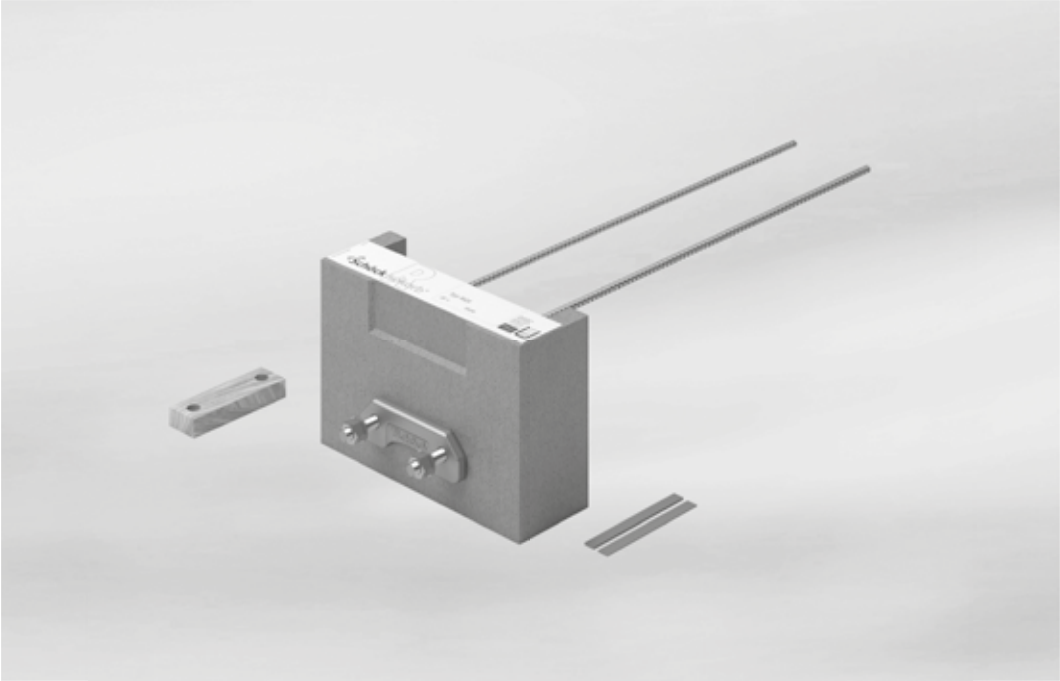


Fig.76: Schöck Isokorb® type RQS

The Schöck Isokorb® type RQS is a load-bearing thermal insulation element for the connection of supported steel balconies to existing reinforced concrete floors. It transfers positive shear forces and horizontal forces.

Schöck Isokorb® type RQS
Approvals / Building materials / Corrosion protection

Approvals

Schöck Isokorb® type RQS:	Z-15.7-298
Hilti grouting mortar HIT-RE 500 V3:	Z-21.8-2064 and ETA-16/0142
fischer grouting mortar FIS EM:	Z-21.8-1874 and ETA-09/0089
PAGEL grouting concrete V1/50:	DAfstb Directive "Production and application of cement-bound grouting concrete and grouting mortar"

Schöck Isokorb® construction materials

Reinforcing steel approval	B500B according to DIN 488-1, BSt 500 NR according to general building supervisory
Pressure bearing in grouting concrete	S 235 JRG2 according to DIN EN 10025-2 for pressure plates
Stainless steel	Material No.: 1.4401, 1.4404, 1.4362, 1.4462 and 1.4571, S 460 according to approval document No.: Z-30.3-6 Structural components and made from stainless steels or BSt 500 NR
Load-bearing plate	Material No.: 1.4404, 1.4362 and 1.4571 or superior grade e.g. B. 1.4462
Shims	Material No.: 1.4401 S 235, Thickness 2 mm and 3 mm
Insulating material	Neopor® – this insulating material is a polystyrene hard foam and is a registered trademark of BASF, λ = 0.031 W/(m·K), building material clasification B1 (flameretardant)

Connected components

Reinforcing steel	B500A, or B500B according to DIN 488-1 or DIN EN 1992-1-1 (EC2) and DIN EN 1992-1-1/NA
Concrete	floor, normal concrete; indicative minimum strength class ≥ C 20/25
Structural steel	balcony minimum S 235; strength class, static verification and corrosion protection according to structural engineer

Corrosion protection

- The stainless steel used with the Schöck Isokorb® type RQS equates to the Material Number: 1.4362, 1.4401, 1.4404 or 1.4571. These steels are, according to the general building supervisory approval document Z-30.3-6 Annex 1 "Structural components and fasteners made from stainless steels" are classified in the resistance class III/medium.
- The connection of the Schöck Isokorb® type RQS in conjunction with a galvanised or corrosion protection coated face plate is uncritical with regard to contact corrosion (see approval document Z-30.3-6, Sectiont 2.1.6.4. With connections using Schöck Isokorb® type RQS the surface of the base metal (steel face plate) is considerably larger than that with stainless steel (bolts, shims and dogs), so that a failure of the connection as a result of contact corrosion is excluded.

Schöck Isokorb® type RQS
Examples for element configuration

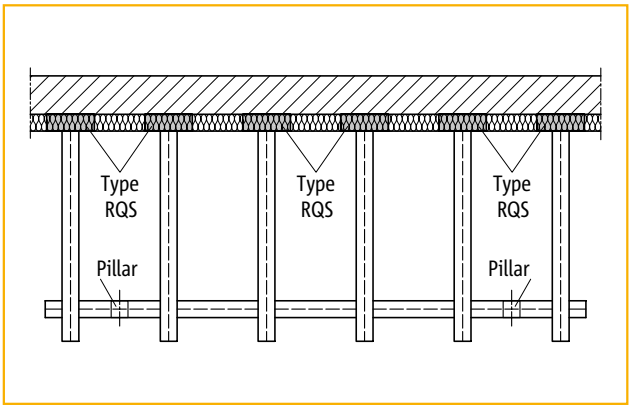


Fig. 77: Renewal of an existing balcony using type RQS, supported construction

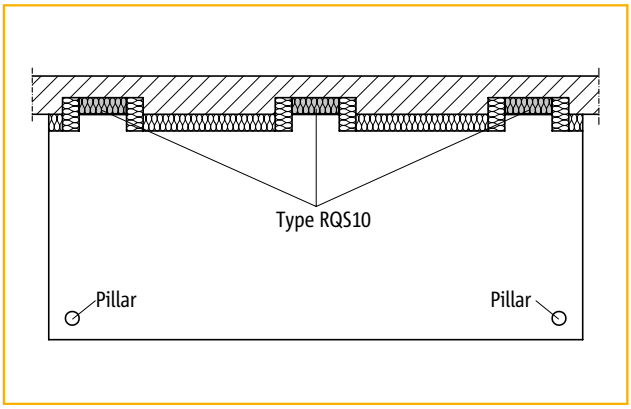


Fig. 78: Connection of a balcony to an existing floor using type RQS, supported construction

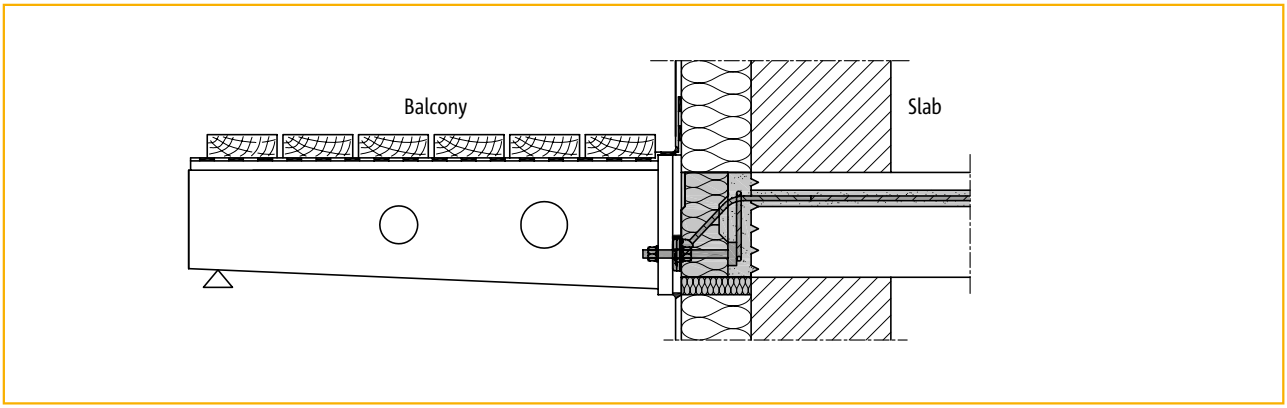


Fig. 79: Balcony with support bearing with renewal of an existing balcony

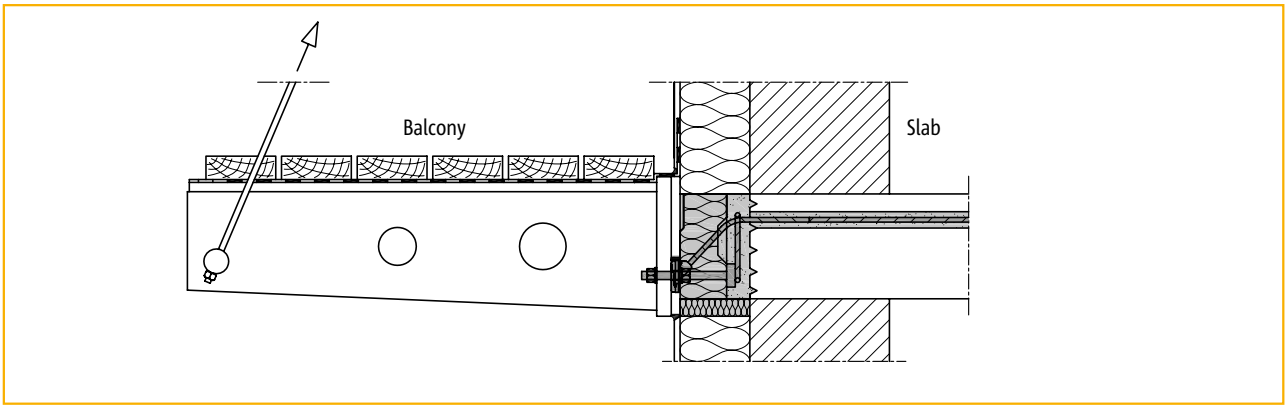


Fig. 80: Balcony suspended with renewal of an existing balcony

Schöck Isokorb® type RQS8
Product description

RQS8

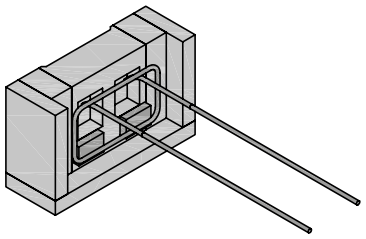


Fig.81: Isometry: Schöck Isokorb® type RQS8

RQS8

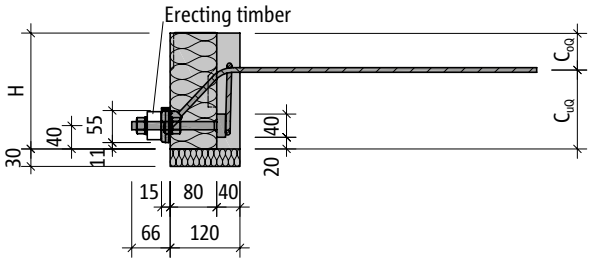


Fig.82: Section: Schöck Isokorb® type RQS8

RQS8

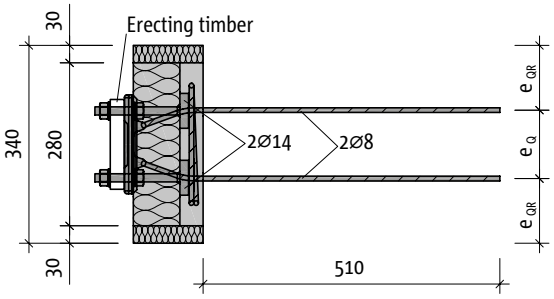


Fig.83: Plan view: Schöck Isokorb® type RQS8

RQS8

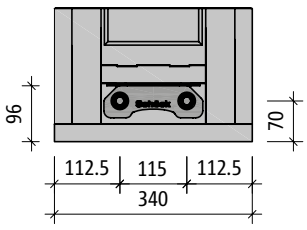


Fig.84: Side view from outside: Schöck Isokorb® type RQS8

RQS8

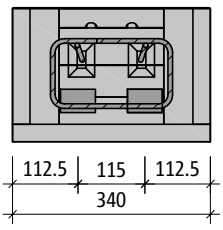


Fig.85: Side view from inside: Schöck Isokorb® type RQS8

Schöck Isokorb® type RQS10
Product description

RQS10

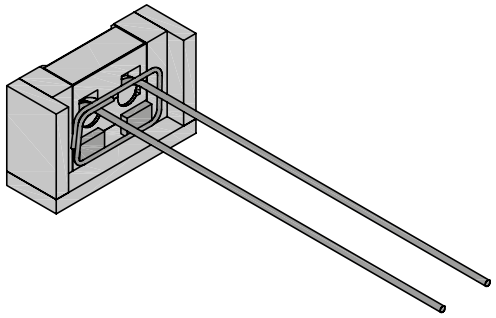


Fig.86: Isometry: Schöck Isokorb® type RQS10

RQS10

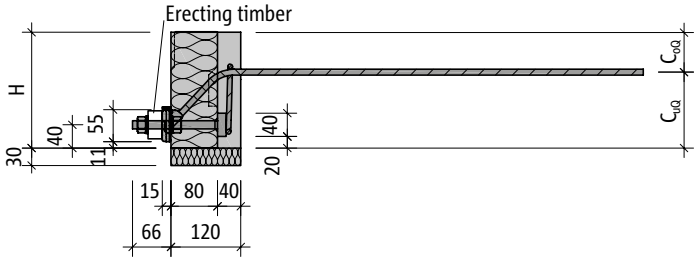


Fig.87: Section: Schöck Isokorb® type RQS10

RQS10

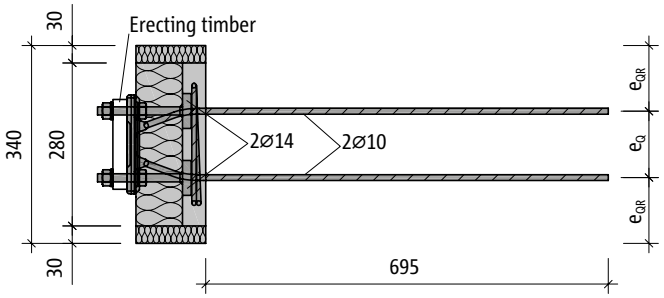


Fig.88: PLan view: Schöck Isokorb® type RQS10

RQS10

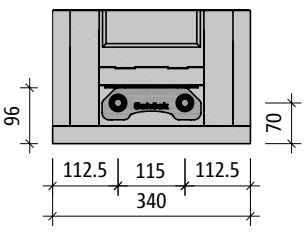


Fig.89: Side view from outside: Schöck Isokorb® type RQS10

RQS10

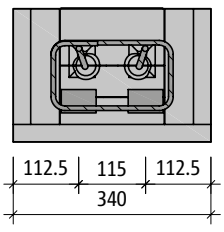


Fig.90: Side view from inside: Schöck Isokorb® type RQS10

Schöck Isokorb® type RQS12
Product description

RQS12

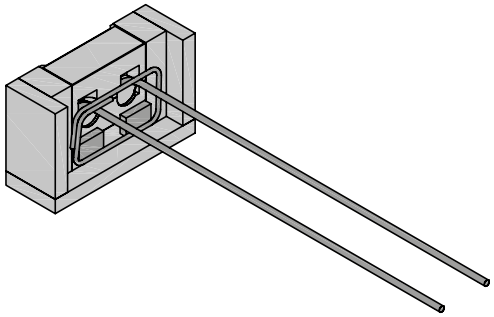


Fig.91: Isometry: Schöck Isokorb® type RQS12

RQS12

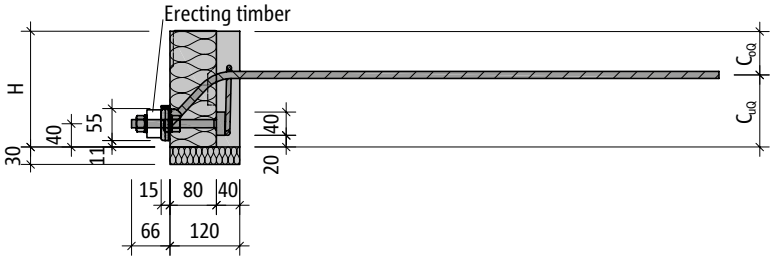


Fig.92: Section: Schöck Isokorb® type RQS12

RQS12

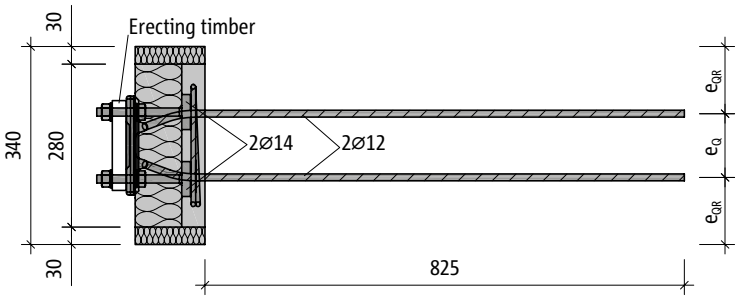


Fig.93: Plan view: Schöck Isokorb® type RQS12

RQS12

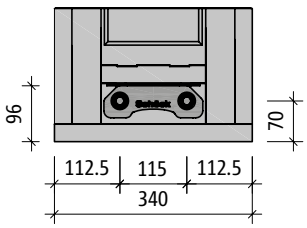


Fig.94: Side view from outside: Schöck Isokorb® type RQS12

RQS12

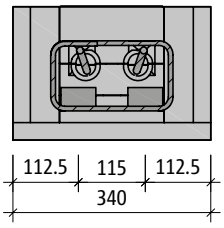


Fig.95: Side view from inside: Schöck Isokorb® type RQS12

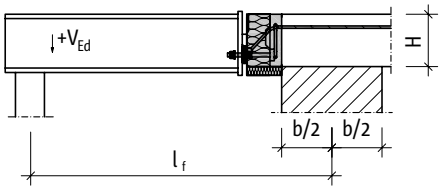
Schöck Isokorb® type RQS
Product description

Schöck Isokorb® type		RQS8				RQS10				RQS12		
Isokorb® height H [mm]		160	180	200	220	160	180	200	220	180	200	220
Product description	Isokorb® length [mm]	340				340				340		
	Shear force bars ($l_{v,floor}$ in mm)	2 ⌀ 8 (510)				2 ⌀ 10 (695)				2 ⌀ 12 (825)		
	Pressure bearing	2 ⌀ 14				2 ⌀ 14				2 ⌀ 14		
	C_{oQ} [mm]	44	44	64	84	50	50	50	70	56	56	76
	C_{uQ} [mm]	116	136	136	136	110	130	150	150	124	144	144
	e_Q [mm]	104	118	118	118	100	114	127	127	109	123	123
	e_{QR} [mm]	118	111	111	111	120	113	106.5	106.5	115.5	108.5	108.5

l_v settlement depth
C_{OQ} centre-to centre distance shear force bars from upper edge Isokorb®
C_{UQ} centre-to-centre distance shear force bars from lower edge Isokorb® (floor edge)
e_Q centre distance of shear force bars between each other
e_{QR} centre distance of shear force bars from outer edge Isokorb®

Schöck Isokorb® type RQS
Design table

Design values are to be referred to the middle of the wall.



Schöck Isokorb® type		RQS8	RQS10	RQS12
Design values for	Concrete strength	≥ C20/25		
	Surface floor front face	rough	toothed	toothed
Isokorb® height H [mm]		Shear force V_{Rd} [kN]		
	160	+28.0	+48.3	–
	180/200/220			+69.6
		Horizontal force H_{Rd} [kN] [1]		
	160 - 220	±2.5	±2.5	±2.5
		max. expansion joint spacing e [m]		
	160	5.1	2.0	–
	180	5.8	5.8	3.1
	200			5.8
	220			

[1] For the acceptance of the existing Horizontal force (H_{Ed}) parallel to the outside wall, a minimum shear force of 2.9 • H_{Ed} is to be ensured.

Schöck Isokorb® type RQS
Notes

Design

- The structural engineering information on pages 26 - 29 is to be observed.
- The straight sides of the shear force bars are to lap with the reinforcement of the neighbouring slabs in the tension zone.

Expansion joint spacing

The determination of the allowable joint spacing is to be based a reinforced concrete balcony securely connected with the steel girders. If structural measures allow for movement between the balcony slab and the individual steel girders are carried out, then only the separation of the immovably formed connections is relevant.

Edge and element separation

The separation of the structural component axis of the Schöck Isokorb® type RKS and type RQS from the edge of the structural component must be at least 190 mm; the centre-to-centre distance of these must not be less than 340 mm.

Installation tolerances

Design-related, with the assembly of the steel girder, only tolerances in the vertical direction can be compensated via the Schöck Isokorb® type RKS/RQS. The tolerance is: +10 mm vertical and ±0 mm horizontal. The Isokorb® types RKS/RQS therfore must be placed according to precise measurement details.

The firm entrusted with the production of the subsequently mortared in slab connections is to be informed by the structural engineer about these accuracies in the implementation plans. In order to enable the functionally correct joining of the shell and steel construction without adjustment and rework, the observation of the tolerances must be checked by the construction supervision taken into account in the steel construction.

Tip:
The start of the production of the new balcony steel construction or prefabricated component) is to take place only if the Schöck Isokorb® R types are placed and their final location has been determined to an accurate degree (mm).

Schöck Isokorb® type RQS
Steel construction / In-situ face plates

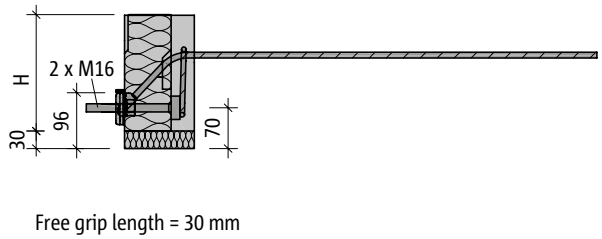


Fig.96: Section: Schöck Isokorb® type RQS

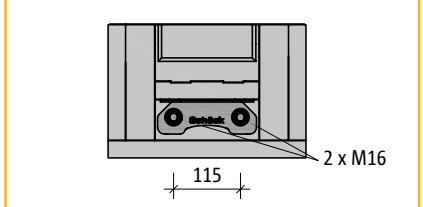


Fig.97: Front view: Schöck Isokorb® type RQS

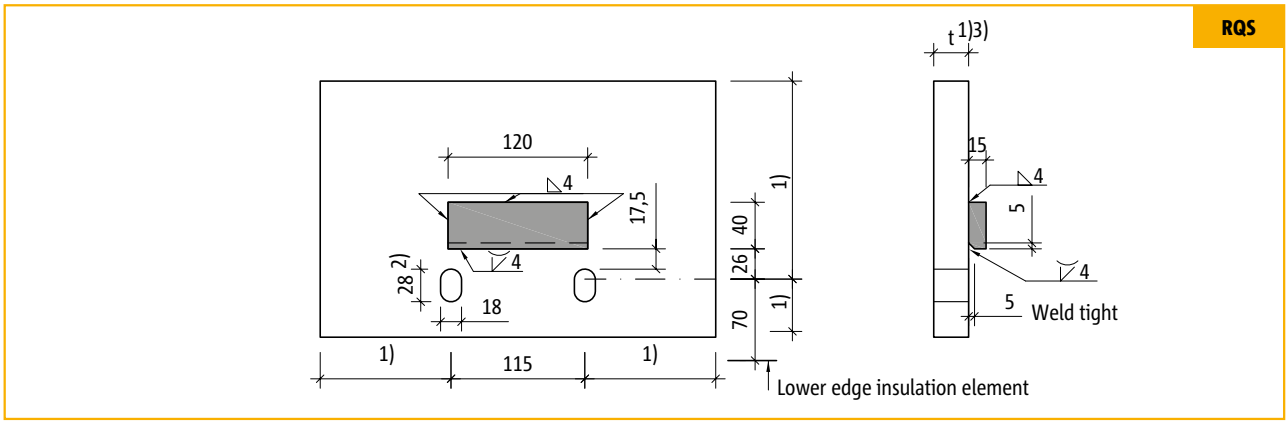


Fig.98: In-situ face plate for Schöck Isokorb® type RQS

Note:

- **The dog is absolutely necessary for the transmission of shear forces! See page 71.**
- Steel grade according to static requirements. Carry out corrosion protection following welding.
- Steel construction: Tolerances of the shell must be checked!

[1] According to details of the structural engineer.
[2] Hole size corresponds to a height adjustment of +10 mm. The height adjustment can be increased through the enlargement of the hole.
[3] Note free clamp length: 30 mm with RQS8, RQS10 and RQS12.

Schöck Isokorb® type RQS
Steel construction / In-situ dog

An in-situ dog (flat steel h=40mm, l= 120mm, t= 15mm), welded on to the face plate is absolutely necessary for the safe transmission of shear forces in the Schöck Isokorb® type RKS (or RQS)!

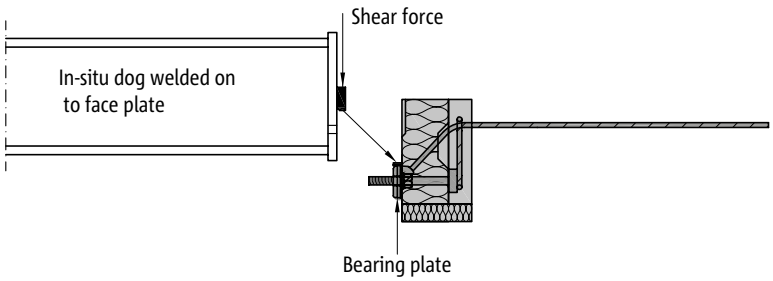


Fig.99: Absolutely necessary dog on the face plate

The dog is part of the steel structure

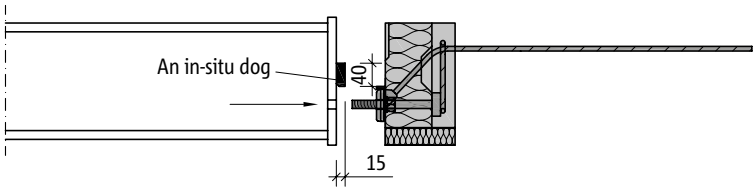


Fig.100: Assembly of the steel girder to the Schöck Isokorb®

After assembly, the dog transmits shear forces in the Schöck Isokorb® type RQS (or RKS)

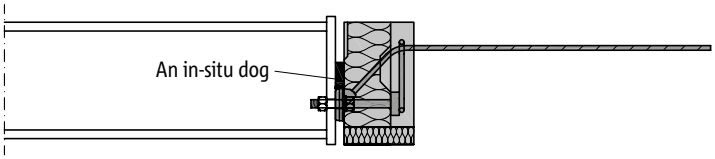


Fig.101: The dog now sits on the support plate; for height adjustment push in shims provided under the dog

Schöck Isokorb® type RQS
Checklist

- ☐ Was the Schöck Isokorb® type matching the static system selected? Type RQS counts as pure shear force connection (not a moment joint).
- ☐ Are the internal forces in the Schöck Isokorb® determined at design level?
- ☐ Was the system supporting width applied with this?
- ☐ Has the concrete quality been analysed and is it basis for the design?
- ☐ Are the maximum expansion joint spacings taken into account?
- ☐ Are the allowable edge and element spacings observed?
- ☐ Is the required connection reinforcement present in the existing floor?
- ☐ Are position and spacings of the existing reinforcement as well as the electrical lines and sanitary pipelines in the existing floor known?
- ☐ Were the overall length and overall height of the insulation element taken into account for the formwork plans?
- ☐ Was attention drawn sufficiently in the implementation plans to the absolutely necessary in-situ dog (page 71)?
- ☐ Have the torques for the screwed connections noted in the implementation plans (see also page 120)?
  The nuts are to be tightened, without normal pre-torque, using the torque wrench;
  The following torques apply:
  RQS8 (Bolts ⌀ 16): M_r = 50 Nm
  RQS10 (Bolts ⌀ 16): M_r = 50 Nm
  RQS12 (Bolts ⌀ 16): M_r = 50 Nm
- ☐ Have the system components to be used with Schöck Isokorb® R been pointed out in the implementation plans?
  Grouting mortar: Hilti HIT-RE 500 V3 or fischer FIS EM
  Grouting concrete: Pagel V1/50
  For this see Chapter Building construction (page 85ff).
- ☐ Are the requirements on the construction drawings from the Schöck Isokorb® R approval documents Z-15.7-297 and Z-15.7-298 been observed? (see page 26)

Schöck Isokorb® type RQS

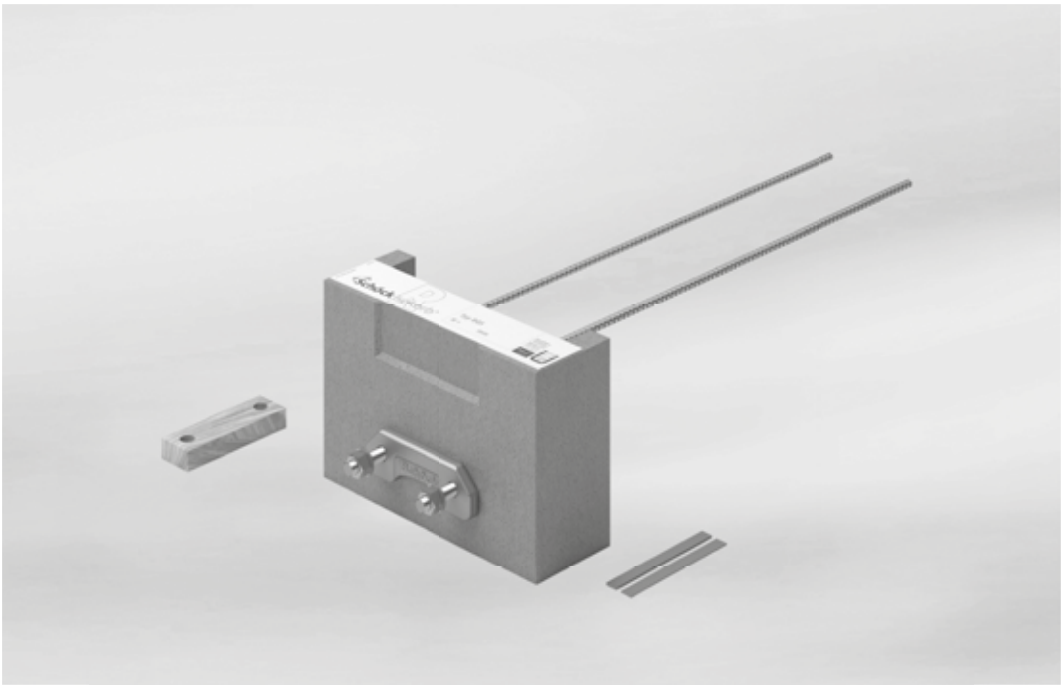


Fig.128: Schöck Isokorb® type RQS

Schöck Isokorb® type RQS
Table for building contractors / Installation details

Schöck Isokorb® type		RQS8	RQS10	RQS12
		Shear force bars	Shear force bars	Shear force bars
Number of drill holes		2	2	2
Drill hole diameter d_0 [mm]		12	14	16
Required seating depth l_v [mm]		510	695	825
Reqd surface of the floor front face		rough	toothed	toothed
Quantity grouting mortar (according to setting instruction) [ml]		85	140	180
Quantity of grouting concrete [l] with Isokorb® height H [mm]	160	1.8		
	180	2.0		
	200	2.2		
	220	2.5		

Information on the grouting mortar Hilti HIT-RE 500 V3, fischer FIS EM and grouting concretePagel VERGUSS V1/50 see page 87.

Installation details

The installation of the Schöck Isokorb® R should take place in close coordination with the archtect and structural engineer, the Schöck Isokorb® type RQS installation instruction (see following pages) is to be observed.

The Schöck Isokorb® type RQS installtion instructions are to be observed:
1. Installation instruction without text (available on all Isokorb® R types)
2. Installation instruction with written installation details (simply supplied with every delivery)

The position and spacings of the existing reinforcement are to be checked (where not known).

The position and spacings of the existing electrical lines and sanitary pipelines are to be checked (where not known).

The front face of the existing floor in the area of the connection of the Schöck Isokorb® R is to be formed as rough or toothed (depending on Isokorb® type).

The implementation of the reinforcement connections with grouting mortar according to approval document Z- 21.8-2064 or Z-21.8-1874 can take place only through firms with qualifying examination.

The Hilti HIT-RE 500 V3 setting instruction „Retrospective reinforcement connection using Hilti HIT-RE 500 V3“ or the assembly instruction "Reinforcement connection using fischer FIS EM" are to be observed. (Permitted drilling methods are hammer or diamond drilling, in each case using drilling aid.)

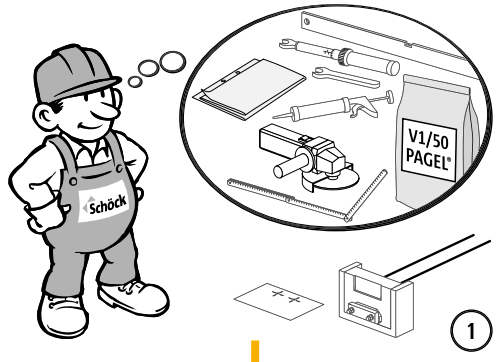
The appropriate Schöck Isokorb® R drilling template is to be used.

If existing reinforcement is met during drilling, the drilling is to be discontinued. The abandoned drill hole (drill hole diameter d_0) is to be grouted using HIT-RE 500 V3 or FIS EM and a new drill hole is to be created with a clear separation of at least $2d_0$.

With the filling of the grouting joint with PAGEL VERGUSS V1/50 grouting concrete the DAfStb Directive "production and application of cement-bound grouting concrete and grouting mortar" is to be observed.

Important:
Design-related, with the assembly of the steel girder, only tolerances in the vertical direction can be compensated via the Schöck Isokorb® type RQS. The tolerance is: +10 mm vertical and ±0 mm horizontal. The Isokorb® type RQS therefore must be placed according to precise measurement details.

Schöck Isokorb® type RQS
Installation instructions



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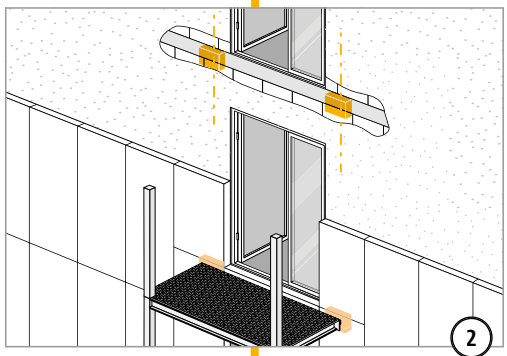

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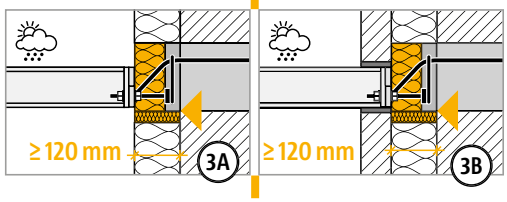

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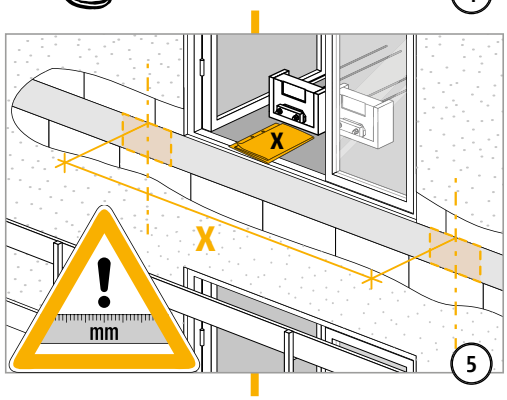


5

The Schöck Isokorb® connection must be planned on an engineering basis; the planning documents must be available on the construction site.

The firm entrusted with the production of the subsequently mortared in slab connections must possess a valid proof of suitability.

- Check Schöck Isokorb® type for freedom from damage and on agreement with the planning documents.
- Check materials' structural properties required for the installation of the Schöck Isokorb® completeness.

① + ② The following are required for the installation of the Schöck Isokorb®:

- Schöck Isokorb® type RQS
- Schöck installation instruction
- Drill template for Schöck Isokorb®
- Planning documents of the construction object including that of the holdings
- PAGEL V1/50 grouting concrete
- Hilti HIT-RE 500 V3 injection system or fischer FIS EM for reinforcement connections
- Approval document Hilti HIT-RE 500 V3 ETA-16/0142 / DIBt Z-21.8-2064 or approval document FIS EM, ETA-09/0089 / DIBt Z-21.8-1874
- Angle grinder to roughen floor front face
- Sealant to seal grouting frame
- Tools for the installation:

③ Installation details for Schöck Isokorb®:

- The Schöck Isokorb® is to be configured with an insulation ≥ 80 mm and 40 mm grouting joint with a total width ≥ 120 mm.
- Attention is to be paid that the lower edge of the grouting recess of the Schöck Isokorb® closes flush with the lower edge of the existing floor.

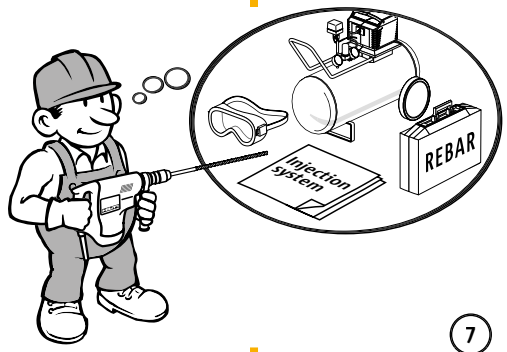
④ The following must as a minimum be indicated on the construction drawing:

- Concrete strength class of the existing floor
- Hammer or diamond process, respectively with drilling aid
- Diameter, concrete cover, centre-to-centre distance and seatiing depth of the moratared in reinforcement bars depending on the Isokorb® type used.
- Marking lengths dimension lm and lv respectively le,tot on the combined elongation for Hilti HIT-RE 500 V3 in accordance with ETA-16/0142, Annex B17, for fischer FIS EM in accordance with ETA-09/0089, Annnex B 9.
- Type of preparation of the front face of the existing structural component including thickness of the concrete layer which, if necessary, has to be removed, and specifying the surface roughness of the front face.

⑤ Marking of the installation position
Before drilling the position of the existing floor reinforcement in relation to the drill holes to be made must be known.

Schöck Isokorb® type RQS
Installation instructions

6

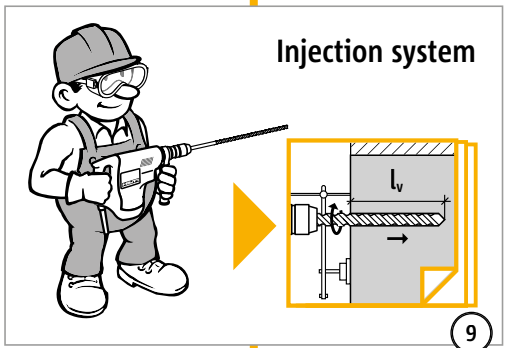


7

	⌀	⌀	l_v
RQS 8	8 mm	12 mm	510 mm
RQS 10	10 mm	14 mm	692 mm
RQS 12	12 mm	16 mm	825 mm

INJECTION:

8



9

⑥ Marking of drill holes:
With the aid of the Schöck drill template the position of the drill holes are marked on the front face of the existing floor according to the details of the construction drawing.

⑦ The bonding of the Schöck Isokorb® R in the existing floor is to be carried out using the Hilti HIT-RE 500 V3 or fischer FIS EM injection systems.
The handling of the injection systems for Hilti HIT-RE 500 V3 und fischer FIS EM reinforcement connections takes place according to the approval documents:

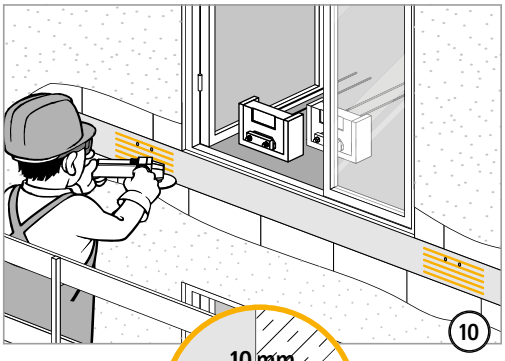
- ETA-16/0142, injection system Hilti HIT-RE 500 V3; ETA-09/0089, injection system fischer FIS EM and
- Z-21.8-2064, Z-21.8-1874, application approvals for the reinforcement connection using grouting mortar Hilti HIT-RE 500 V3 or fischer FIS EM

The drill hole diameter and the seating depth are dependent on the Isokorb® type. Please note table:

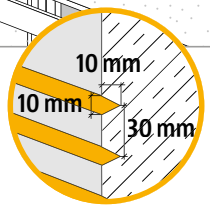
⑧ With drilling and with the use of the injection systems for reinforcement connections the the person carrying these out must possess a valid proof of suitability

⑨ With drilling, the existing reinforcement as well as the electrical lines and sanitary pipelines in the floor are to be noted. The drilling must be carried out using the hammer or diamond drilling method with drilling aid according to the setting instructions of the ETA-16/0142 for Hilti or ETA-09/0089 for fischer.
The drill holes must be placed without damage to the reinforcement. In the case of a reinforcement hit or a mis-drilling, the responsible site manager and, if necessary, the structural engineer, are to be informed without delay and suitable corrective measures are to be agreed.
In the case of abandoned drill-holes these are to be correctly filled with mortar.

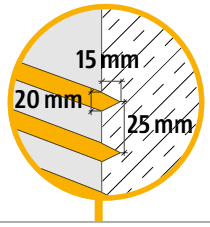
Schöck Isokorb® type RQS
Installation instructions

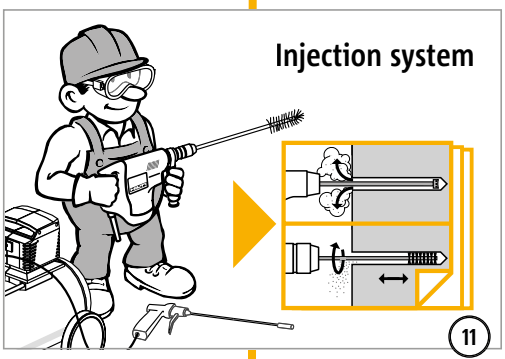


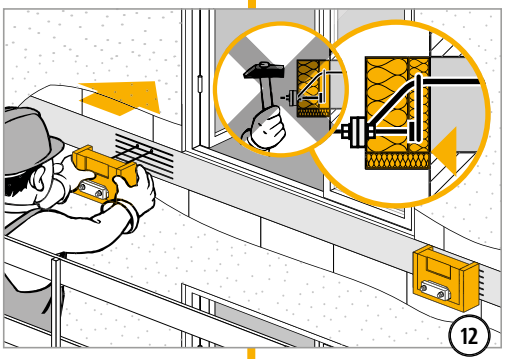
rough:
RQS 8

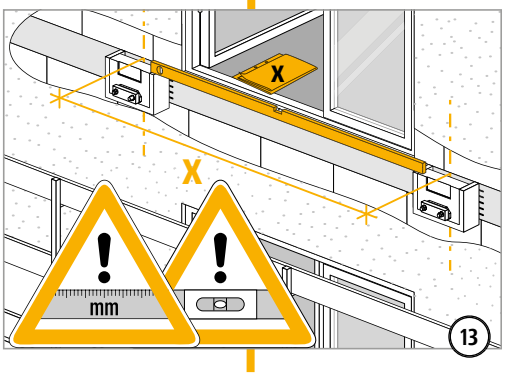


toothed:
RQS 10
RQS 12









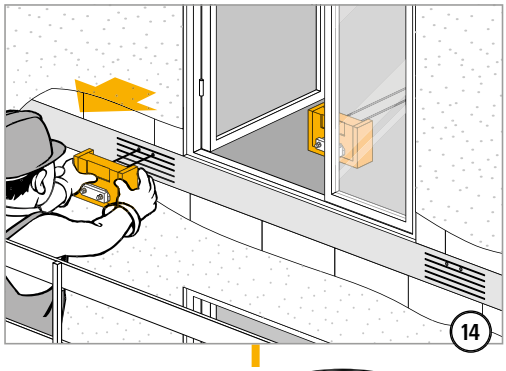
⑩ In the area of the Schöck Isokorb® the front face of the existing floor must be worked according to the adjacent sketch or according to DIN EN 1992-1-1 (EC2) and DIN EN 1992-1-1/NA.
The surface roughened depth for RQS 8 R_t must be ≥ 1.5 mm.
The surface roughened depth for RQS 10 and RQS 12 R_t must be ≥ 3.0 mm.

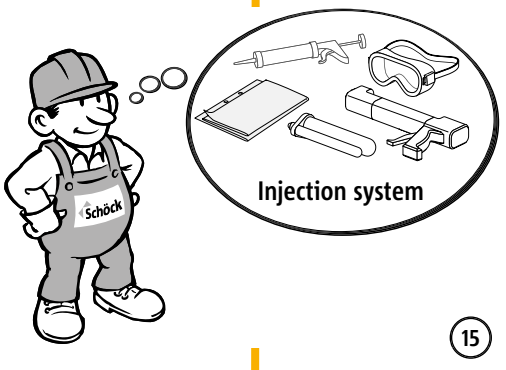
⑪ Each drill hole must be cleaned according to the technical instructions of the ETA-16/0142, Z-21.8-2064 for Hilti and ETA-09/0089, Z-21.8-1874 for fischer.

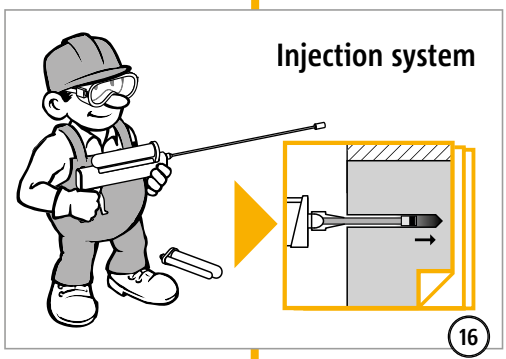
⑫ Following cleaning of the drill holes thr dry installation of the Schöck Isokorb® takes place for control purposes. The Schöck Isokorb® must be capable of being placed without large mechanical effort.

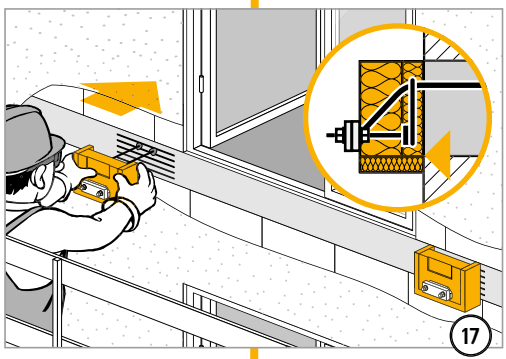
⑬ The flush and and height fitting position as well as the spacing of all Schöck Isokorb® elements among themselves must again be checked in accordance with the specifications given in the construction plan. The maximum allowable measurement tolerances are, without fail, to be observed.

Schöck Isokorb® type RQS
Installation instructions









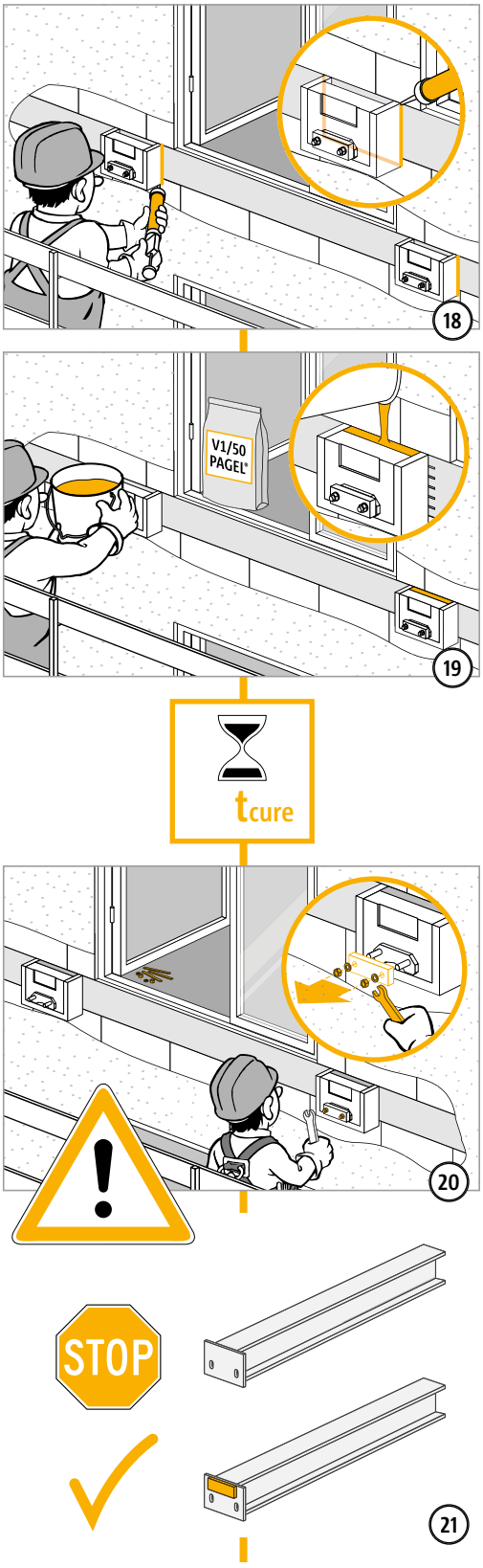
⑭ Following the checking of the position of the Schöck Isokorb® the Schöck Isokorb® is removed.

⑮ The preparation of the film packaging respectively the cartridges of the Hilti HIT-RE 500 V3 or fischer FIS EM injection systems is to take place for Hilti according to the technical instructions of the ETA-16/0142 and Z-21.8-2064. For fischer the ETA-09/0089 and Z-21.8-1874 apply.

⑯ The drill hole must be filled free of air bubbles with grouting mortar Hilti HIT-RE 500 V3 or fischer FIS EM. With this, for HIT-RE 500 V3 the technical instructions of the ETA-09/0143 and of the Z-21.8-2064 are to be noted. For FIS EM the instructions of the ETA-09/0089 and of the Z-21.8-1874.

⑰ The sequence of the installation of the Schöck Isokorb®:
- As required assemble support for the duration of the hardening time of the grouting mortar.
- Fill the drill hole, (in each case for one Schöck Isokorb® element only).
- Immediately thereafter, the Schöck Isokorb® must be placed in the prepared drill hole.
  Attention is to be paid that the lower edge of the grouting recess of the Schöck Isokorb® closes flush with the lower edge of the existing floor.

Schöck Isokorb® type RQS
Installation instructions



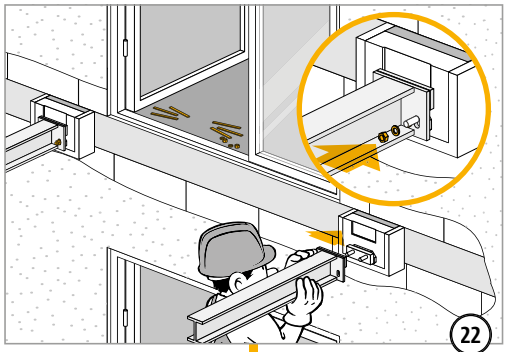
⑱ After completion of the hardening timing "t_{cure}" according to the technical instructions of the ETA-16/0164 and Z-21.8-2064, or of the ETA-09/0089 and the Z-21.8-1874, the Schöck Isokorb® can be further processed.
The connection joint between Schöck Isokorb® and the existing facade is to be formed absolutely watertight so that during grouting of the joint the concrete grout does not run out.

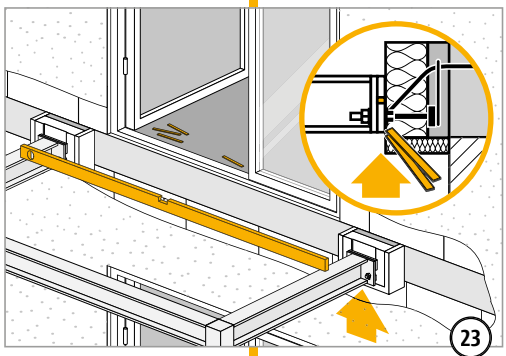
⑲ The grouting joint must be filled with PAGEL V1/50 grouting concrete. Manufacturer's details on the processing are to be observed. Following the hardening of the grouting concrete the connection of the steel structure of the balcony is to take place according to the following instruction.

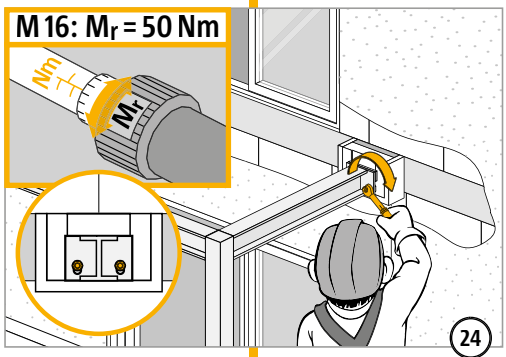
⑳ + ㉑ With connection of the in-situ steel structure to the Schöck Isokorb® the following is to be noted:

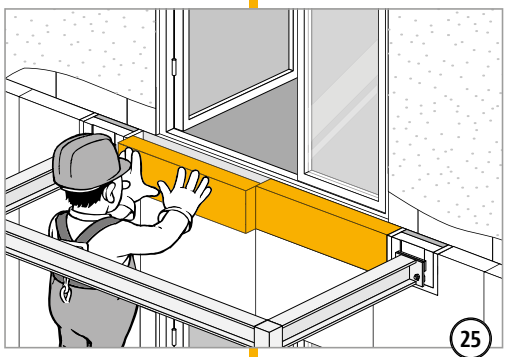
- Dismantling of the transport timber.
- Steel girder with welded-on face plate according to static requirement.
- Position and size of the drill holes in the face plate in accordance with the general building supervisory approval of the Schöck Isokorb®.
- A flat steel dog h = 40 mm, l = 120mm, t = 15 mm, welded on the face plate for the secure transmission tof the shear forces in the Schöck Isokorb® is absolutely necessary!

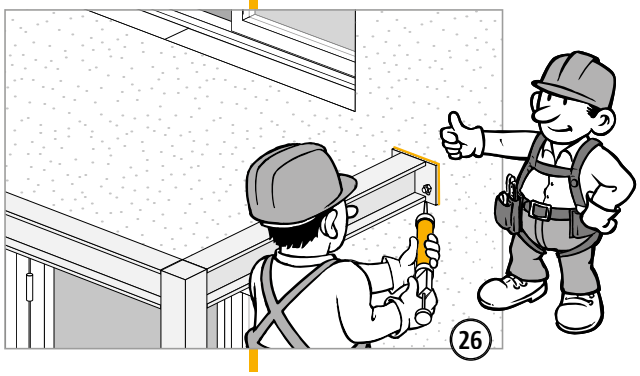
Schöck Isokorb® type RQS
Installation instructions











㉒ Connect steel girder with the face plate to the 2 threaded bolts of the Schöck Isokorb® using nuts and washers.

㉓ Fine adjustment to match the height of the steel girder between bearing plates of the Schöck Isokorb® and the welded-on dog on the face plate of the steel girder using the steel shims provided.

㉔ The huts of the Schöck Isokorb® are to be tightened, without normal pre-torque, using the torque wrench;
The following torques apply:
M16: M_r = 50 Nm

㉕ Connection of the in-situ TICS close-packed to the Schöck Isokorb® elements.
Between the individual Schöck Isokorb® elements the TICS are to be connected equally close-packed to the Schöck Isokorb® elements.

㉖ The joint between Schöck Isokorb® element and the neighbouring TICS is to be professionally formed using permanently elastic sealant.