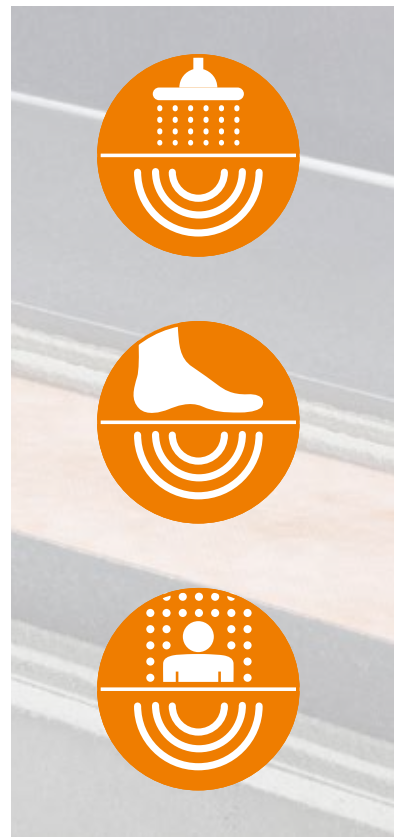


Planning basis Schlüter®-KERDI-LINE-SR

Sound insulation membrane



Wetroom and shower assemblies tested in accordance to acoustic reduction standards and regulations



PROFILE OF INNOVATION



Contents	Page
■ Assembly variant details A – J	Inside covers
■ Sound insulation in shower areas	2
■ Noise type measurements	2
■ Sound transmission of shower areas	2
■ Standards and regulations	3
Requirements in Germany	
Installation noise – measuring results and requirements	4
Impact sound level and reduction – measuring results and requirements	5
Requirements in Austria and Switzerland	
Installation noise – measuring results and requirements	6
Impact sound level and reduction – measuring results and requirements	7
Additional requirements in Switzerland	
User noise – measuring results and requirements	8



Sources of noise in shower areas

Showering is associated with noise created by the impact of water on the surface of the shower area as well as accessing the area and user activities such as putting down a shampoo bottle.

Both airborne and structure-borne sound is generated. Structure-borne sound in particular can be transmitted via adjoining construction elements.

To protect residents against this noise,

standards and regulations establish requirements to limit **installation noise, impact sound and user noise** (Switzerland).

In order to quantify the sound transmission of Schlüter shower systems in conjunction with Schlüter-KERDI-LINE linear drainage systems and to evaluate them in accordance with standards and regulations in effect in Germany, Austria and Switzerland, sound measurements were carried out in an

installation test stand simulating a building. The installation test stand consisted of a solid construction with a continuous 180 mm reinforced concrete ceiling and 115 mm installation walls made of solid limestone with an area-specific mass of 220 kg/m².

Noise types measured in the installation test assembly



1. Installation noise:

Generated by water impact during showering.

The test was performed with a measurement standard for **structure-borne sound** according to DIN EN 15657, (BS EN 15657) which simulates the water jet of shower heads.



2. Impact sound:

Generated when the shower area is accessed.

The test was performed with a **standard hammer mill** according to DIN EN ISO 10140-5, (BS EN ISO 10140-5) which simulates walking in hard-soled shoes.

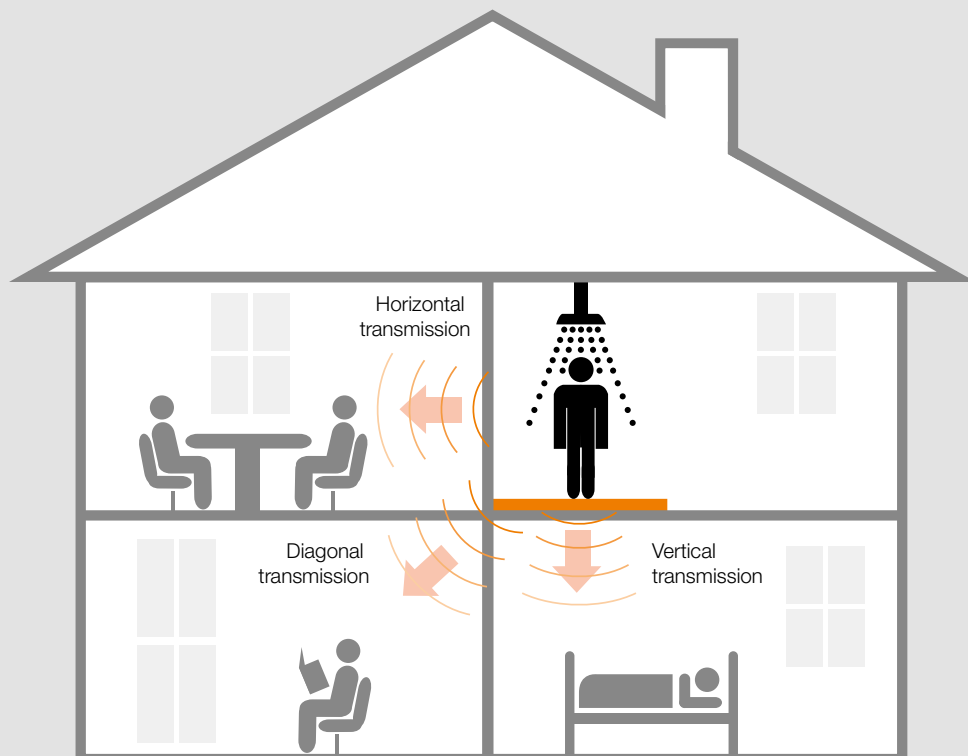


3. User noise:

Generated by, for example, putting down a shampoo bottle.

The test was performed with a **pendulum hammer** according to SIA 181, which simulates setting down hard objects.

Noise transmission of shower areas to adjacent rooms





Standards and regulations

The measuring results were evaluated to review regulatory compliance with the following standards and regulations for the scenario examined in the installation test stand:

DIN 4109-1

Sound insulation in buildings - Part 1: Minimum requirements, 2018-01

DIN 4109 - Supplement 2

Sound insulation in buildings; guidelines for planning and execution; proposals for increased sound insulation; recommendations for sound insulation in personal living and working areas, 1989-11

VDI 4100

Sound protection in buildings – Apartments – Assessment and proposals for enhanced sound protection 2012-10

ÖNORM B 8115-2 – *Austrian standard*

Sound insulation and room acoustics in building construction - Part 2: Requirements for sound insulation, 2006-12

SIA 181 – *Swiss standard*

Sound insulation in buildings, 2006

In buildings, noise transmission occurs in a horizontal, diagonal, and vertical direction. The requirements apply exclusively to rooms in need of protection in other living areas. In multi-story residential construction, only diagonal transmission is usually relevant.

The tables below therefore compare the test results for diagonal transmission in multi-family homes with the requirement values.





Requirements in Germany

Installation noise

Measurement results and requirements for the installation noise level

		Measuring results	DIN 4109		VDI 4100		
		Installation noise level	Minimum requirement	Increased requirement	SST I	SST II	SST III
Requirement parameter		LAFmax,n / LAFmax,nT [dB]	LAFmax,n [dB]		LAFmax,nT [dB]		
Requirement value			≤ 30	≤ 25	≤ 30	≤ 27	≤ 24
A	Schlüter®-KERDI-LINE H40 Sloped screed	15 / 12	✓	✓	✓	✓	✓
B	Schlüter®-KERDI-LINE H40 Sloped tray and screed	≤ 25 ^{*)} / ≤ 24 ^{*)}	✓	✓	✓	✓	✓
C	Schlüter®-KERDI-LINE H50 Sloped screed	≤ 25 ^{*)} / ≤ 24 ^{*)}	✓	✓	✓	✓	✓
D	Schlüter®-KERDI-LINE H50 Sloped tray and screed	≤ 25 ^{*)} / ≤ 24 ^{*)}	✓	✓	✓	✓	✓
E	Schlüter®-KERDI-LINE H50 Sloped tray and levelling board	21 / 18	✓	✓	✓	✓	✓
F	Schlüter®-KERDI-LINE F40 Sloped screed	15 / 12	✓	✓	✓	✓	✓
G	Schlüter®-KERDI-LINE H50 G2 Sloped screed	14 / 11	✓	✓	✓	✓	✓
H	Schlüter®-KERDI-LINE V50 G2 Sloped screed	19 / 16	✓	✓	✓	✓	✓
I	Schlüter®-KERDI-LINE V50 G2 Sloped screed	19 / 16	✓	✓	✓	✓	✓
J	Schlüter®-KERDI-LINE V50 G2 Sloped screed	≤ 25 ^{*)} / ≤ 24 ^{*)}	✓	✓	✓	✓	✓

^{*)} The indicated values refer to impact sound measurements of assemblies in the ceiling test stand (see table "Impact sound level and reduction").
It can be presumed that with the same impact sound reduction the same sound impact levels, installation noise and user noise will occur.

Note:
The indicated measuring values refer to diagonal transmission.
For vertical pipe penetrations through the ceiling (assemblies H - J), the project-specific pipe placement below the ceiling must meet sound insulation and fire protection requirements, if applicable with the corresponding panelling.



Requirements in Germany

Impact sound level and reduction

Measurement results and impact sound level requirements

		Measuring results		DIN 4109		VDI 4100		
		Impact sound level	Impact sound reduction	Minimum requirement	Increased requirement	SST I	SST II	SST III
Requirement parameter		$L'_{n,w} / L'_{nT,w}$ [dB]	ΔL_w [dB]	$L'_{n,w}$ [dB]		$L'_{nT,w}$ [dB]		
Requirement value				≤ 50	≤ 46	≤ 51	≤ 44	≤ 37
A	Schlüter®-KERDI-LINE H40 Sloped screed	37 / 34	36 ¹⁾	✓	✓	✓	✓	✓
B	Schlüter®-KERDI-LINE H40 Sloped tray and screed	$\leq 46^{1)} / \leq 37^{1)}$	34 ¹⁾	✓	✓	✓	✓	✓
C	Schlüter®-KERDI-LINE H50 Sloped screed	$\leq 46^{1)} / \leq 37^{1)}$	38 ¹⁾	✓	✓	✓	✓	✓
D	Schlüter®-KERDI-LINE H50 Sloped tray and screed	$\leq 46^{1)} / \leq 37^{1)}$	35 ¹⁾	✓	✓	✓	✓	✓
E	Schlüter®-KERDI-LINE H50 Sloped tray and levelling board	47 / 44	22 ¹⁾	✓	–	✓	–	–
F	Schlüter®-KERDI-LINE F40 Sloped screed	41 / 38	32	✓	✓	✓	✓	–
G	Schlüter®-KERDI-LINE H50 G2 Sloped screed	38 / 35	35	✓	✓	✓	✓	✓
H	Schlüter®-KERDI-LINE V50 G2 Sloped screed	40 / 37	27	✓	✓	✓	✓	✓
I	Schlüter®-KERDI-LINE V50 G2 Sloped screed	39 / 36	31	✓	✓	✓	✓	✓
J	Schlüter®-KERDI-LINE V50 G2 Sloped screed	$\leq 46^{1)} / \leq 37^{1)}$	32	✓	✓	✓	✓	✓

^{*)} The indicated values refer to impact sound measurements of assemblies in the ceiling test stand.
It can be presumed that with the same impact sound reduction the same sound impact levels, installation noise and user noise will occur.

¹⁾ Values determined in the ceiling test stand according to DIN EN ISO 10140 (BS EN ISO 10140), using a 140 mm reference ceiling made of reinforced concrete.

Note:
The indicated measuring values refer to diagonal transmission.

For vertical pipe penetrations through the ceiling (assemblies H - J), the project-specific pipe placement below the ceiling must meet sound insulation and fire protection requirements, if applicable with the corresponding panelling.



Requirements in Austria and Switzerland

Installation noise

Measurement results and requirements for the installation noise level in Austria
(designation in ÖNORM B 8115-2: assembly noise level) and in Switzerland
(designation in SIA 181: evaluation level for continuous functional noise)

		Measuring results	ÖNORM B 8115-2		SIA 181		
		Installation noise level	Minimum requirement	Increased sound insulation	Sensitivity to noise		
					low	medium	high
Requirement parameter		LAFmax,nT [dB]	LAFmax,nT [dB]		LAFmax,nT [dB]		
Requirement value			≤ 25	≤ 20	≤ 33	≤ 28	≤ 25
A	Schlüter®-KERDI-LINE H40 Sloped screed	12	✓	✓	✓	✓	✓
B	Schlüter®-KERDI-LINE H40 Sloped tray and screed	≤ 20 ^{*)}	✓	✓	✓	✓	✓
C	Schlüter®-KERDI-LINE H50 Sloped screed	≤ 20 ^{*)}	✓	✓	✓	✓	✓
D	Schlüter®-KERDI-LINE H50 Sloped tray and screed	≤ 20 ^{*)}	✓	✓	✓	✓	✓
E	Schlüter®-KERDI-LINE H50 Sloped tray and levelling board	18	✓	✓	✓	✓	✓
F	Schlüter®-KERDI-LINE F40 Sloped screed	12	✓	✓	✓	✓	✓
G	Schlüter®-KERDI-LINE H50 G2 Sloped screed	11	✓	✓	✓	✓	✓
H	Schlüter®-KERDI-LINE V50 G2 Sloped screed	16	✓	✓	✓	✓	✓
I	Schlüter®-KERDI-LINE V50 G2 Sloped screed	16	✓	✓	✓	✓	✓
J	Schlüter®-KERDI-LINE V50 G2 Sloped screed	≤ 20 ^{*)}	✓	✓	✓	✓	✓

^{*)} The indicated values refer to impact sound measurements of assemblies in the ceiling test stand (see table "Impact sound level and reduction").
It can be presumed that with the same impact sound reduction the same sound impact levels, installation noise and user noise will occur.

Notes:

The indicated measuring values refer to diagonal transmission.

SIA 181 contains additional enhanced requirements (mandatory for new construction): The values listed in the above table are reduced by 3 dB, with 25 dB as the smallest value.


For vertical pipe penetrations through the ceiling (assemblies H - J), the project-specific pipe placement below the ceiling must meet sound insulation and fire protection requirements, if applicable with the corresponding panelling.



Requirements in Austria and Switzerland

Impact sound level and reduction

Measurement results and impact sound level requirements

		Measuring results		ÖNORM B 8115-2		SIA 181		
		Impact sound level	Impact sound reduction	Minimum requirement	Increased sound insulation	Sensitivity to noise		
						low	medium	high
Requirement parameter		L'nT,w [dB]	ΔLw [dB]	L'nT,w [dB]		L'nT,w [dB]		
Requirement value				≤ 48	≤ 43	≤ 58	≤ 53	≤ 48
A	Schlüter®-KERDI-LINE H40 Sloped screed	34	36 ¹⁾	✓	✓	✓	✓	✓
B	Schlüter®-KERDI-LINE H40 Sloped tray and screed	≤ 43 ¹⁾	34 ¹⁾	✓	✓	✓	✓	✓
C	Schlüter®-KERDI-LINE H50 Sloped screed	≤ 43 ¹⁾	38 ¹⁾	✓	✓	✓	✓	✓
D	Schlüter®-KERDI-LINE H50 Sloped tray and screed	≤ 43 ¹⁾	35 ¹⁾	✓	✓	✓	✓	✓
E	Schlüter®-KERDI-LINE H50 Sloped tray and levelling board	44	22 ¹⁾	✓	–	✓	✓	✓
F	Schlüter®-KERDI-LINE F40 Sloped screed	38	33 ¹⁾	✓	✓	✓	✓	✓
G	Schlüter®-KERDI-LINE H50 G2 Sloped screed	35	35 ¹⁾	✓	✓	✓	✓	✓
H	Schlüter®-KERDI-LINE V50 G2 Sloped screed	37	27 ¹⁾	✓	✓	✓	✓	✓
I	Schlüter®-KERDI-LINE V50 G2 Sloped screed	36	31 ¹⁾	✓	✓	✓	✓	✓
J	Schlüter®-KERDI-LINE V50 G2 Sloped screed	≤ 43 ¹⁾	32 ¹⁾	✓	✓	✓	✓	✓

^{*)} The indicated values refer to impact sound measurements of assemblies in the ceiling test stand.
It can be presumed that with the same impact sound reduction the same sound impact levels, installation noise and user noise will occur.

¹⁾ Values determined in the ceiling test stand according to DIN EN ISO 10140 (BS EN ISO 10140), using a 140 mm reference ceiling made of reinforced concrete.

Notes:

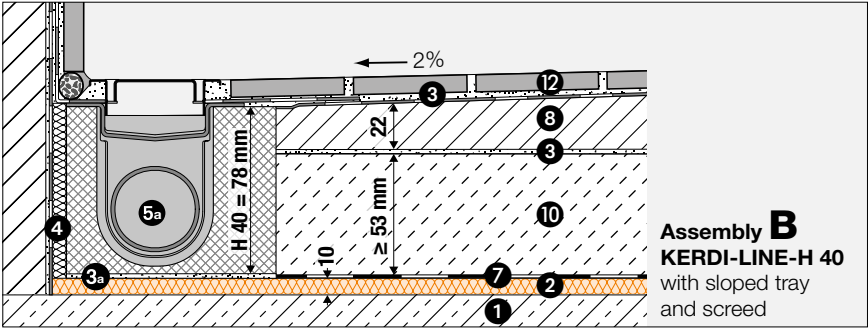
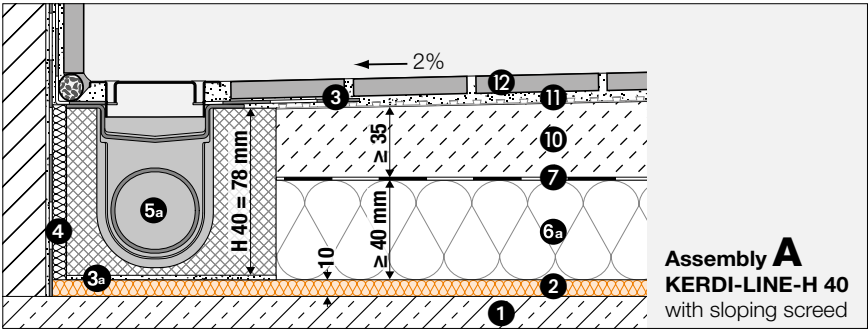
The indicated measuring values refer to diagonal transmission.

SIA 181 contains additional enhanced requirements (mandatory for new construction): The values listed in the above table are reduced by 3 dB, with 25 dB as the smallest value.

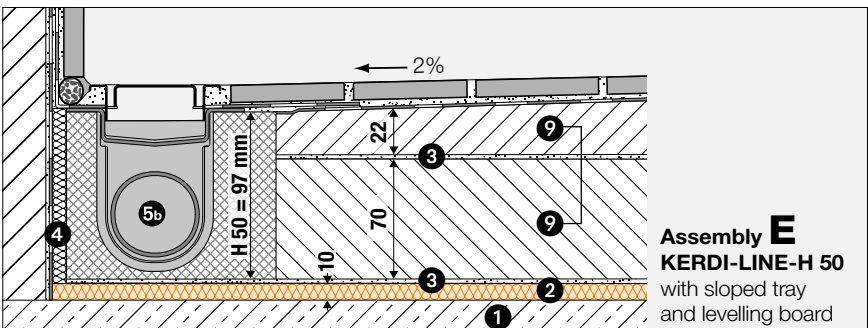
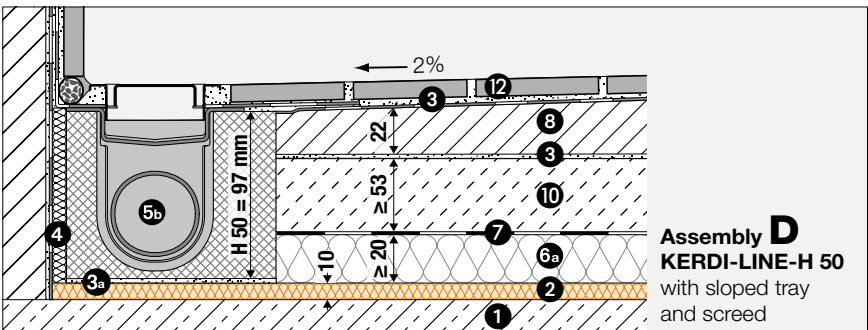
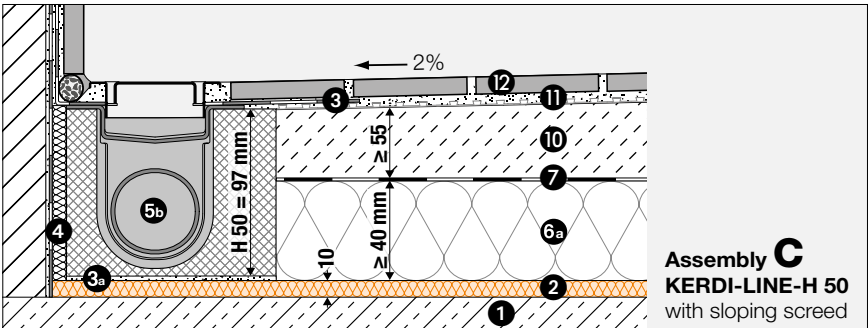
For vertical pipe penetrations through the ceiling (assemblies H - J), the project-specific pipe placement below the ceiling must meet sound insulation and fire protection requirements, if applicable with the corresponding panelling.



Assembly variants with Schlüter®-KERDI-LINE-H 40

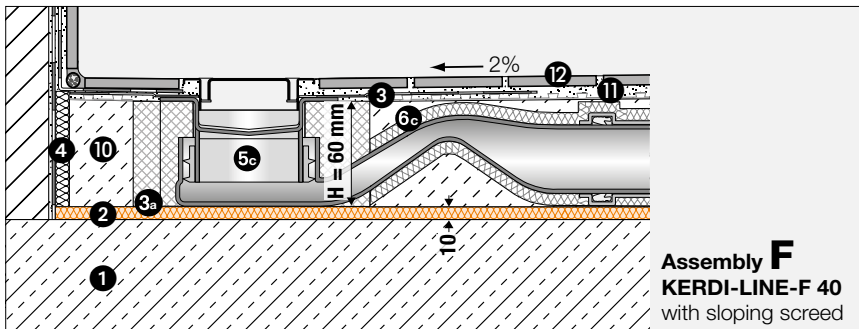


Assembly variants with Schlüter®-KERDI-LINE-H 50

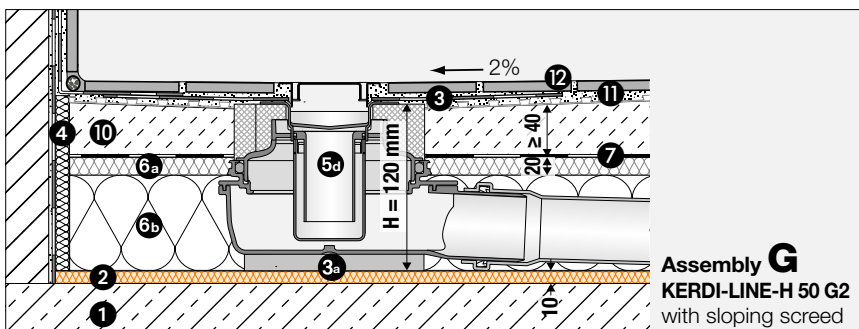




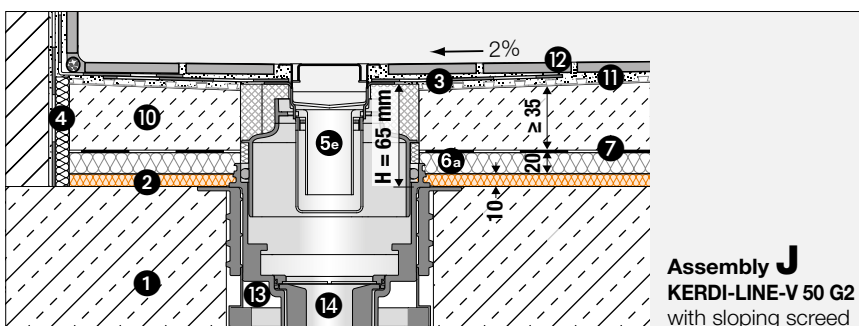
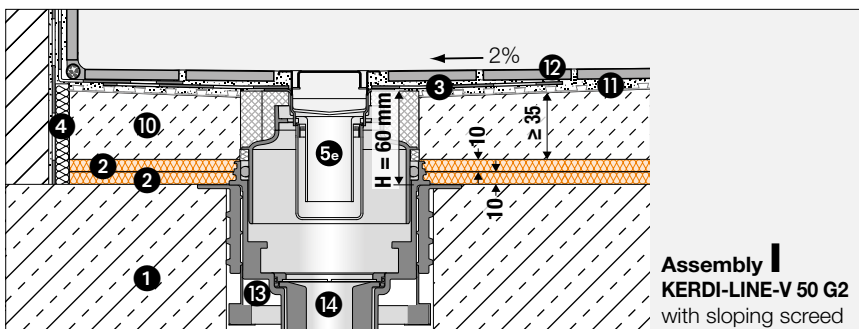
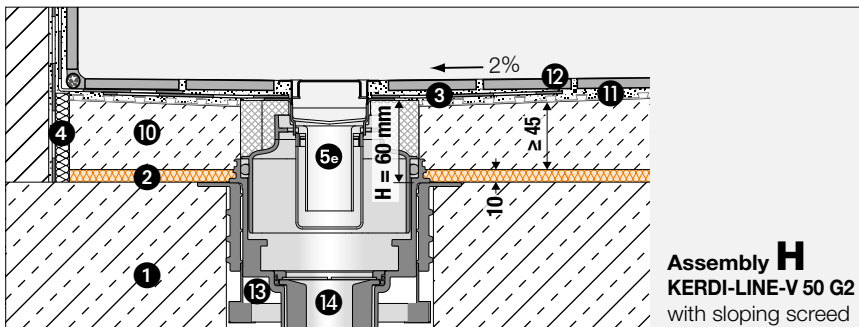
Assembly variants with Schlüter®-KERDI-LINE-F 40



Assembly variants with Schlüter®-KERDI-LINE-H 50 G2

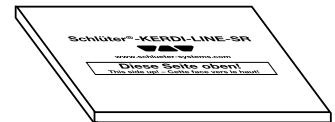


Assembly variants with Schlüter®-KERDI-LINE-V 50 G2



Note!

The sound insulation membranes **Schlüter-KERDI-LINE-SR** are laid loosely on top of a level, solid load bearing substrate. Make sure that the “printed side” faces up.



To avoid sound bridges, the joints between adjacent pieces of membrane can be covered with Schlüter-DITRA-SOUND-KB joint tape. For further installation instructions see the system assemblies A to J.

- 1 Load bearing substrate
- 2 **Schlüter®-KERDI-LINE-SR**
sound insulation membrane, d = 10 mm
Install with printed side facing up!
- 3 Thin bed adhesive
- 3a Thin bed adhesive
Height adjustment with adhesive if necessary
- 4 Edge insulation strip
- 5a Schlüter®-KERDI-LINE-H 40
- 5b Schlüter®-KERDI-LINE-H 50
- 5c Schlüter®-KERDI-LINE-F
- 5d Schlüter®-KERDI-LINE-H 50 G2
- 5e Schlüter®-KERDI-LINE-V 50 G2
- 6a Footfall sound insulation (≤ CP3)
- 6b Heat insulation (DEO)
- 6c Wrap fleece
- 7 Separating layer (eg. polythene sheet)
- 8 Schlüter®-KERDI-SHOWER-LS
sloped tray
- 9 Schlüter®-KERDI-SHOWER-LCS
sloped tray + levelling board
- 10 Screed
- 11 Schlüter®-DITRA 25
- 12 Tile covering
- 13 Schlüter®-KERDI-DRAIN-ZBS (if required)
- 14 Schlüter®-KERDI-LINE-BS (if required)


More information on Schlüter-KERDI-LINE can be found in product data sheet 8.7 and the installation instructions.



Additional requirements in Switzerland

User noise

Measurement results and requirements for user noise

		Measuring results	SIA 181		
			Sensitivity to noise		
			low	medium	high
Requirement parameter		L _{H,tot} [dB]	L _{H,tot} [dB]		
Requirement value			≤ 43	≤ 38	≤ 33
A	Schlüter®-KERDI-LINE H40 Sloped screed	25	✓	✓	✓
B	Schlüter®-KERDI-LINE H40 Sloped tray and screed	≤ 33 ^{*)}	✓	✓	✓
C	Schlüter®-KERDI-LINE H50 Sloped screed	≤ 33 ^{*)}	✓	✓	✓
D	Schlüter®-KERDI-LINE H50 Sloped tray and screed	≤ 33 ^{*)}	✓	✓	✓
E	Schlüter®-KERDI-LINE H50 Sloped tray and levelling board	32	✓	✓	✓
F	Schlüter®-KERDI-LINE F40 Sloped screed	24	✓	✓	✓
G	Schlüter®-KERDI-LINE H50 G2 Sloped screed	24	✓	✓	✓
H	Schlüter®-KERDI-LINE V50 G2 Sloped screed	26	✓	✓	✓
I	Schlüter®-KERDI-LINE V50 G2 Sloped screed	24	✓	✓	✓
J	Schlüter®-KERDI-LINE V50 G2 Sloped screed	≤ 33 ^{*)}	✓	✓	✓

^{*)} The indicated values refer to impact sound measurements of assemblies in the ceiling test stand (see table "Impact sound level and reduction").
It can be presumed that with the same impact sound reduction the same sound impact levels, installation noise and user noise will occur.

Note:
The indicated measuring values refer to diagonal transmission.
For vertical pipe penetrations through the ceiling (assemblies H - J), the project-specific pipe placement below the ceiling must meet sound insulation and fire protection requirements, if applicable with the corresponding panelling..



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