Schöck Isolink®

Design tables

Schöck Isolink® for insulated precast concrete walls

June 2018

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Notes

- The design tables serve the design of core insulated concrete walls using Schöck Isolink®.
- Sources of the design table are the Schöck Isolink® Approval Z-21.8-1894 and the Schöck Combar® Approval Z-1.6-238.
- For submission to the inspecting structural engineer use the design software or contact the engineers of the Schöck Application Engineering Dept.

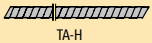
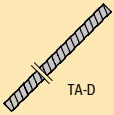
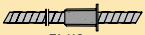
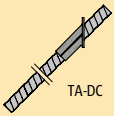
Software

- The design software Schöck Isolink® for insulated precast concrete walls serves the rapid design of the Schöck Isolink® in core insulated reinforced concrete walls. This design can be used as verifiable structural analysis.
- The design software can be obtained under www.schoeck.de/download.

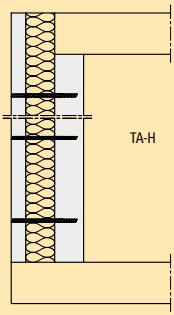
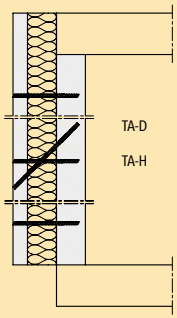
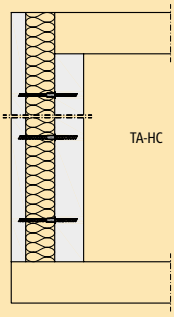
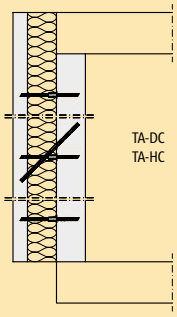
Contents

Overview

Type overview

Schöck Isolink® type		Schöck Isolink® type	
	**Cover layer** Supported Freely-suspended		**Cover layer** Freely-suspended
	**Cover layer** Supported Freely-suspended		**Cover layer** Freely-suspended

Application overview

Supported cover layer		Freely-suspended cover layer	
	**Wall type** Sandwich wall Element wall **Schöck Isolink®** Type TA-H		**Wall type** Sandwich wall Element wall **Schöck Isolink®** Type TA-H Type TA-D
	In facing concrete with special requirements **Wall type** Sandwich wall Element wall **Schöck Isolink®** Type TA-HC		In facing concrete with special requirements **Wall type** Sandwich wall Element wall **Schöck Isolink®** Type TA-HC Type TA-DC

Basic principles

Core insulated concrete walls

Core insulated concrete walls are produced as sandwich or element walls.

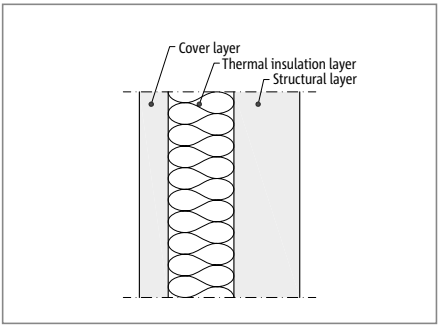


Fig. 1: Section through a sandwich wall

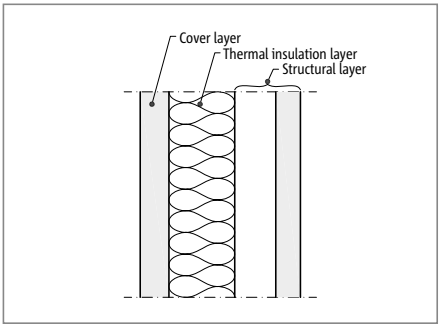


Fig. 2: Section through an element wall; structural layer with in-situ concrete infill

Element configuration

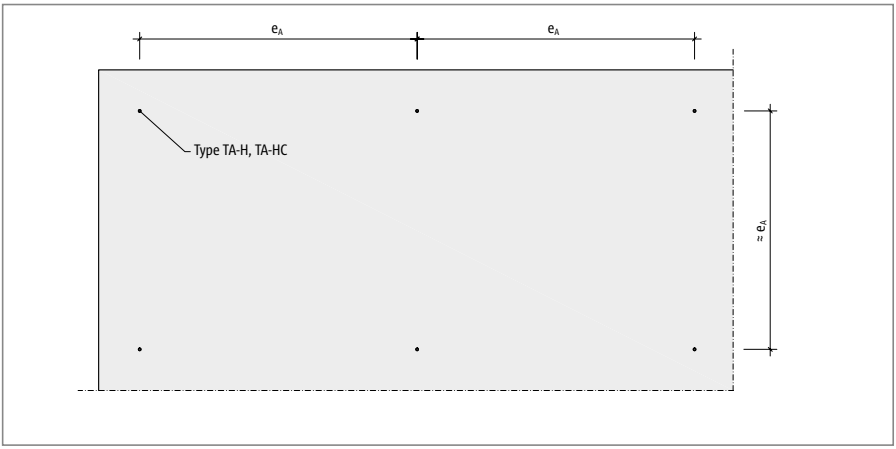


Fig. 3: Schöck Isolink®: Detail of the cover layer; type TA-H, TA-HC is configured in a square grid

i Element configuration Schöck Isolink® type TA-H, TA-HC

- The Schöck Isolink® types TA-H, TA-HC are to be configured preferably in a square grid.

Basic principles

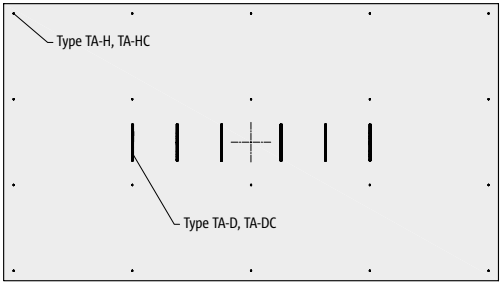


Fig. 4: Schöck Isolink®: Freely-suspended cover layer; type TA-D, TA-DC is configured on the horizontal centre line of the cover layer

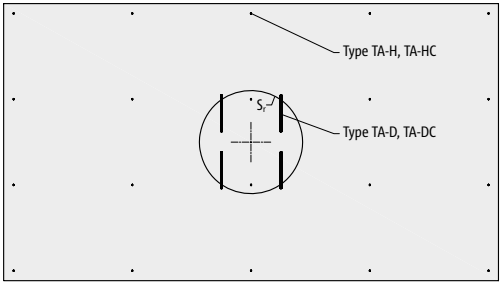


Fig. 5: Schöck Isolink®: Freely-suspended cover layer; type TA-D, TA-DC is configured within a circle around the deformation fix point of the cover layer

Schöck Isolink® type	TA-D, TA-DC		
Thickness of the thermal insulation layer h_D [mm]	< 80	80 - 100	> 100
Radius S_r [mm]	300	550	900

Element alignment Schöck Isolink® type TA-D, TA-DC

- Isolink® type TA-D, TA-DC with two options of element configuration:
  Configure type TA-D, TA-DC side by side on the horizontal centre line of the cover layer or type TA-D, TA-DC within a circle with radius S_r about the deformation fixed point

Basic principles

Structural component geometry sandwich wall

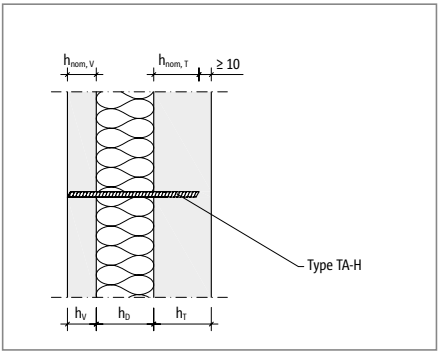


Fig. 6: Schöck Isolink® type TA-H: Cross-section details for the sandwich wall; $h_{nom,V} = h_V$

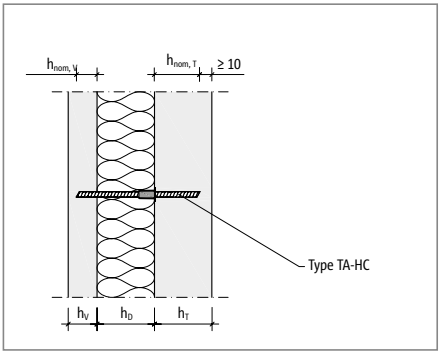


Fig. 7: Schöck Isolink® type TA-HC: Cross-section details for the sandwich wall; $h_{nom,V} < h_V$

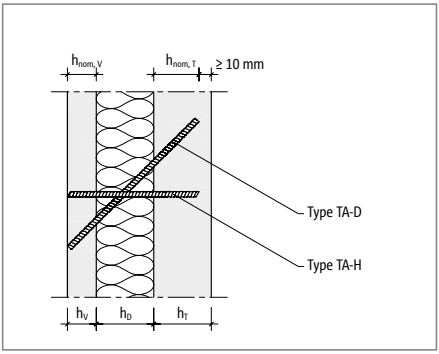


Fig. 8: Schöck Isolink® type TA-H, TA-D: Cross-section details for the sandwich wall; $h_{nom,V} = h_V$

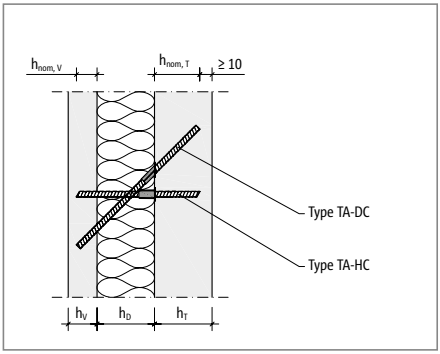


Fig. 9: Schöck Isolink® type TA-HC, TA-DC: Cross-section details for the sandwich wall; $h_{nom,V} < h_V$

Schöck Isolink® type	TA-H, TA-HC
Bond length of the Isolink® in the concrete h_{nom} [mm]	≥ 40
Thickness of the facing shell h_V [mm]	50 - 200
Thickness of the thermal insulation layer h_D [mm]	60 - 350
Thickness of the structural layer h_T [mm]	≥ 50

Basic principles

Structural component geometry element wall

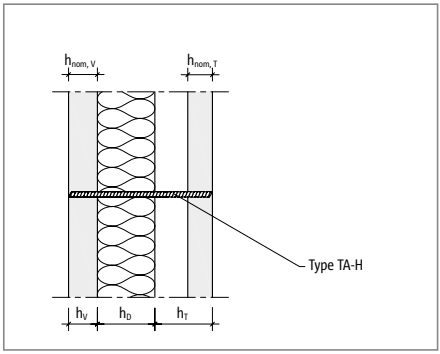


Fig. 10: Schöck Isolink® type TA-H: Cross-section details for the element wall $h_{nom,V} = h_V$

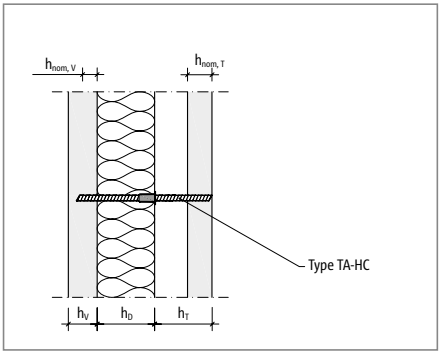


Fig. 11: Schöck Isolink® type TA-HC: Cross-section details for the element wall $h_{nom,V} < h_V$

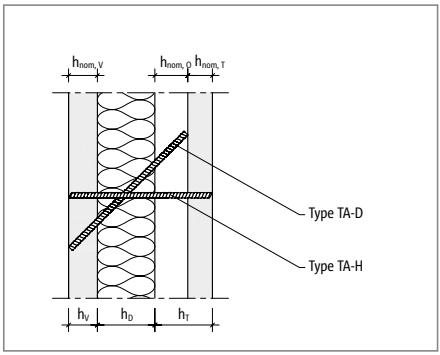


Fig. 12: Schöck Isolink® type TA-H, TA-D: Cross-section details for the element wall $h_{nom,V} = h_V$

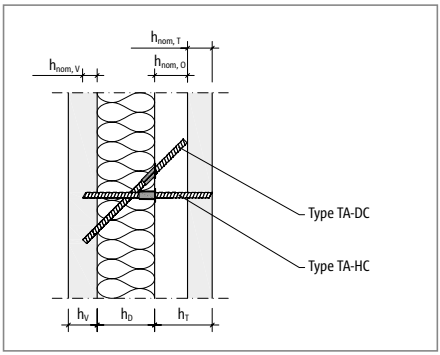


Fig. 13: Schöck Isolink® type TA-HC, TA-DC: Cross-section details for the element wall; $h_{nom,V} < h_V$

Schöck Isolink® type		TA-H	TA-HC
Bond length of the Isolink® in the concrete h_{nom} [mm]		min {h_V; 100}	60 - 100
Thickness of the cover layer h_V [mm]		60 - 200	
Thickness of the thermal insulation layer h_D [mm]		60 - 350	
Thickness of the structural layer	Overall h_T [mm]	≥ 140	
	Thickness of the in-situ concrete layer [mm]	≥ 80	
	Thickness of the precast element [mm]	≥ 60	

Structural component geometry

- With the design of the Schöck Isolink® the allowable length in the concrete is limited to $h_{nom} \leq 100$ mm.
- Solutions for the design of the Schöck Isolink® with cover layers with the thickness $h_V > 200$ mm can be requested from the Application Engineering Dept.

Basic principles

Centre to centre distance

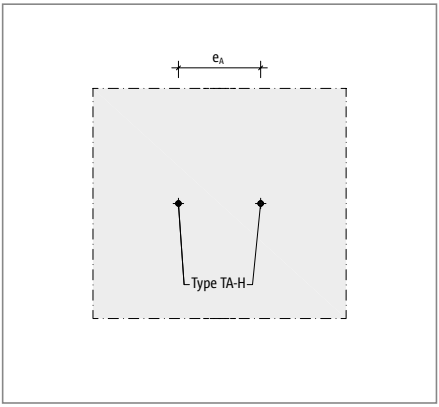


Fig. 14: Schöck Isolink® type TA-H: Centre to centre distance

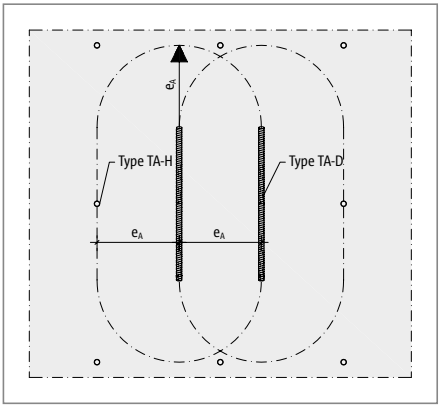


Fig. 15: Schöck Isolink® type TA-H, TA-D: Centre to centre distance

Schöck Isolink® type	TA-H, TA-HC, TA-D, TA-DC
Minimum centre to centre distance	e_A [mm]
	200

Edge distance

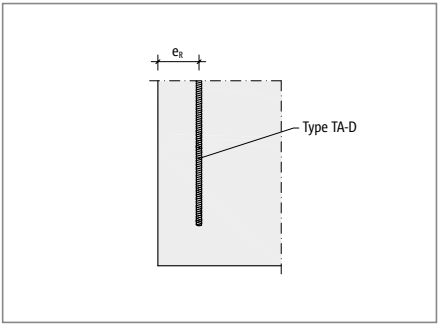


Fig. 16: Schöck Isolink® type TA-D: Edge distance e_R in the wall elevation

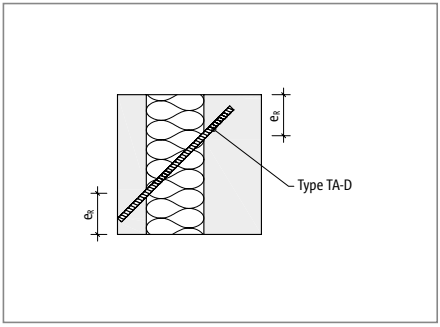


Fig. 17: Schöck Isolink® type TA-D: Edge distances e_R in the wall cross-section

Schöck Isolink® type	TA-H, TA-HC, TA-D, TA-DC
Minimum edge distance	e_R [mm]
	100

Edge distance

- The minimum edge distances also apply to openings such as doors or windows.
- Element wall: The employment of prefabricated stirrup cages as starter bars requires a careful planning of the edge distance of the Schöck Isolink®.

Basic principles

Load case 1: Wind pressure, wind suction

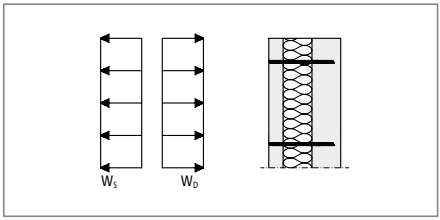


Fig. 18: Schöck Isolink® type TA-H, TA-HC: Load case wind; wind suction, wind pressure

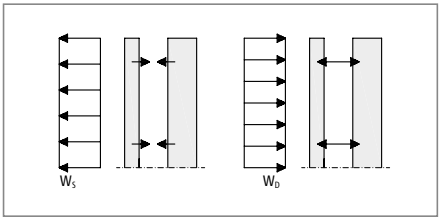


Fig. 19: Schöck Isolink® type TA-H, TA-HC: Wind suction creates a tension force, wind pressure a compressive force in the Isolink®

Load case 2: Temperature gradient over the thickness of the facing shell

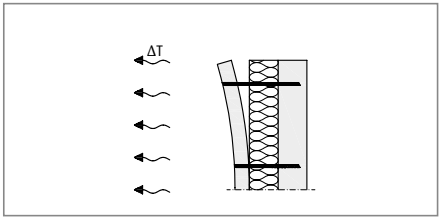


Fig. 20: Schöck Isolink® type TA-H, TA-HC: Load case temperature gradient over the thickness of the cover layer

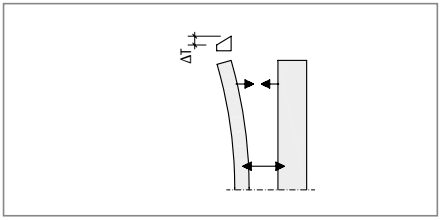


Fig. 21: Schöck Isolink® type TA-H, TA-HC: Tension or compressive force, depending on the position of the Isolink®

Load case 3: Fresh concrete creates pressure, in the construction state only

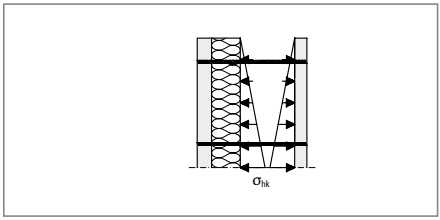


Fig. 22: Schöck Isolink® type TA-H, TA-HC: Load case fresh concrete pressure; element wall in the construction state

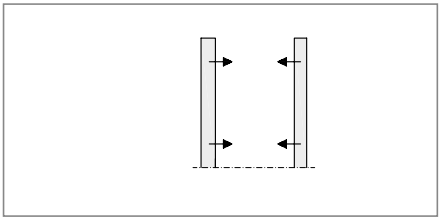


Fig. 23: Schöck Isolink® type TA-H, TA-HC: Tension force in the Isolink®

Load case 4: Self-weight of the cover layer

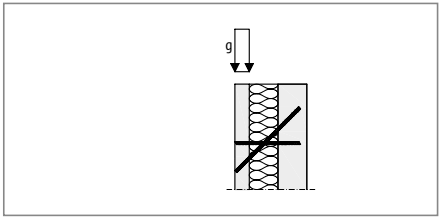


Fig. 24: Schöck Isolink® type TA-H, TA-HC, TA-D, TA-DC: Load case self-weight of the cover layer

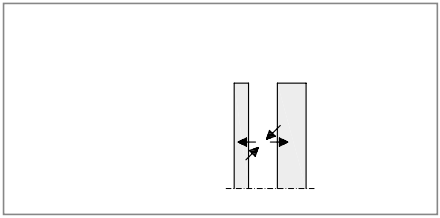


Fig. 25: Schöck Isolink® type TA-H, TA-HC, TA-D, TA-DC: Tension force in type TA-D and compressive force in type TA-H

Basic principles

Load case 5: Temperature difference between cover layer and structural layer (fatigue)

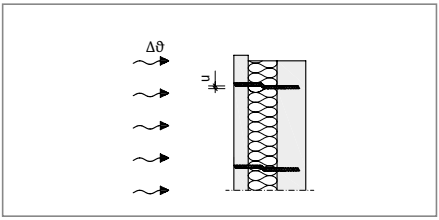


Fig. 26: Schöck Isolink® type TA-H, TA-HC, TA-D, TA-DC: Load case temperature difference between cover layer and structural layer

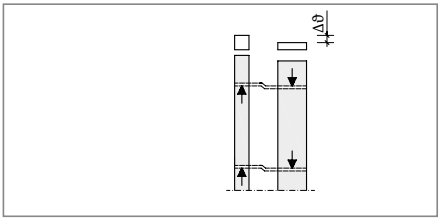


Fig. 27: Schöck Isolink® type TA-H, TA-HC, TA-D, TA-DC: Lateral displacement of the Isolink® through shear force load

Fatigue

Load case 5 "Temperature difference between cover layer and structural layer" is the basis for the verification of the fatigue safety of the Isolink®. This verification is effected through the maximum distance S (see figures page 11).

Schöck Isolink® type	TA-H, TA-HC, TA-D, TA-DC
Insulation thickness h_D [mm]	max. S [mm]
60	5500
80	7375
100 - 350	9250

Expansion joints

- The edges of the freely-suspended cover layer are to be constructed as expansion joints.

Basic principles

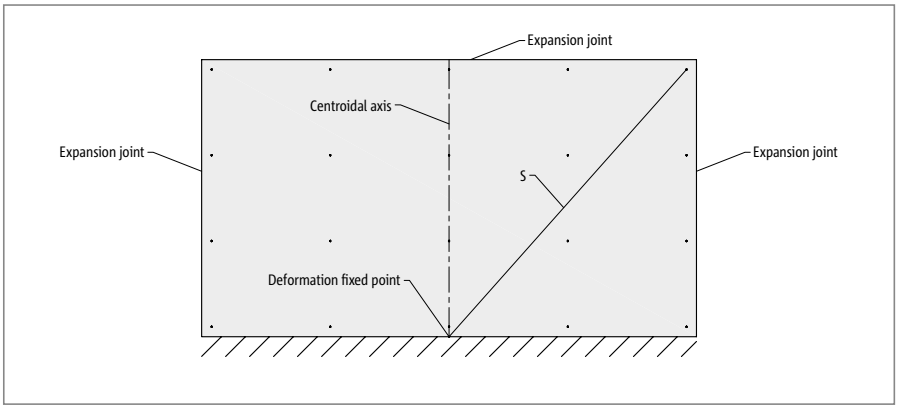


Fig. 28: Schöck Isolink®: Distance S between the deformation fix point and the outermost Isolink® type TA-H, TA-HC

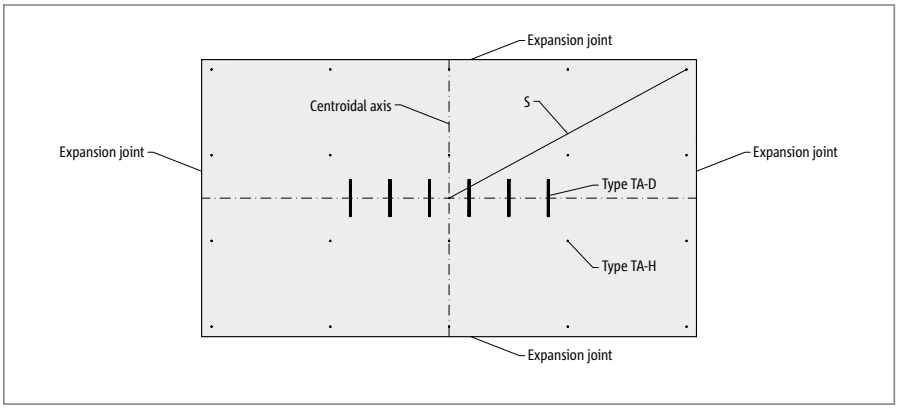


Fig. 29: Schöck Isolink®: Distance S between the deformation fix point and the outermost Isolink® type TA-H, TA-HC

Basic principles

Required verifications

Schöck Isolink® type	TA-H, TA-HC		TA-H, TA-HC, TA-D, TA-DC	
Load	Cover layer supported		Cover layer freely-suspended	
	Element wall	Sandwich wall	Element wall	Sandwich wall
	Ultimate limit state			
Load case 1: Wind pressure, wind suction	x	x	x	x
Load case 2: Temperature gradient over the thickness of the cover layer	x	x	x	x
Load case 3: Fresh concrete pressure, in the construction state only	x		x	
Load case 4: Self-weight of the cover layer			x	x
	Serviceability limit state			
Load case 5 Temperature difference between cover layer and structural layer	x	x	x	x

i Required verifications

- For the design of the Schöck Isolink® type TA-H, TA-HC the maximum value from the design tables load case combination 1+2 and load case 3 is relevant.
- For the design of the Schöck Isolink® type TA-D, TA-DC design table load case 3 is relevant.

Design

Load case 1 + 2: Wind pressure, wind suction and temperature gradient cover layer

Schöck Isokorb® type				TA-H, TA-HC				
Combination of Load case 1: Wind + Load case 2: ΔT = 5 [K]				Concrete strength class ≥ C20/25				
				Bond length of the Isolink® in the concrete h_{nom} [mm]				
				40	50	60	80	100
				Quantity [piece/m²]				
Characteristic wind load w_k [kN/m²]	≤ 1.0	Thickness of the cover layer h_v [mm]	60	1.8	0.9	0.6	-	-
			70	4.1	1.6	0.9	-	-
			80	7.9	3.3	1.5	0.6	-
			90	10.5	5.6	2.9	0.9	-
			100	11.9	7.2	4.4	1.6	0.7
			200	10.1	7.6	6.1	4.2	3.0
	≤ 2.0		60	3.3	1.9	1.3	-	-
			70	6.1	2.9	1.7	-	-
			80	9.4	4.7	2.6	1.2	-
			90	11.7	6.7	4.0	1.7	-
			100	12.8	8.1	5.3	2.4	1.3
			200	10.7	8.1	6.5	4.5	3.3
	≤ 3.0		60	4.7	2.7	1.9	-	-
			70	7.7	4.0	2.5	-	-
			80	10.7	5.9	3.6	1.8	-
			90	12.7	7.7	4.9	2.3	-
			100	13.7	9.0	6.1	3.0	1.8
			200	11.3	8.6	6.9	4.8	3.6

Load case 3: Fresh concrete creates pressure, in the construction state only

Schöck Isokorb® type	TA-H, TA-HC				
Load case 3: Fresh concrete pressure	Concrete strength class ≥ C30/37				
	Bond length of the Isolink® in the concrete h_{nom} [mm]				
	60	70	80	90	100
Maximum fresh concrete pressure $\sigma_{hk,max}$ [kN/m²]	Quantity [piece/m²]				
25	4.0	3.1	2.5	2.1	1.8
35	5.7	4.3	3.5	3.0	2.6

Design Schöck Isolink® type TA-H, TA-HC

- Load case 1: Characteristic wind load w_k according to details of the structural engineer
- Load case 2: ΔT = 5 K according to approval No. Z-21.8-1894
- Load case 3: For the design of the Schöck Isolink® type TA-H, TA-HC the maximum fresh concrete pressure according to DIN 18218 is to be calculated.
- Load case 3: Consistancy classes acording to DIN EN 206 and DIN 1045-2 are to be specified by the structural engineer.
- Load case 3: The concrete strength class refers to the precast parts. Taking into account the higher concrete strength class leads to an efficient design of the Schöck Isolink® type TA-H, TA-HC.

- Load case 3 "Fresh concrete pressure" takes into account the construction state. It occurs with the element wall only.

Load case 4: Self-weight of the cover layer

Schöck Isokorb® type	TA-D, TA-DC				
Load case 4: Self-weight of the cover layer	Concrete strength class ≥ C20/25				
	Bond length of the Isolink® in the concrete h_{nom} [mm]				
	40	50	60	80	100
Thickness of the cover layer h_V [mm]	Quantity [piece/m²]				
60	0.80	0.63	0.52	-	-
70	0.94	0.74	0.61	-	-
80	1.07	0.84	0.69	0.51	-
90	1.21	0.95	0.78	0.58	-
100	1.34	1.05	0.87	0.64	0.51
200	2.68	2.10	1.73	1.28	1.01

Schöck Isolink® type	TA-D, TA-DC				
Load case 4: Self-weight of the cover layer	Concrete strength class ≥ C30/37				
	Bond length of the Isolink® in the concrete h_{nom} [mm]				
	40	50	60	80	100
Thickness of the cover layer h_V [mm]	Quantity [piece/m²]				
60	0.63	0.50	0.41	-	-
70	0.74	0.58	0.48	-	-
80	0.84	0.66	0.54	0.40	-
90	0.95	0.74	0.61	0.45	-
100	1.05	0.83	0.68	0.50	0.40
200	2.11	1.65	1.36	1.01	0.80

Design Schöck Isolink® type TA-D, TA-DC

- The Schöck Isolink® type TA-D, TA-DC is employed according to approval No. Z-21.8-1894 in conjunction with the Isolink® type TA-H, TA-HC for the load transfer with freely-suspended cover layers.
- Isolink® type TA-D, TA-DC with two options of element configuration:
  Configure type TA-D, TA-DC side by side on the horizontal centre line of the cover layer or type TA-D, TA-DC within a circle with radius S_r about the deformation fixed point
- For the anchoring of the Schöck Isolink® type TA-D, TA-DC with the element wall the quality of the concrete is relevant. Therefore, here in addition, concrete strength class C20/25 is designated.

Design

Variant bending load Schöck Isolink® type TA-H, TA-HC:
Load case combination with freely-suspended cover layer

Sandwich wall, concrete strength class ≥ C20/25:

Schöck Isokorb® type				TA-H, TA-HC															
Combination of Load case 1: Wind + Load case 2: ΔT = 5 [K] + Load case 4: Self-weight				Concrete strength class ≥ C20/25															
				Bond length of the Isolink® in the concrete h_{nom} [mm]															
				40					50					60					
				Thickness of the insulation layer h_D [mm]															
				60	80	100	120	140	60	80	100	120	140	60	80	100	120	140	
				Quantity [piece/m²]															
Characteristic wind load w_k [kN/m²]	≤ 1.0	Thickness of the cover layer h_V [mm]	60	1.8	1.7	1.8	2.0	3.0	1.2	1.5	1.8	2.1	3.0	1.2	1.5	1.8	2.1	3.0	
			70	4.1	3.7	3.5	3.2	3.5	1.6	1.7	2.1	2.4	3.5	1.4	1.8	2.1	2.5	3.5	
			80	7.9	6.7	5.9	5.3	4.8	3.3	3.0	2.7	2.8	4.0	1.6	2.0	2.4	2.8	4.0	
			90	10.5	8.7	7.5	6.6	5.9	5.6	4.8	4.2	3.8	4.5	2.9	2.6	2.7	3.2	4.5	
			100	11.9	9.8	8.3	7.3	6.5	7.2	6.0	5.2	4.6	5.0	4.4	3.7	3.3	3.5	5.0	
	≤ 2.0		60	3.3	3.2	3.2	3.1	3.0	1.9	1.8	1.8	2.1	3.0	1.3	1.5	1.8	2.1	3.0	
			70	6.1	5.5	5.1	4.8	4.6	2.9	2.8	2.7	2.6	3.5	1.7	1.8	2.1	2.5	3.5	
			80	9.4	8.1	7.2	6.6	6.0	4.7	4.3	4.0	3.7	4.0	2.6	2.5	2.4	2.8	4.0	
			90	11.7	9.8	8.6	7.7	7.0	6.8	5.8	5.2	4.7	4.5	4.0	3.6	3.3	3.2	4.5	
			100	12.8	10.7	9.3	8.2	7.4	8.1	6.9	6.1	5.4	5.0	5.3	4.6	4.1	3.7	5.0	
	≤ 3.0		60	4.7	4.6	4.4	4.3	4.2	2.7	2.7	2.7	2.6	3.0	1.9	1.9	1.9	2.1	3.0	
			70	7.6	7.0	6.5	6.1	5.8	4.0	3.8	3.7	3.6	3.5	2.5	2.5	2.4	2.5	3.5	
			80	10.7	9.4	8.4	7.7	7.1	5.9	5.4	5.0	4.7	4.4	3.6	3.4	3.2	3.1	4.0	
			90	12.7	10.8	9.6	8.6	7.9	7.7	6.8	6.1	5.6	5.2	4.9	4.4	4.1	3.8	4.5	
			100	13.7	11.6	10.1	9.1	8.2	9.0	7.7	6.8	6.2	5.7	6.1	5.3	4.8	4.4	5.0	

Sandwich wall with freely-suspended cover layer through bending load of the Schöck Isolink® type TA-H, TA-HC

- For the design of the Schöck Isolink® type TA-H, TA-HC without additional Isolink® type TA-D, TA-DC, the design table load case combination 1 + 2 + 4 is relevant.
- Load case 4: The static deformation through self-weight is limited to w = 3 mm.

Design

Variant bending load Schöck Isolink® type TA-H, TA-HC:
Load case combination with freely-suspended cover layer

Element wall, concrete strength class ≥ C20/25:

Schöck Isokorb® type				TA-H, TA-HC															
Combination of Load case 1: Wind + Load case 2: ΔT = 5 [K] + Load case 4: Self-weight or Load case 3: Fresh concrete pressure				Concrete strength class ≥ C20/25															
				Bond length of the Isolink® in the concrete h_{nom} [mm]															
				60					80					100					
				Thickness of the insulation layer h_D [mm]															
				60	80	100	120	140	60	80	100	120	140	60	80	100	120	140	
				Quantity [piece/m²]															
Characteristic wind load w_k [kN/m²]	≤ 1.0	Thickness of the cover layer h_V [mm]	60	5.1	5.1	5.1	5.1	5.1	-	-	-	-	-	-	-	-	-	-
			70	5.1	5.1	5.1	5.1	5.1	-	-	-	-	-	-	-	-	-	-
			80	5.1	5.1	5.1	5.1	5.1	3.0	3.0	3.0	3.0	4.0	-	-	-	-	-
			90	5.1	5.1	5.1	5.1	5.1	3.0	3.0	3.0	3.3	4.5	-	-	-	-	-
			100	5.1	5.1	5.1	5.1	5.1	3.0	3.0	3.1	3.6	5.0	2.2	2.7	3.2	3.8	5.0
	≤ 2.0		60	5.1	5.1	5.1	5.1	5.1	-	-	-	-	-	-	-	-	-	-
			70	5.1	5.1	5.1	5.1	5.1	-	-	-	-	-	-	-	-	-	-
			80	5.1	5.1	5.1	5.1	5.1	3.0	3.0	3.0	3.0	4.0	-	-	-	-	-
			90	5.1	5.1	5.1	5.1	5.1	3.0	3.0	3.0	3.3	4.5	-	-	-	-	-
			100	5.3	5.1	5.1	5.1	5.1	3.0	3.0	3.1	3.6	5.0	2.2	2.7	3.2	3.8	5.0
	≤ 3.0		60	5.1	5.1	5.1	5.1	5.1	-	-	-	-	-	-	-	-	-	-
			70	5.1	5.1	5.1	5.1	5.1	-	-	-	-	-	-	-	-	-	-
			80	5.1	5.1	5.1	5.1	5.1	3.0	3.0	3.0	3.0	4.0	-	-	-	-	-
			90	5.1	5.1	5.1	5.1	5.1	3.0	3.0	3.0	3.3	4.5	-	-	-	-	-
			100	6.1	5.3	5.1	5.1	5.1	3.0	3.0	3.1	3.6	5.0	2.2	2.7	3.2	3.8	5.0

Element wall with freely-suspended cover layer through bending load of the Schöck Isolink® type TA-H, TA-HC

- For the design of the Schöck Isolink® type TA-H, TA-HC without additional Isolink® type TA-D, TA-DC the design table load case combination 1 + 2 + 4 or 3 is relevant.
- Load case 4: The static deformation through self-weight is limited to w = 3 mm.

Design

Variant bending load Schöck Isolink® type TA-H, TA-HC:
Load case combination with freely-suspended cover layer

Element wall, concrete strength class ≥ C30/37:

Schöck Isokorb® type				TA-H, TA-HC															
Combination of Load case 1: Wind + Load case 2: ΔT = 5 [K] + Load case 4: Self-weight or Load case 3: Fresh concrete pressure				Concrete strength class ≥ C30/37															
				Bond length of the Isolink® in the concrete h_{nom} [mm]															
				60					80					100					
				Thickness of the insulation layer h_D [mm]															
				60	80	100	120	140	60	80	100	120	140	60	80	100	120	140	
				Quantity [piece/m²]															
Characteristic wind load w_k [kN/m²]	≤ 1.0	Thickness of the cover layer h_V [mm]	60	4.0	4.0	4.0	4.0	4.0	-	-	-	-	-	-	-	-	-	-
			70	4.0	4.0	4.0	4.0	4.0	-	-	-	-	-	-	-	-	-	-
			80	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.6	3.0	4.0	-	-	-	-	-
			90	4.0	4.0	4.0	4.0	4.5	2.5	2.5	2.9	3.3	4.5	-	-	-	-	-
			100	4.0	4.0	4.0	4.0	5.0	2.5	2.7	3.2	3.7	5.0	2.3	2.8	3.3	3.9	5.0
	≤ 2.0		60	4.0	4.0	4.0	4.0	4.0	-	-	-	-	-	-	-	-	-	-
			70	4.0	4.0	4.0	4.0	4.0	-	-	-	-	-	-	-	-	-	-
			80	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.6	3.0	4.0	-	-	-	-	-
			90	4.0	4.0	4.0	4.0	4.5	2.5	2.5	2.9	3.3	4.5	-	-	-	-	-
			100	4.4	4.0	4.0	4.0	5.0	2.5	2.7	3.2	3.7	5.0	2.3	2.8	3.3	3.9	5.0
	≤ 3.0		60	4.0	4.0	4.0	4.0	4.0	-	-	-	-	-	-	-	-	-	-
			70	4.0	4.0	4.0	4.0	4.0	-	-	-	-	-	-	-	-	-	-
			80	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.6	3.0	4.0	-	-	-	-	-
			90	4.0	4.0	4.0	4.0	4.5	2.5	2.5	2.9	3.3	4.5	-	-	-	-	-
			100	5.1	4.4	4.0	4.0	5.0	2.5	2.7	3.2	3.7	5.0	2.3	2.8	3.3	3.9	5.0

Element wall with freely-suspended cover layer through bending load of the Schöck Isolink® type TA-H, TA-HC

- For the design of the Schöck Isolink® type TA-H, TA-HC without additional Isolink® type TA-D, TA-DC the design table load case combination 1 + 2 + 4 or 3 is relevant.
- Load case 4: The static deformation through self-weight is limited to w = 3 mm.

Design

Load case 5: Temperature difference between cover layer and structural layer (fatigue)

Component measurements with supported cover layer:

Schöck Isolink® type		TA-H, TA-HC		
Load case 5 Temperature difference between cover layer and structural layer		Insulation thickness h_D [mm]		
		60	80	100 - 350
		Max. cover layer length l [mm]		
Cover layer height h [mm]	2500	10090	12000	12000
	3000	9540	12000	12000
	3500	8840	12000	12000
	4000	7950	12000	12000
	4500	6800	12000	12000
	5000	5190	11220	12000
	5500	2280	10240	12000
	6000	-	9050	12000
	6500	-	6000	6000
	7000	-	5400	6000
	7500	-	-	6000
	8000	-	-	6000
	8500	-	-	6000
	9000	-	-	5240

Component measurements with freely-suspended cover layer:

Schöck Isolink® type		TA-H, TA-HC, TA-D, TA-DC	
Load case 5 Temperature difference between cover layer and structural layer		Insulation thickness h_D [mm]	
		60	80 - 350
		Max. cover layer length l [mm]	
Cover layer height h [mm]	2500	10950	12000
	3000	10830	12000
	3500	10690	12000
	4000	10520	12000
	4500	10320	12000
	5000	10090	12000
	5500	9830	12000
	6000	9540	12000

i Component measurements

- The representation of the table values for the maximum cover layer length and cover layer height is based on the values for max. S.
- With a freely-suspended cover layer the maximum measurements for the length and height apply also reciprocally.

Design example

Element wall, supported cover layer

Geometry:	Cover layer:	h_V = 70 mm
	Insulation layer:	h_D = 140 mm
	Structural layer:	h_T = 140 mm
	In-situ concrete layer:	h_O = 80 mm
	Bond length of the Isolink® in the concrete:	h_{nom} = 60 mm
	Wall area:	A = 5 × 3 m = 15 m²

Design loads:

Load case 1: Wind
w_K = 0.85 kN/m²

Load case 2: Temperature gradient over the thickness of the cover layer according to the approval
ΔT = 5 K

Load case 3: Fresh concrete pressure
$\sigma_{hk,max}$ = 25 kN/m²

Load case 4: Self-weight of the cover layer
not relevant

Load case 5: Temperature difference between facing layer and structural layer according to the approval
$\Delta\theta$ = 40 K

Selected: Concrete strength class C30/37 for the precast concrete units

Verifications in the ultimate limit state for the Schöck Isolink® type TA-H

Combination of the load cases 1 + 2:	Required quantity	= 0.9 piece/m²
Load case 3:	Required quantity	= 5.4 piece/m²
	See design tables page 13	

=> Relevant load case: Load case 3 (Fresh concrete pressure in the construction state)
Required quantity per cover layer: = 5.4 • 15 = 81 piece

Verifications in the serviceability limit state for the Schöck Isolink®

Load case 5: Maximum measurements of the cover layer, see table page 18
Cover layer height: 3000 mm
Cover layerl length: 5000 mm < 12000 mm
=> Verification fulfilled

Design example

Sandwich wall, freely-suspended cover layer

Geometry:	Cover layer:	h_V = 70 mm
	Insulation thickness:	h_D = 140 mm
	Structural layer:	h_T = 140 mm
	Bond length of the Isolink® in the concrete:	h_{nom} = 60 mm
	Wall area:	A = 5 × 3 m = 15 m²

Design loads:

Load case 1: Wind
w_K = 0.85 kN/m²

Load case 2: Temperature gradient over the thickness of the cover layer according to the approval
ΔT = 5 K

Load case 3: Fresh concrete pressure
not relevant

Load case 4: Self-weight of the cover layer

Load casel 5: Temperature difference between cover layer and structural layer according to the approval
$\Delta\theta$ = 40 K

Selected: Concrete strength class C30/37

Verifications in the ultimate limit state for the Schöck Isolink® type TA-H

Combination of the load cases 1 + 2:	Required quantity	= 0.9 piece/m²
	See design table page 13	
Required quantity per cover layer:	= 0.9 • 15 = 14 piece	

Verifications in the ultimate limit state for the Schöck Isolink® type TA-D

Load case 4:	Required quantity	= 0.53 piece/m²
	See design table page 14	
Required quantity per cover layer:	= 0.53 • 15 = 8 piece	

Verifications in the serviceability limit state for the Schöck Isolink®

Load case 5: Maximum measurements of the cover layer, see table page 18
Cover layer height: 3000 mm
Cover layerl length: 5000 mm < 12000 mm
=> Verification fulfilled

Design example

Variant bending load Schöck Isolink® type TA-H: Sandwich wall, freely-suspended cover layer

Geometry:	Cover layer:	h_V = 70 mm
	Insulation thickness:	h_D = 140 mm
	Structural layer:	h_T = 140 mm
	Bond length of the Isolink® in the concrete:	h_{nom} = 60 mm
	Wall area:	A = 5 × 3 m = 15 m²

Design loads:

Load case 1: Wind
w_K = 0.85 kN/m²

Load case 2: Temperature gradient over the thickness of the cover layer according to the approval
ΔT = 5 K

Load case 3: Fresh concrete pressure
not relevant

Load case 4: Self-weight of the cover layer

Load casel 5: Temperature difference between cover layer and structural layer according to the approval
Δθ = 40 K

Selected: Concrete strength class C30/37

Verifications in the ultimate limit state for the Schöck Isolink® type TA-H

Combination of load cases 1 + 2 + 4:	Required quantity	= 3.5 piece/m²
	See design table page 15	
Required quantity per cover layer:	= 3.5 • 15 = 53 piece	

Verifications in the serviceability limit state for the Schöck Isolink®

Load case 5: Maximum measurements of the cover layer, see table page 18

Cover layer height:	3000 mm
Cover layerl length:	5000 mm < 12000 mm

=> Verification fulfilled

Building physics characteristic values

U-values of the walls using Schöck Isolink® for insulated precast concrete walls

Insulation layer thickness [mm]	Heat transmission coefficient U [W/(m²·K)]												
	Wall thickness [cm]												
	20	24	25	30	32	34	36	38	40	42	46	48	50
60	0.323	0.322	0.321	0.319	0.318	0.317	0.316	0.315	0.315	0.314	0.312	0.311	0.310
70	-	0.279	0.279	0.277	0.277	0.276	0.275	0.275	0.274	0.273	0.272	0.271	0.271
80	-	0.247	0.247	0.245	0.245	0.244	0.244	0.243	0.243	0.242	0.241	0.241	0.240
90	-	0.221	0.221	0.220	0.219	0.219	0.219	0.218	0.218	0.217	0.216	0.216	0.216
100	-	0.200	0.200	0.199	0.199	0.198	0.198	0.198	0.197	0.197	0.196	0.196	0.196
110	-	-	0.183	0.182	0.182	0.181	0.181	0.181	0.181	0.180	0.180	0.179	0.179
120	-	-	-	0.168	0.167	0.167	0.167	0.167	0.166	0.166	0.166	0.165	0.165
130	-	-	-	0.155	0.155	0.155	0.155	0.155	0.154	0.154	0.154	0.154	0.153
140	-	-	-	0.145	0.145	0.144	0.144	0.144	0.144	0.144	0.143	0.143	0.143
150	-	-	-	0.136	0.135	0.135	0.135	0.135	0.135	0.135	0.134	0.134	0.134
160	-	-	-	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.126	0.126	0.126
170	-	-	-	-	0.120	0.120	0.120	0.120	0.120	0.119	0.119	0.119	0.119
180	-	-	-	-	0.114	0.113	0.113	0.113	0.113	0.113	0.113	0.113	0.113
190	-	-	-	-	-	0.108	0.108	0.108	0.107	0.107	0.107	0.107	0.107
200	-	-	-	-	-	0.103	0.102	0.102	0.102	0.102	0.102	0.102	0.102
210	-	-	-	-	-	-	0.098	0.098	0.098	0.097	0.097	0.097	0.097
220	-	-	-	-	-	-	0.093	0.093	0.093	0.093	0.093	0.093	0.093
230	-	-	-	-	-	-	-	0.089	0.089	0.089	0.089	0.089	0.089
240	-	-	-	-	-	-	-	0.086	0.086	0.086	0.086	0.085	0.085
250	-	-	-	-	-	-	-	-	0.082	0.082	0.082	0.082	0.082
260	-	-	-	-	-	-	-	-	0.079	0.079	0.079	0.079	0.079
270	-	-	-	-	-	-	-	-	-	0.076	0.076	0.076	0.076
280	-	-	-	-	-	-	-	-	-	0.074	0.074	0.074	0.074
290	-	-	-	-	-	-	-	-	-	-	0.071	0.071	0.071
300	-	-	-	-	-	-	-	-	-	-	0.069	0.069	0.069
310	-	-	-	-	-	-	-	-	-	-	0.067	0.067	0.067
320	-	-	-	-	-	-	-	-	-	-	0.065	0.065	0.065
330	-	-	-	-	-	-	-	-	-	-	-	0.063	0.063
340	-	-	-	-	-	-	-	-	-	-	-	0.061	0.061
350	-	-	-	-	-	-	-	-	-	-	-	-	0.059

- The table applies for sandwich and element walls using Schöck Isolink®.
- This table is based on using λ= 0.021 W/(m·K) insulation.
- The thickness of the cover layer is specified as 60 mm.

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