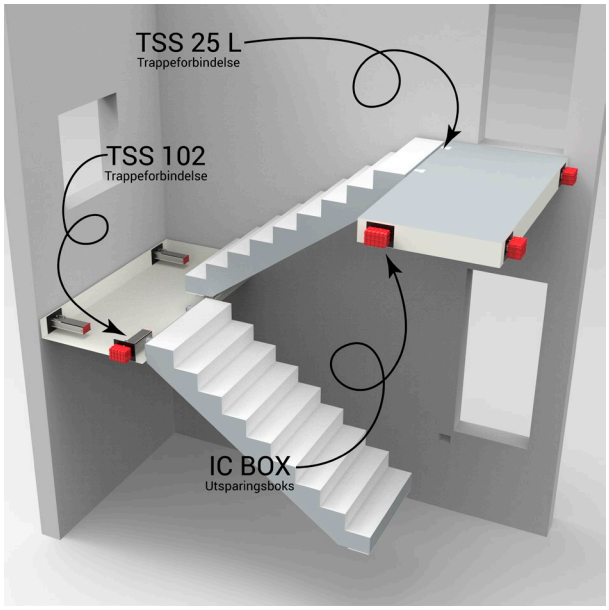
MEMO 31 GUIDANCE RVK AND TSS		Dato: Siste rev.: Dok. nr.:	04.02.2022 18.10.2024 K3-10/9	Sign.: Sign.: Kontr.:	ELS ELS TB

GUIDANCE TO IC STAIR CONNECTORS

The easiest way for fixing stair and landings.



- Thinner slabs (20-25% reduce concert consumption)
- ETA tested and approved solution
- Fast installation
  - no shimming

- Good tolerances
- Fire protection
- Safe to install
- Rapid provision of access stairs

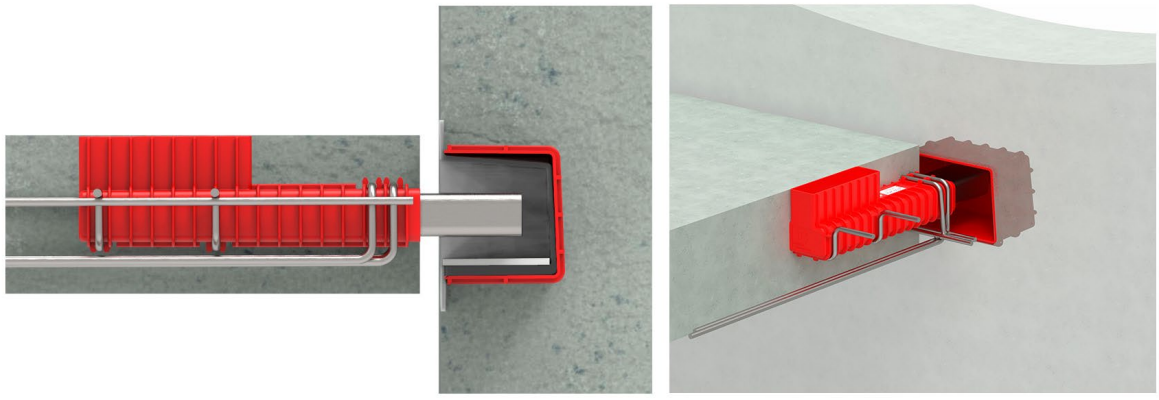
Demands for the stairs.

Surface, terasso.

TSS or RVK

TSS

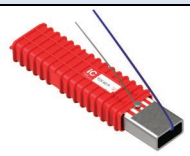
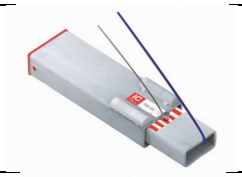
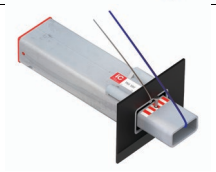
Inner sleeve pulled out with a wire (no visual marks in the surface of the slab).



RVK

Inner sleeve adjusted through a slot in the surface of the staircase (the slot must be grouted).

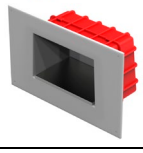
TSS for landing/wall.

Article no	Description	Capasity	
TSS 60 p	Slim design allows thinner slabs all the way down to ≥120 mm (full capacity 170 mm). Outer sleeve made of recycled HDPE.	60 kN	
TSS 101	Connector capacity up to 80 kN in a minimum 200 mm thick landing increasing to 100 kN for 265 mm thick landing.	100 kN	
TSS 102	Incorporates sound reducing rubber composite. Connector capacity up to 80 kN in a minimum 200 mm thick landing increasing to 100 kN for 265 mm thick landing	100 kN	

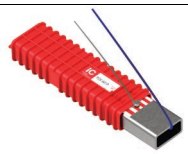
RVK for landing/wall.

Article no	Description	Capasity	
RVK 60 p	Slim design enables thinner landings and stair thicknesses ≥120mm (full capacity 170mm). Capacity up to 57kN. Recycled HDPE outer.	57 kN	
RVK 101	Standard connector capacity up to 80 kN in a minimum 200 mm thick landing, increasing to 100 kN for 265 mm thick landing.	100 kN	

IC Box .

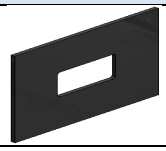
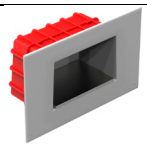
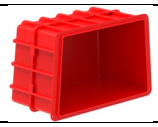
Article no	Description	Capasity	Bilde
IC Box	Recess box, out-block. Made of 100% recycled HDPE		
IC Box SRU	Recess box with sound reduction, Recycled HDPE.		

Connections for stair flight to landing.

Article no	Description	Capasity	
TSS 20 FA	Stairflight to landing connector with adjustment	20 kN	
TSS 25 L	Stair flight to landing connector with adjustment and lifting device.	25 kN	
TSS 60 p	Slim design allows thinner slabs all the way down to ≥120 mm (full capacity 170 mm). Outer sleeve made of recycled HDPE	57 kN	

Additional products

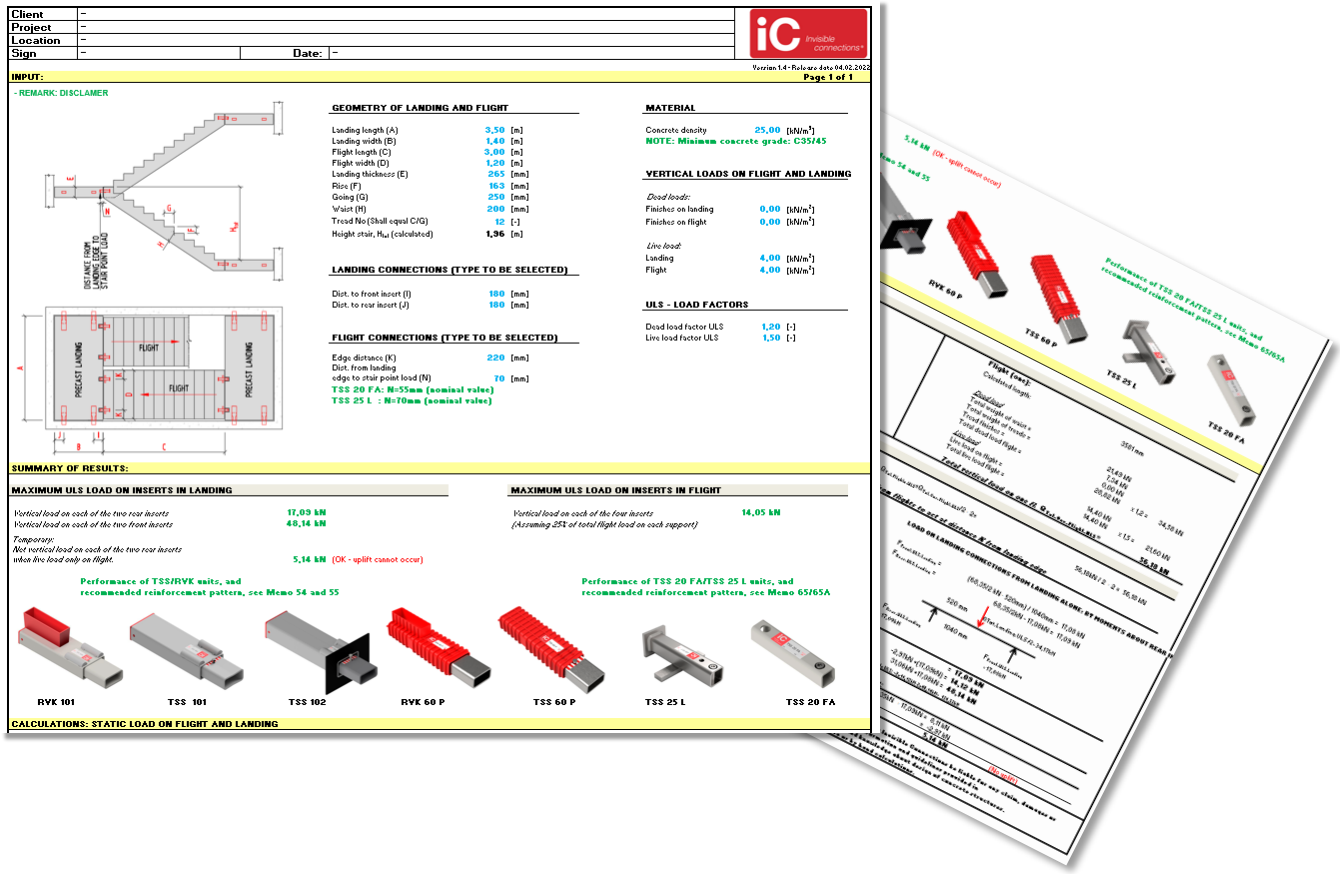
For more information see Resources – Stair-landing Connections – Memo 41, Additional products.

	Article no	Description
	GF 60	Vertical rubber flange 240x190x5
	GF 100	Vertical rubber flange 240x190x5
	GF 102	Vertical rubber flange 240x190x5
	Lokk 101	Cap for sealing storage and transport RVK101/TSS101
	Lokk TSS 102	Cap for sealing storage and transport TSS 102
		
	IC Box 100 SRU	IC Box 100 SRU recycled HDPE with sound insulation 170x115x100
		
	IC Box 100	IC Box 100 SRU recycled HDPE 170x115x100
	USK 100	Out block RVK/TSS
	USK 100 M	Out block with magnet RVK/TSS

Which model and capacity to choose?

For more information see Resources – Stair-landing Connections – Calculations tool, stair connections.
Our calculation tool helps you easily find the right connection.

Tip! TSS/RVK should be located as close to the front edge as possible to avoid uplift/negative forces in the rear end of the element.



Slab thickness and edge distances

For more information see Resources – Stair-landing Connections – Memo 55, Anchoring reinforcement, stair connections.

PRODUCT SERIES		RVK 60 P	TSS 60 P	TSS 101 TSS 101 G	RVK 101 RVK 101 G	TSS 102 TSS 102 G
Load category a) - without *simultaniously acting horizontal design support reaction.* H_{Ed}						
	Recommended maximum ULS load $F_{v,Ed}$ [kN]					
Slab thickness [mm]	120	34	34	-	-	-
	150	46	46	-	-	-
	170	57	57	96	96	-
	200			100	100	96 [1)]
	265			100	100	100
Minimum edge distance:						
x_5 [mm]:		120	120	130	130	130
x_6 [mm]:		160	160	180	180	180
x_7 [mm]:		80	80	100	100	100

Drawings

On our website under resources and under each individual product you will find drawings for each individual unit in the most used formats.

Production

See Memo 20 and 32 for production procedure.
Movies: stair connections for production.

Installation

Movies: stair connections for installation.

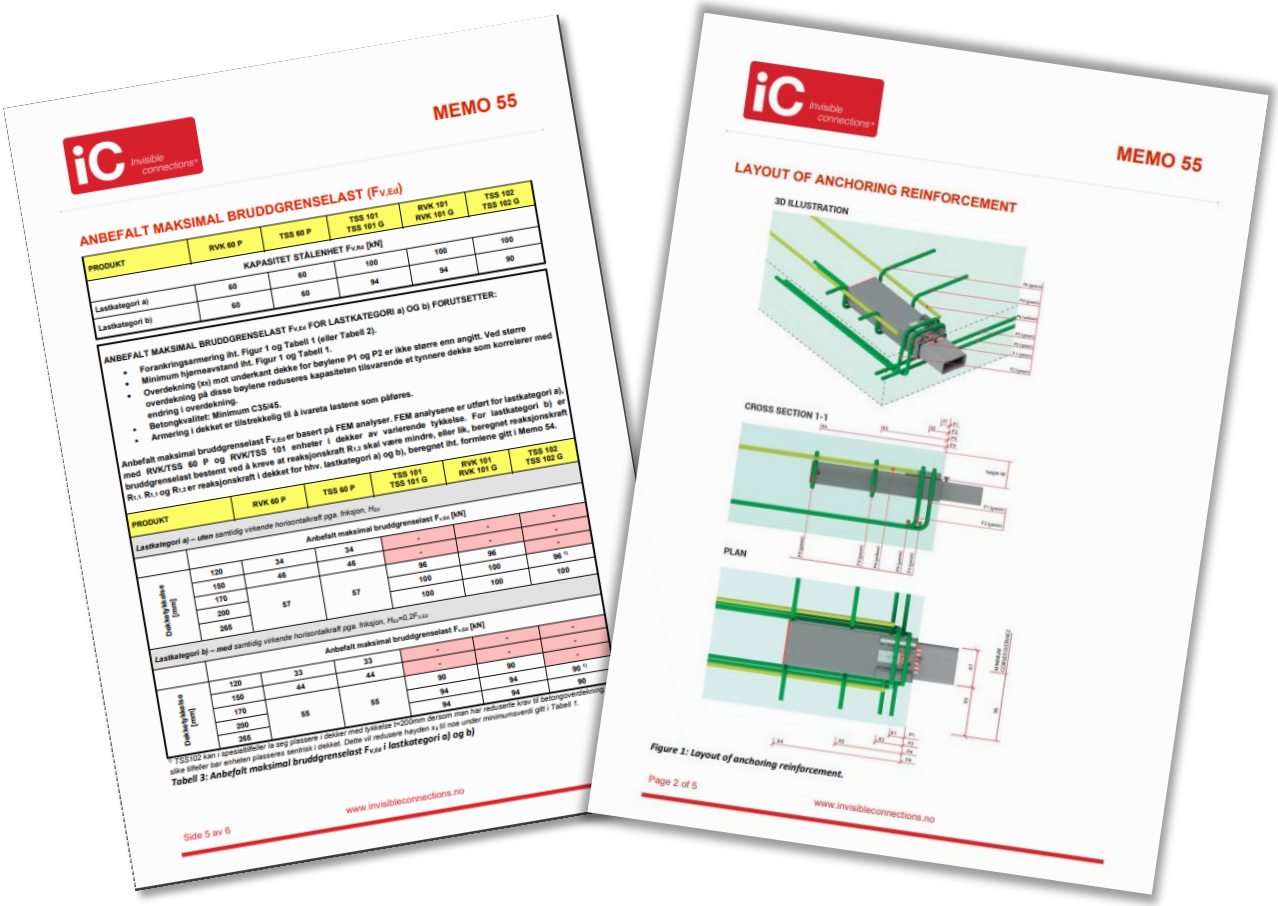
Approvals

ETA
EN 1090

Reinforcement of stair connectors TSS/RVK landing-wall

We have developed standard reinforcement for TSS and RVK landing-wall connections. For more information see Resources – Stair-landing Connections – Memo 55, Anchoring reinforcement, stair connections.

See also movie: Staircase Connections engineer.


MEMO 55

ANBEFALT MAKSIMAL BRUDDGRENSELAST ($F_{V,Ed}$)

PRODUKT	RVK 60 P	TSS 60 P	TSS 101 TSS 101 G	RVK 101 RVK 101 G	TSS 102 TSS 102 G
	KAPASITET STÅLENHET $F_{V,Rd}$ [kN]				
Lastkategori a)	60	60	100	100	100
Lastkategori b)	60	60	94	94	90

ANBEFALT MAKSIMAL BRUDDGRENSELAST $F_{V,Ed}$ FOR LASTKATEGORI a) OG b) FORUTSETTER:

- Forankringsarmering iht. Figur 1 og Tabell 1 (eller Tabell 2).
- Minimum hjørneavstand iht. Figur 1 og Tabell 1.
- Overdekning (xs) mot underkant dekke for bøylene P1 og P2 er ikke større enn angitt. Ved større overdekning på disse bøylene reduseres kapasiteten tilsvarende et tynnere dekke som korrelerer med endring i overdekning.
- Betongkvalitet: Minimum C35/45.
- Armering i dekket er tilstrekkelig til å ivareta lastene som påføres.

Anbefalt maksimal bruddgrenselast $F_{V,Ed}$ er basert på FEM analyser. FEM analysene er utført for lastkategori a), med RVK/TSS 60 P og RVK/TSS 101 enheter i dekker av varierende tykkelse. For lastkategori b) er bruddgrenselast bestemt ved å kreve at reaksjonskraft $R_{z,1}$ skal være mindre, eller lik, beregnet reaksjonskraft $R_{z,1}$, $R_{z,2}$ og $R_{z,3}$ er reaksjonskraft i dekket for hhv. lastkategori a) og b), beregnet iht. formlene gitt i Memo 54.

PRODUKT	RVK 60 P	TSS 60 P	TSS 101 TSS 101 G	RVK 101 RVK 101 G	TSS 102 TSS 102 G
Lastkategori a) – uten samtidig virkende horisontalkraft pga. friksjon, H_{Ed}	Anbefalt maksimal bruddgrenselast $F_{V,Ed}$ [kN]				
Dekketykkelse [mm] 120	34	34	-	-	-
150	46	46	-	96	-
170	57	57	96	100	96 [1]
200			100	100	100
265			100		
Lastkategori b) – med samtidig virkende horisontalkraft pga. friksjon, $H_{Ed}=0.2F_{V,Ed}$	Anbefalt maksimal bruddgrenselast $F_{V,Ed}$ [kN]				
Dekketykkelse [mm] 120	33	33	-	-	-
150	44	44	-	-	-
170	55	55	90	90	86 [1]
200			94	94	90
265			94		

[1] TSS102 kan i spesialtilfeller la seg plassere i dekker med tykkelse h=200mm dersom man har reduserte krav til betongoverdekning. I slike tilfeller bør enheten plasseres sentrisk i dekket. Dette vil redusere høyden x til noe under minimumskravet gitt i Tabell 1.

Tabell 3: Anbefalt maksimal bruddgrenselast $F_{V,Ed}$ i lastkategori a) og b)

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Side 5 av 6

MEMO 55

LAYOUT OF ANCHORING REINFORCEMENT

3D ILLUSTRATION

CROSS SECTION 1-1

PLAN

Figure 1: Layout of anchoring reinforcement.

Page 2 of 5

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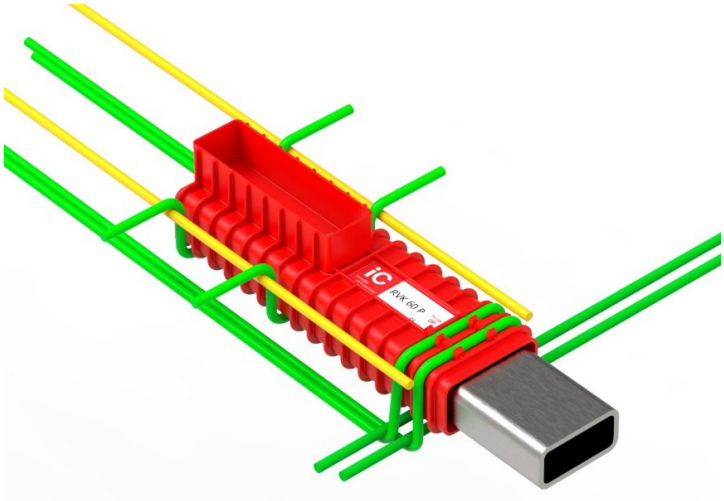
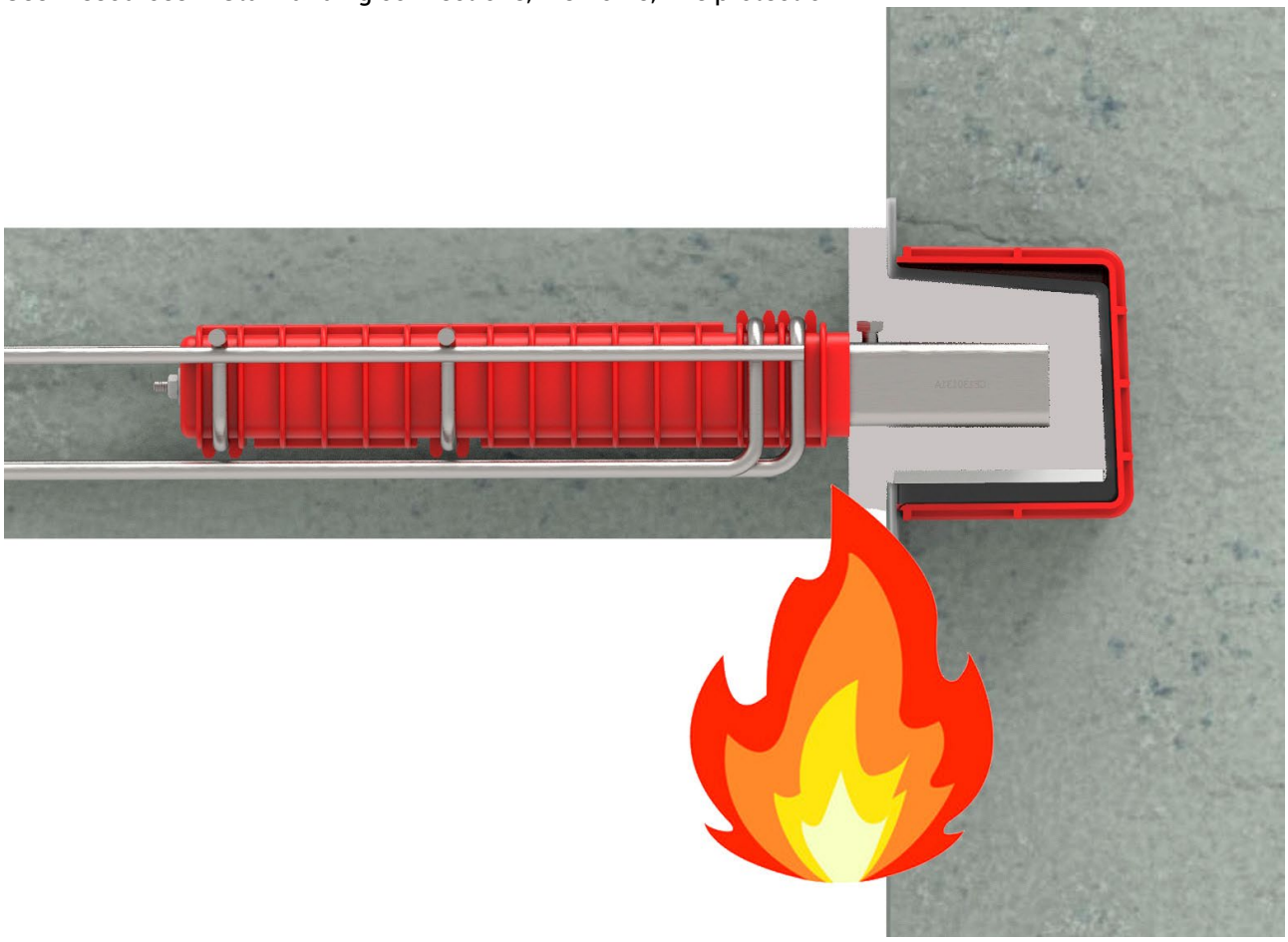


Fire protection

See: Resources – Stair-landing connections, Memo 45, Fire protection



Fire protection is taken care of in a good way when using IC star connectors.
After installation the TSS/RVK will be completely covered with concrete.

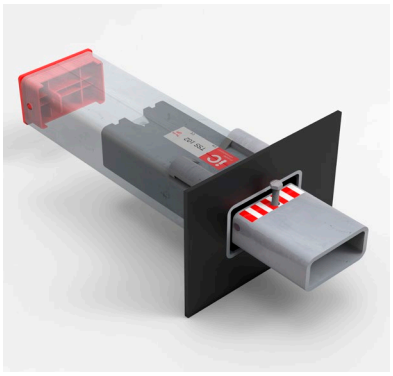
Fire rating in accordance with Eurocode

Required fire resistance	R30	R60
Minimum cover «C» mm	25	40

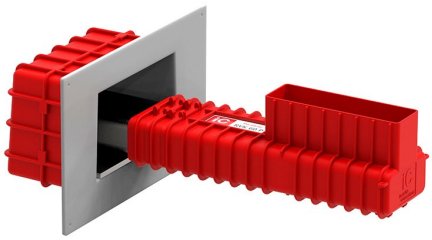
Impact sound insulation

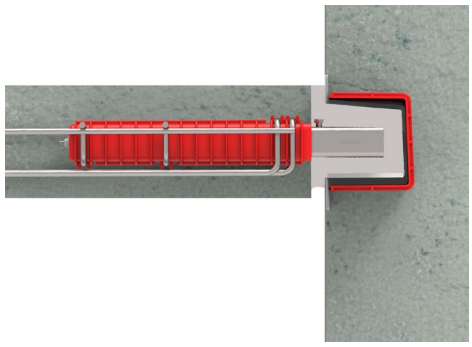
IC deliver several solutions for impact sound insulation, See: Design tool – Stair/landing connections, Memo 47, Impact sound transmission.

TSS102 with vertical rubber flange, reduce sound impact by 20-25 dB

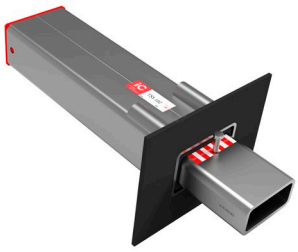


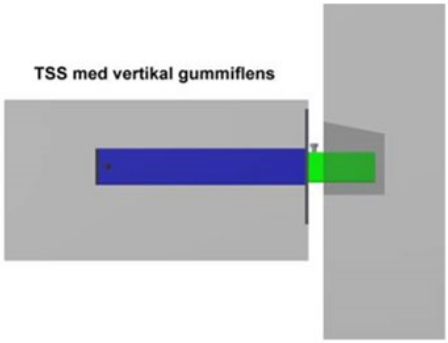
TSS/RVK with IC-Box SRU
Reduce impact sound by 20-28 dB





TSS/RVK with vertical rubber flange,
Reduce sound impact by 10-12 dB



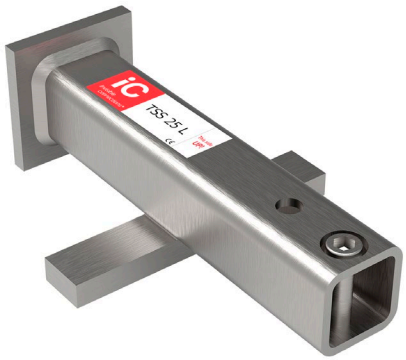


TSS 25 L

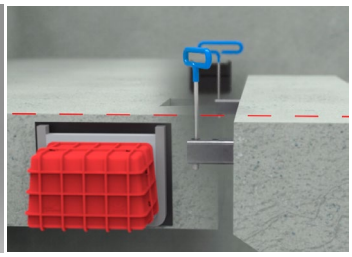
For more information about TSS 25 L:

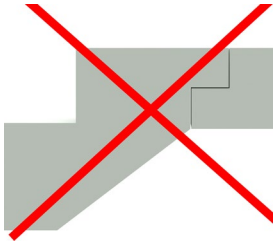
Se: Resources – Stair-lanings connections: Memo 65A, Anhoring reinforcement, stair connections - TSS 25 L.

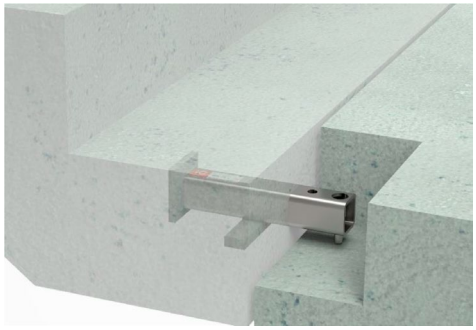
Brochure: Product – Stair-landings connections – TSS 25 L – Brochures.



- TSS 25 L can be used as a lifting point. Quick and easy installation on the construction site.
- No lifting anchor or flicking of stairs afterwards.
- Fast and easy leveling, flight to landing.
- Lifting device for lifting and handling the element in production, saves several lifting anchors.
- Avoids corbel solution.
- Efficient assembly on construction site, avoids shimming. Estimated time saving is 10-15% on construction site.
- Fully reinforced.







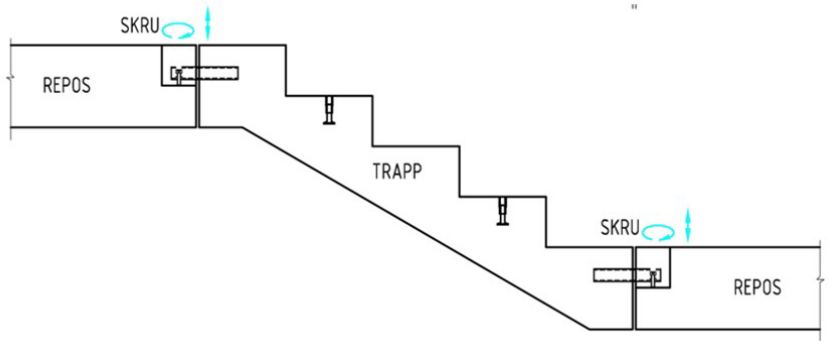
TSS 25 L is fully reinforced with flat steel and back plate.
For vertical load: **25 kN,**
Lifting capacity: **8 kN**

TSS 20 FA

- Stepless height adjustment
- Saves stair shelves
- Efficient installation on construction site, avoids shimming

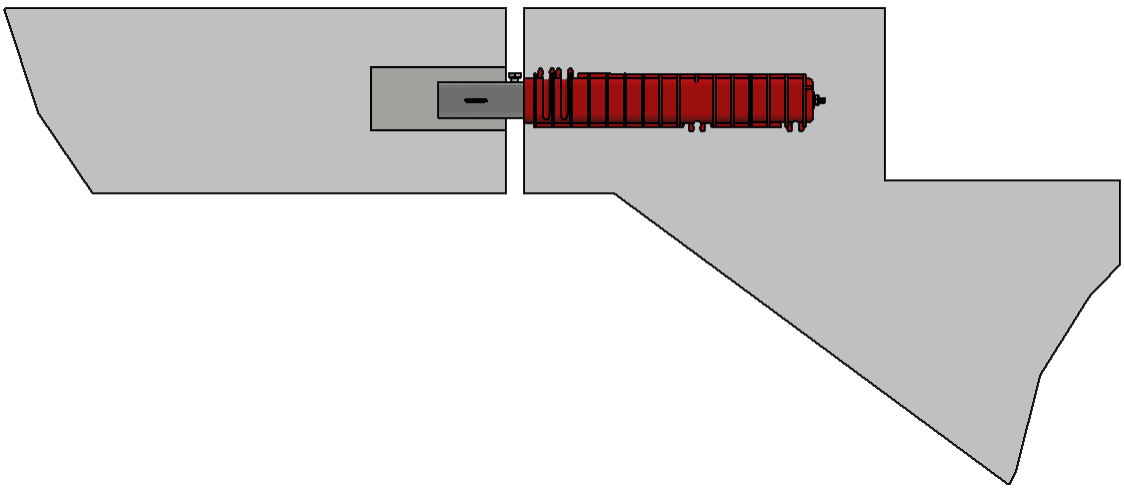
For more information about TSS 20 FA:

Se: Resources – Stair-lanings connections: Memo 65, Anhoring reinforcement, stair connections - TSS 20 FA



TSS 60 P

Can be used as connection between stair flight and landing.



REVISJON	
Date:	**Description:**
04.02.2022	Preliminary
18.02.2022	Updated
31.03.2023	Updated pictures of IC box 100 SRU
06.10.2023	Updated fireprotection
18.10.2024	Updated setup and where to find memos

Terje Berg
Terje Berg (21. okt.. 2024 08:48 GMT+2)