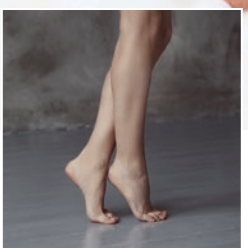
...wedi®

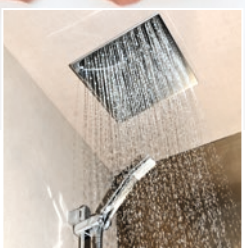
an ARDEXGROUP Company

wedi sound insulation

According to DIN 4109 and VDI 4100











Sound insulation in the recognised wedi system

During showering and bathing, different types of noise occur which may be transmitted to neighbouring rooms as a sound. For this reason, regulations are put in place defining the maximum sound level to ensure that the quality of living of a building's inhabitants is not affected. wedi's sound insulation products and floor level shower elements, when installed together as a system, comply with the latest regulations, providing increased sound protection giving a calm environment within the bathroom and adjacent rooms.

04 Sound insulation types

06 Regulations

10 Sound insulation under ceramic tiles – wedi Nonstep Plan/Plus

11 Sound insulation under wedi Fundo shower systems – wedi Nonstep ProS

12 Test results

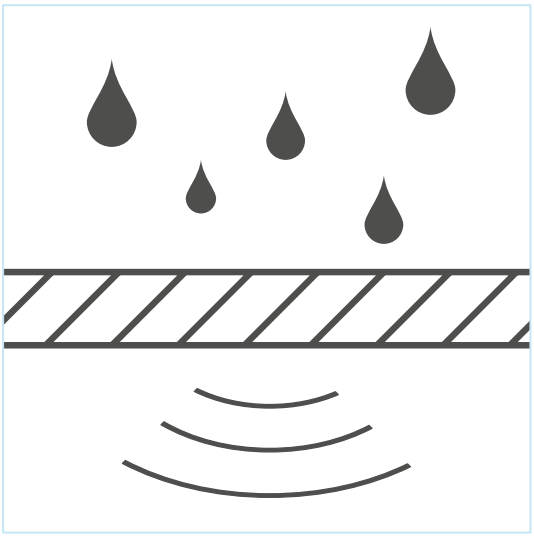
14 System structures

Sound insulation types

The bathroom as source of sound

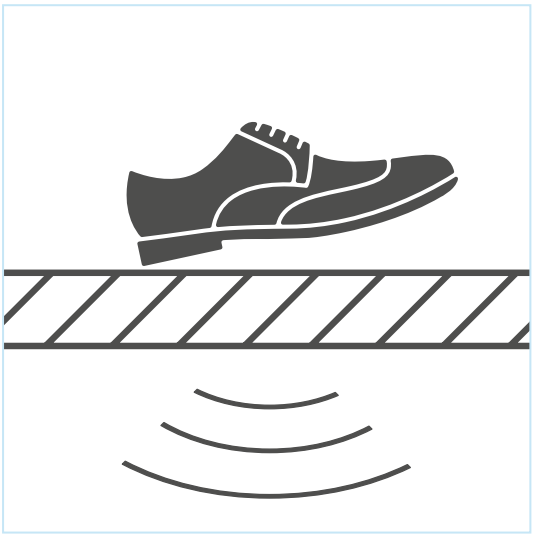
Peace and quiet is exactly what is required for a comfortable atmosphere in a home. This especially applies for areas like the living room and bedrooms. During showering, the impact of water on the floor causes high degrees of sound development (air and structure borne sound) and the occurring noises may be perceived as annoying.

Additionally, the bathroom and shower areas could also be accessed whilst wearing shoes (footsteps). If not properly decoupled this can lead to considerable noise generation and disturbance in neighbouring rooms and below. We would like to point out two important types of sound insulation below:



Water impact insulation

Protection against high noise levels caused by water impact on the shower floor. This is also referred to as the installation noise level. The noise generated in this manner travels to adjacent rooms via the sanitary area.



Footstep sound insulation

Protection against noises which are caused by walking on floor surfaces. This is also referred to as footfall noise. Noises are generally transmitted downwards.

Quiet rooms? A question of requirements!

To ensure that nothing gets in the way of a ‘comfortable atmosphere’, all disturbing sound transmission possibilities have to be taken into account during construction or renovation and appropriate sound insulation has to be provided.



Typical
noise level
in dB(A)



140 dB(A)
Pain threshold

120 dB(A)



110 dB(A)

90 dB(A)





80 dB(A)

70 dB(A)

60 dB(A)



50 dB(A)

40 dB(A)



30 dB(A)

20 dB(A)



10 dB(A)



0 dB(A)
Audible threshold





Regulations

Minimum requirements and increased sound insulation

The levels of audible noise transmitted into adjacent rooms which are acceptable and those which are not are set out in two regulations. The minimum requirements for structural sound insulation are set out in DIN 4109 and are mandatory.

For higher sound insulation requirements, the sound insulation levels (I, II, III) in VDI 4100 are commonly used as a basis for assessment. However, the increased sound insulation should be contractually agreed between the builder and the client. Measurement of the noise level with water falling on the floor of a shower is done on the basis of DIN EN ISO 10052 in conjunction with DIN 4109-11.

A standardised tapping machine was used for determination of the estimated impact sound reduction ΔLw. The impact sound measurement was done on the basis of DIN EN ISO 10140 and DIN ISO 717-2 for small specimens in category I. With this information, the sound insulation required for the building can be determined and planned.

Requirements on sound insulation for water impact sound

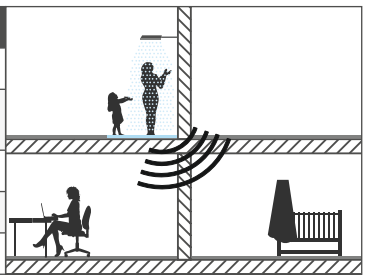
For sanitary installations and in the building drainage, we differentiate between fall, impact and flow noises, also referred to as installation noise. The value for the installation noise requirements is the A-assessed noise level $L_{AF,max,n}$. Here, the noise level caused by building installations in other rooms which require protection is taken into consideration.

Showers and bath tubs are sources of water impact noise, whereby the fall energy is predominantly converted into sound energy. Flow noises result from water flowing horizontally e.g. in a horizontal drain. The steady flow of water is disrupted by unevenness in the pipe or by changes of direction.

The contact points between bathroom objects and the structure cause adjoining components to vibrate. This generates a structure-borne sound that is transmitted through and emitted from ceilings and walls to adjacent rooms as an audible airborne sound. Measurement of the noise level with water falling on the floor of a shower is done on the basis of DIN EN ISO 10052 in conjunction with DIN 4109-11:2010.

In order to sever the transmission path for the structure-borne sound and minimise disruptive installation noises, the contact surfaces between the bathroom objects and the structure must be elastically decoupled. Acoustic bridging is thus prevented. The wedi system solutions for flush-to-floor showers meet the minimum requirements for sound insulation for water impact noise and, depending on the accessories, achieve sound insulation levels I to III in accordance with VDI 4100.

Regulation	Requirement	Admissible sound pressure level
DIN 4109 (2018)	Minimum requirements	$L_{AFmax,n} \leq 30$ dB(A)
DIN 4109, Bbl. 2 (1989)	Proposal for increased requirements	$L_{AFmax,n} \leq 25$ dB(A)
VDI 4100 (2012) Apartment buildings	Sound insulation level I	$L_{AFmax,n} \leq 30$ dB(A)
	Sound insulation level II	$L_{AFmax,n} \leq 27$ dB(A)
	Sound insulation level III	$L_{AFmax,n} \leq 24$ dB(A)

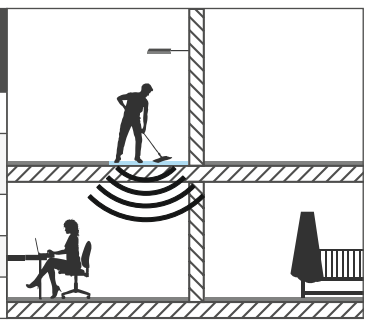




Requirements on sound insulation for footsteps

Particularly in the nursing and health care sectors, bathroom and shower areas are accessed by nursing or cleaning personnel wearing shoes. The occurring footsteps sound is transmitted and may cause a disturbing noise in the rooms beneath.

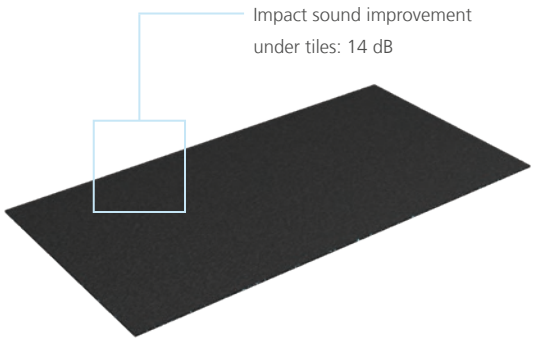
Regulation	Requirement	Permissible noise level in rooms in other people's houses which require protection
DIN 4109 (2018)	Minimum requirements	$L'_{n,w} \leq 53$ dB(A)
DIN 4109, Bbl. 2 (1989)	Proposal for increased requirements	$L'_{n,w} \leq 46$ dB(A)
VDI 4100 (2012) Apartment buildings	Sound insulation level I	$L'_{nT,w} \leq 51$ dB(A)
	Sound insulation level II	$L'_{nT,w} \leq 44$ dB(A)
	Sound insulation level III	$L'_{nT,w} \leq 37$ dB(A)



Sound insulation under ceramic tiles

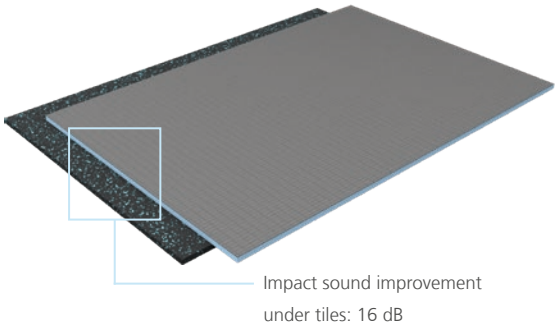
wedi Nonstep® Plan

The wedi Nonstep Plan impact sound insulation is a thinlayered rubber granulate mat with a flexible, mineral coating which is used for decoupling under ceramic floor coverings, laminate or ready-to-lay parquet.



wedi Nonstep® Plus

The wedi Nonstep Plus sound insulation composite board consists of a 6 mm wedi building board and a 5 mm rubber mat that are bonded together in the factory creating an overlap. It is used for decoupling under ceramic flooring, laminate or ready-to-lay parquet.

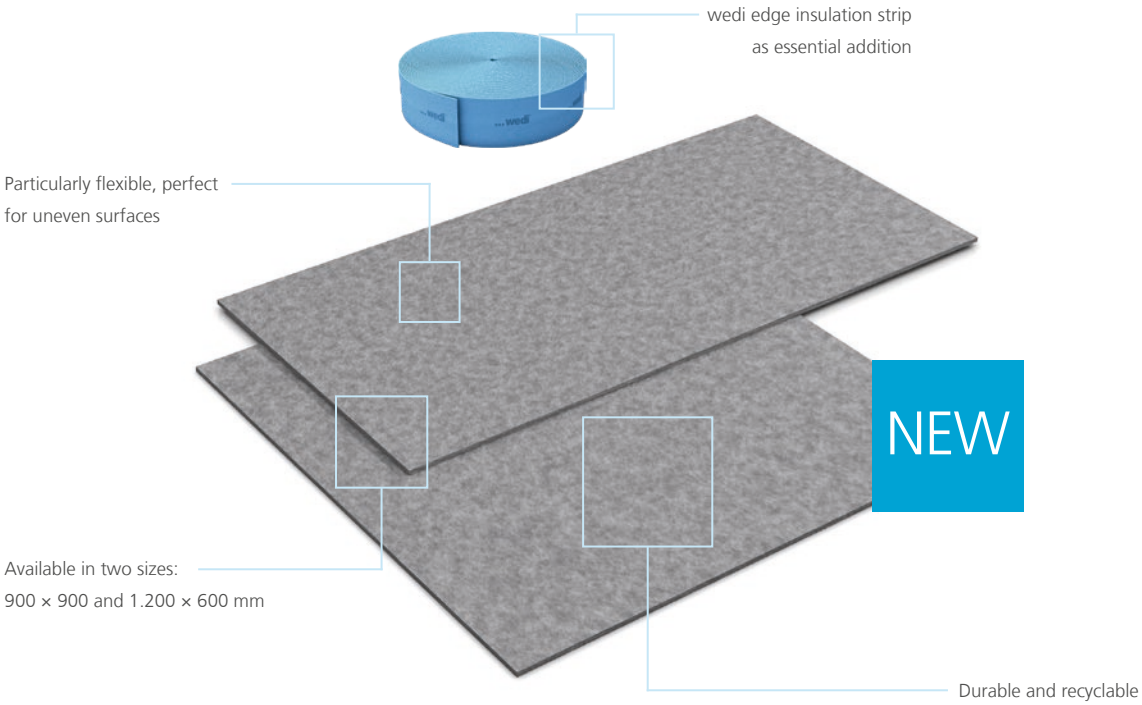




Sound insulation under wedi Fundo® shower systems

wedi Nonstep® ProS

The wedi Nonstep ProS is a high-quality sound insulation fleece which is used under wedi Fundo shower elements to significantly reduce water impact and footfall noises. The light fleece is moisture and rot-resistant and its thickness of just 9 mm only slightly changes the installation height. The wedi Nonstep ProS not only meets the minimum requirements (DIN 4109) but has also been successfully tested in the wedi system for compliance with the increased sound insulation requirements (VDI 4100) – see pages 12 and 13.



Test results and system structures

Footfall noise reduction with wedi Nonstep® ProS

You can find the results of footfall noise measurements for various wedi shower systems in the table below.

Shower element	Substructure	wedi Nonstep ProS	Installation height without tiling	Rated footfall noise reduction
Fundo Primo	point drain horizontal DN 50, 85 – 120 mm screed	9 mm	137 mm – 172 mm	$\Delta L_{w,P}$ = 29 dB
Fundo Primo	point drain horizontal DN 50, 90 mm wedi Fundo substructure set	9 mm	145 mm	$\Delta L_{w,P}$ = 28 dB
Fundo Primo	point drain Mini Max DN 40, 60 mm screed	9 mm	112 mm	$\Delta L_{w,P}$ = 29 dB
Fundo Primo	point drain Mini Max DN 40, 60 mm wedi Fundo substructure set	9 mm	115 mm	$\Delta L_{w,P}$ = 28 dB
Fundo Riolito/ Riolito neo/Riofino	channel drain horizontal DN 50, 80 – 120 mm screed	9 mm	142 mm – 182 mm	$\Delta L_{w,P}$ = 29 dB
Fundo Riolito/ Riolito neo/Riofino	channel drain horizontal DN 50, 90 mm wedi Fundo substructure set	9 mm	155 mm	$\Delta L_{w,P}$ = 28 dB
Fundo Riolito/ Riolito neo/Riofino	channel drain Mini Max DN 40, 49 mm screed	9 mm	111 mm	$\Delta L_{w,P}$ = 29 dB
Fundo Riolito/ Riolito neo/Riofino	channel drain Mini Max DN 40, 60 mm wedi Fundo substructure set	9 mm	125 mm	$\Delta L_{w,P}$ = 28 dB
Fundo Plano	none, as fully integrated	9 mm	77 mm	$\Delta L_{w,P}$ = 28 dB
Fundo Integro	none, as fully integrated	9 mm	102 mm	$\Delta L_{w,P}$ = 28 dB
Fundo Plano Linea	none, as fully integrated	9 mm	82 mm	$\Delta L_{w,P}$ = 28 dB

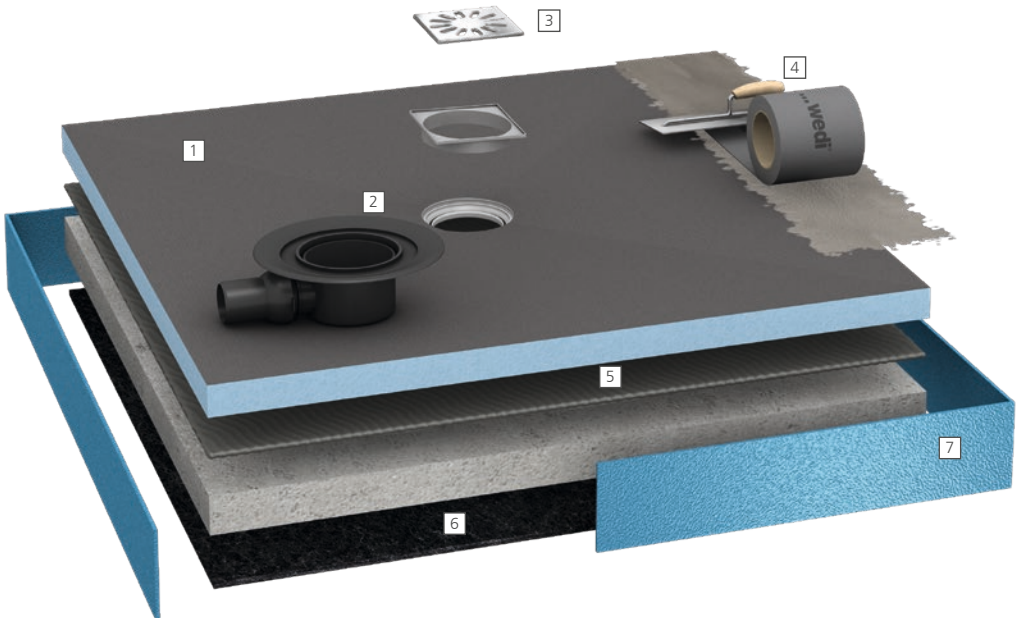
Water impact noise measurement with wedi Nonstep® ProS

You can find the sound insulation requirements in accordance with DIN 4109 and VDI 4100, as well as the measurement results / ratings for the wedi Fundo systems, in the table below. The acoustic reports can be found at www.wedi.co.uk.

				DIN 4109		VDI 4100		
Shower element	Substructure	wedi Nonstep ProS	Installation height without tiling	min.	increased	Level I	Level II	Level III
Fundo Primo	point drain horizontal DN 50, 85 – 120 mm screed	9 mm	137 mm – 172 mm	✓	✓	✓	✓	✓
				measured/rated value 16 dB(A)		measured/rated value 16 dB(A)		
Fundo Primo	point drain horizontal DN 50, 90 mm wedi Fundo substructure set	9 mm	145 mm	✓	✓	✓	✓	✓
				measured/rated value 20 dB(A)		measured/rated value 20dB(A)		
Fundo Primo	point drain Mini Max DN 40, 60 mm screed	9 mm	112 mm	✓	✓	✓	✓	✓
				measured/rated value 16 dB(A)		measured/rated value 16 dB(A)		
Fundo Primo	point drain Mini Max DN 40, 60 mm wedi Fundo substructure set	9 mm	115 mm	✓	✓	✓	✓	✓
				measured/rated value 20 dB(A)		measured/rated value 20 dB(A)		
Fundo Riolito/ Riolito neo/ Riofino	channel drain horizontal DN 50, 80 – 120 mm screed	9 mm	142 mm – 182 mm	✓	✓	✓	✓	✓
				measured/rated value 16 dB(A)		measured/rated value 16 dB(A)		
Fundo Riolito/ Riolito neo/ Riofino	channel drain horizontal DN 50, 90 mm wedi Fundo substructure set	9 mm	155 mm	✓	✓	✓	✓	✓
				measured/rated value 20 dB(A)		measured/rated value 20 dB(A)		
Fundo Riolito/ Riolito neo/ Riofino	channel drain Mini Max DN 40, 49 mm screed	9 mm	111 mm	✓	✓	✓	✓	✓
				measured/rated value 16 dB(A)		measured/rated value 16 dB(A)		
Fundo Riolito/ Riolito neo/ Riofino	channel drain Mini Max DN 40, 60 mm wedi Fundo substructure set	9 mm	125 mm	✓	✓	✓	✓	✓
				measured/rated value 20 dB(A)		measured/rated value 20 dB(A)		
Fundo Plano	none, as fully integrated	9 mm	77 mm	✓	✓	✓	✓	✓
				measured/rated value18 dB(A)		measured/rated value 19 dB(A)		
Fundo Integro	none, as fully integrated	9 mm	102 mm	✓	✓	✓	✓	✓
				measured/rated value18 dB(A)		measured/rated value 19 dB(A)		
Fundo Plano Linea	none, as fully integrated	9 mm	82 mm	✓	✓	✓	✓	✓
				measured/rated value18 dB(A)		measured/rated value 19 dB(A)		

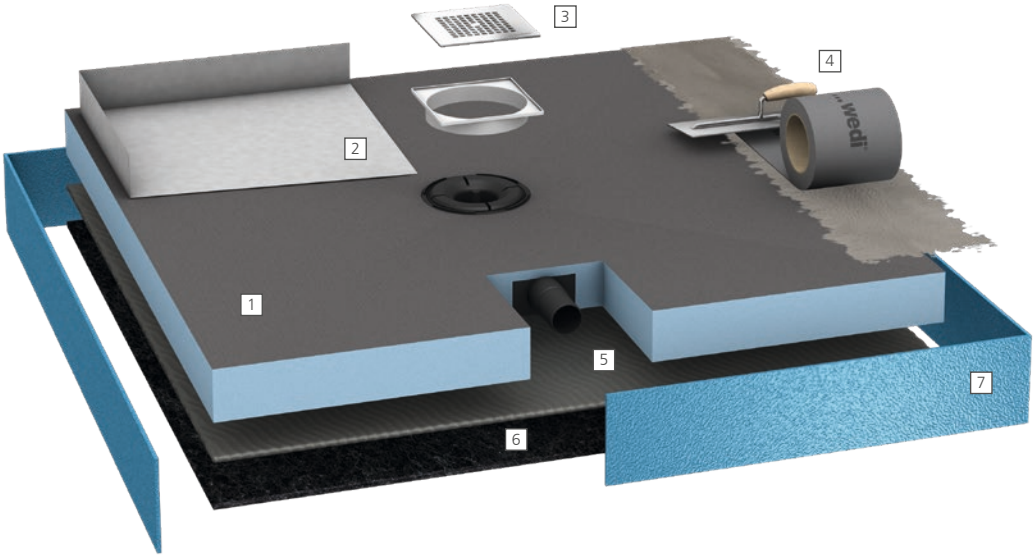
Minimum requirements on sound insulation for water impact DIN 4109	Increased requirements DIN 4109	Sound insulation level I, VDI 4100	Sound insulation level II, VDI 4100	Sound insulation level III, VDI 4100
≤ 30 dB (A)	≤ 25 dB (A)	≤ 30 dB (A)	≤ 27 dB (A)	≤ 24 dB (A)

The assessment serves as example for a room requiring particular sound protection with 31 m3 and a concrete ceiling of 20 cm.



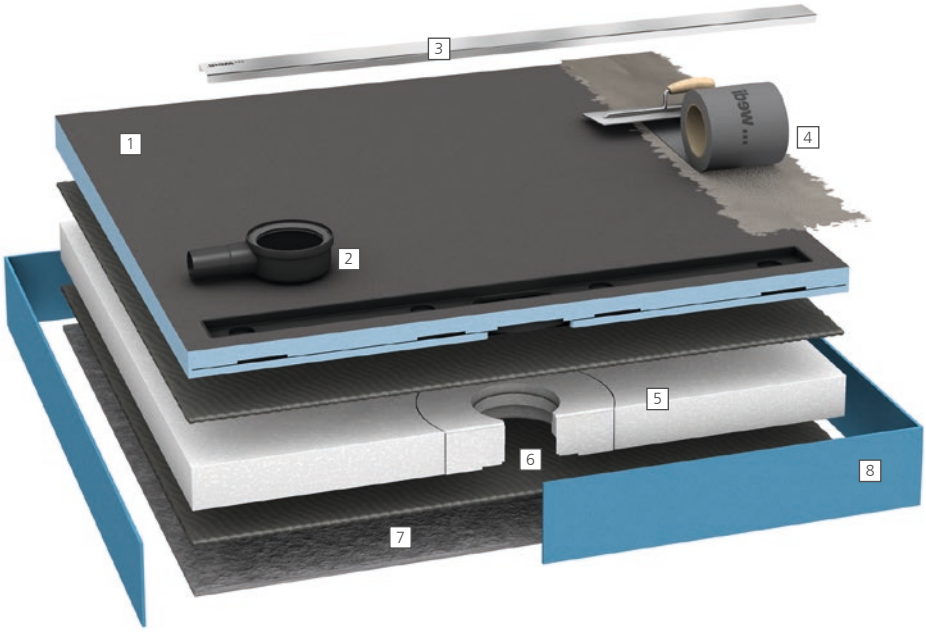
Sound insulation for classic shower systems on screed

wedi system components: 1 Fundo Primo shower element 2 wedi Fundo point drain DN 50, horizontal 3 wedi Fundo drain grid 4 wedi Fundo sealing set 5 wedi 320 universal tile adhesive 6 wedi Nonstep ProS sound insulation fleece 7 wedi Tools edge insulation strips



Sound insulation for complete systems

wedi system components: 1 Fundo Plano shower element 2 sealing corner for Fundo Plano 3 Fundo Plano drain grid 4 wedi Fundo sealing set 5 wedi 320 universal tile adhesive 6 wedi Nonstep ProS sound insulation fleece 7 wedi Tools edge insulation strips



Sound insulation for shower systems on the wedi Fundo substructure set

wedi system components: 1 Fundo Riolito neo shower element 2 wedi Fundo channel drain Mini Max DN 40, horizontal 3 wedi Fundo channel cover 4 wedi Fundo sealing set 5 wedi Fundo substructure set 6 wedi 320 universal tile adhesive 7 wedi Nonstep ProS sound insulation fleece 8 wedi Tools edge insulation strips







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