SOUND INSULATION

Trust in LUNOS

Fresh air for generations

LUNOS is a Berlin-based company and the market leader for decentralised residential ventilation systems. The company was founded in 1959 and is still based in Berlin-Spandau. In 2019 a second location was opened in Brandenburg. With the expanded production capacities and the company's own research and development department, the increased demand the company can meet the demand for modern ventilation systems. In Falkensee, the units are subjected to numerous performance and situation tests based on modern laboratory technology. The range of tests extends from volume flow and sound insulation measurements in different situations, to thermodynamic performance tests to determine the efficiency. In a special laboratory, the foundations are also laid for the development of advanced ventilation systems and prototypes. In order to meet the quality standards of our customers, every unit is thoroughly tested before it goes on sale. In addition to numerous performance tests, various simulations are carried out for living and ventilation situations.

The development department is divided into various special laboratories with different test focuses: In thermodynamic and volumetric flow laboratories, for example, different application and temperature conditions are created as a test basis in order to determine the volumetric flow or the running performance at different pressure conditions. This also includes a large number of efficiency and effectiveness measurements. Thanks to this very comprehensive and up-to-date test environment, it is possible to react to the most varied and changing demands on advanced ventilation systems. Research and development is a central component of the LUNOS future.

For decades LUNOS has been standing for highest quality, functionality and comfort. Ventilation systems, whether with or without heat recovery, improve the air quality in the house and save energy in everyday life at the same time.

Made in Germany

INFORMATION
On our homepage www.lunos.de/en you will find data sheets, user information and much more.

Maximum sound insulation thanks to LUNOS

with the new sound insulation products

Just leave the noise outside

A representative survey of 2,000 participants by the Federal Environment Agency revealed that more than half of the German population feels disturbed or annoyed by street noise. Approximately the same number of people are actually exposed to excessive noise levels and suffer from health problems as a result. In order to ensure a sense of well-being and to protect oneself from street noise, special sound insulation is essential.

LUNOS recognised this problem years ago and is constantly working on new products that help you to feel good in your own four walls.

On the following pages we will provide you with detailed information on the subject of sound insulation, including terms and values, and introduce you to our products with a focus on sound insulation. The ventilators and components can be combined with each other, so the right ventilation system can be found for every building project.

Why settle for anything less?

As the market leader for decentralised residential ventilation with 60 years of experience in the ventilation industry, we naturally know all the standards and guidelines. So you can always be sure that the ventilation concept meets the current requirements.

Furthermore, we give our values with the possible and realistic volume flows under fixed conditions (e.g. wall thickness). Our sound values are always documented by measurement reports according to valid standards. In most cases, independent institutes have also been entrusted with the measurement and have issued corresponding certificates, which can be viewed on request. This is important to avoid unpleasant surprises after successful planning. For your individual offer, our technical customer service is also available to you personally:

@ planung@lunos.de
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During the planning phase, pay close attention to what volume flows in combination with what sound values and wall thickness can actually be achieved. Only the correct combination of these values will bring the desired success in ventilation and sound insulation planning.

You can count on us

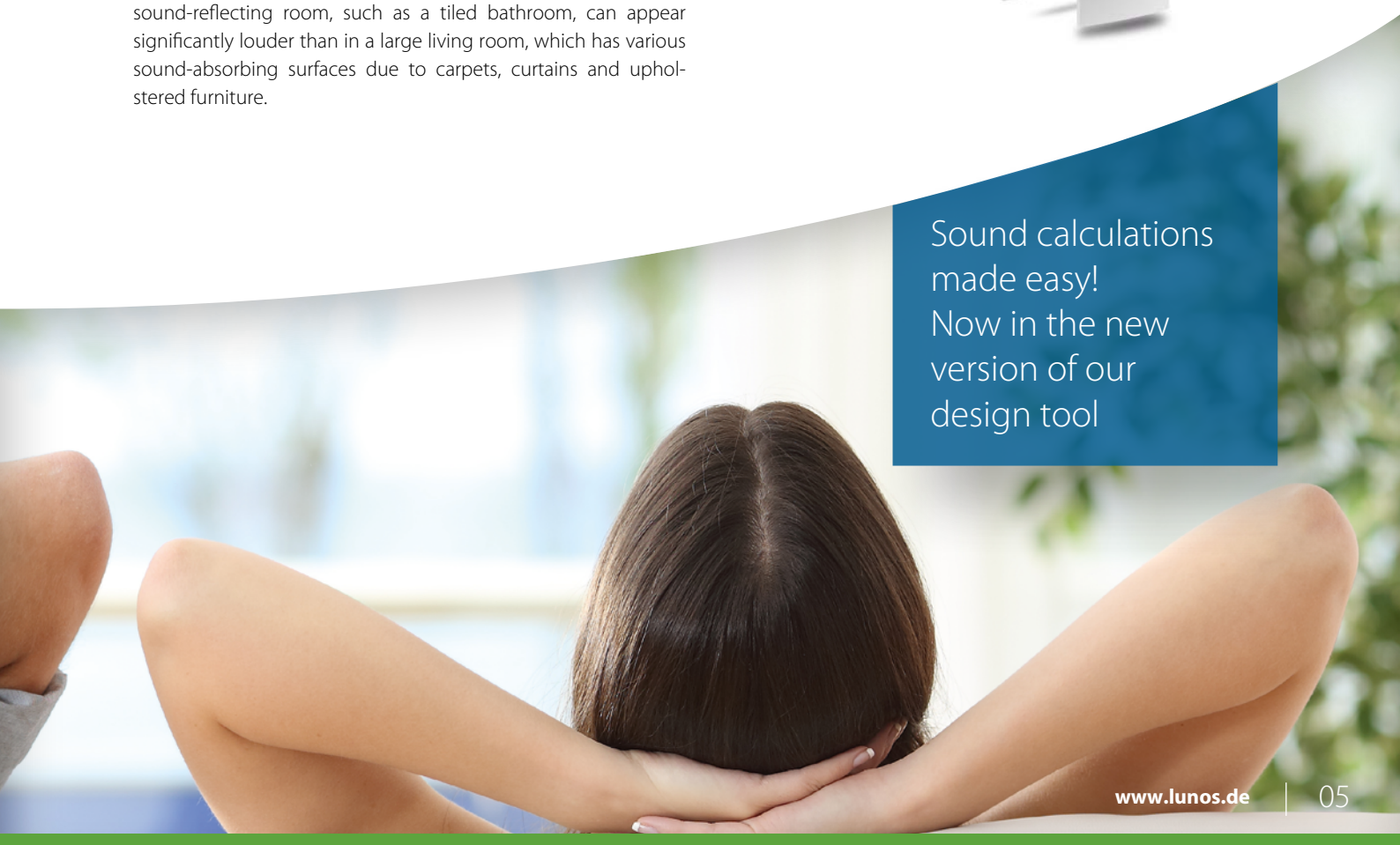
The same applies to the technical data of LUNOS. Consequently, sound values are of course measured and tested with the ventilation unit open. A closed unit may let through less sound, but ventilation is ultimately about the supply of fresh air. And this is precisely what has been close to LUNOS' heart for over 60 years.

Interesting facts about ventilation with sound insulation

The standard sound level difference is a measure in decibels [dB] for the attenuation of a component from external noise. It describes how much noise can penetrate through the component from outside to inside. Higher values are advantageous because the attenuation of the noise is then stronger. The higher the standard sound level difference, the more noise is absorbed by the component. 3 dB more corresponds to a halving of the volume, since the standard sound level difference is not linear but logarithmic.

It is also important to distinguish between sound from outside and from the device itself. It is practically impossible to differentiate without comparative measurements. The filtering of ambient noise is also problematic. For example, there are often sound components which cannot be perceived but which the measuring instrument reproduces as an average value. The positioning of the ventilation units is also decisive. Depending on the installation location and the associated possible sound reflections, the volume of a fan can vary considerably.

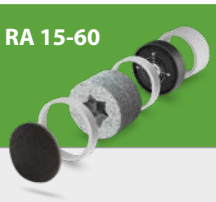
Fans in a corner of a room become up to 9 dB louder than when positioned directly on a free wall. The size and the nature or equipment of a room also play a role in the development and perception of sound. For example, a sound source in a small sound-reflecting room, such as a tiled bathroom, can appear significantly louder than in a large living room, which has various sound-absorbing surfaces due to carpets, curtains and upholstered furniture.



Sound insulation overview

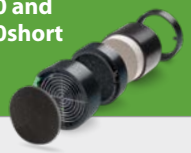
Intelligent combination of sound insulation ventilation

SINGLE-CHANNEL

Maximum achievable standard sound level difference Dn,e,w (dB) *according to DIN EN ISO 140-2, measured at 500 mm wall thickness**	**ALD** 	**ALD-SV** 	**ALD-S** 	**RA 15-60** 
Inner screen & outer grilles 	56	61	67	53
Inner screen & outer hood 	57	62	68	54
Inner screen & LUNOtherm-S 	63	65	70	60
Inner screen & LUNOtherm-S+ 	65	69	**75**	63
Sound insulation screen & outer grilles 	57	62	68	54
Sound insulation screen & outer hood 	58	63	68	55
Sound insulation screen & LUNOtherm-S 	65	67	71	62
Sound insulation screen & LUNOtherm-S+ 	**69**	**71**	73	**67**

Sound values of standard inner screen 9/IBE are also valid for all other inner screens except sound insulation screen.
All data are mathematically rounded.

In the LUNOS design tool you can now determine the values yourself depending on the combination and wall thickness.

$e^2$60 and $e^2$60short 	TWO-CHANNEL **Maximum achievable standard sound level difference Dn,e,w (dB)** *according to DIN EN ISO 140-2, measured at 500 mm wall thickness**	e^{go} 	Ne^{xx}t 
	Outer hood 		
58		43	49
60			
62			
67			
59			
60			
62			
67			

Noise insulation analysis

In principle, the weakest link in the overall noise control assessment is the one that is most responsible for the success of a noise control measure. For example, it does not make sense to combine a ventilation system with maximum sound insulation with windows, for example, which do not contribute significantly to sound insulation. Nor does it make sense to use a strongly sound-insulated ventilation system with limited sound insulation (consideration of the dwelling or room without a ventilation system), which has values above the total sound insulation (without ventilation system). A coordination of all components to each other is indispensable here. A ventilation system should always have a higher sound insulation than, for example, a window in the immediate vicinity or in the same room. This makes sense, because otherwise the human ear tends to "locate" a conspicuous sound source. If, for example, the sound insulation of the ventilation system were lower than that of the window, the user would have the feeling that all the sound input from outside is introduced by the ventilation system. Thus, even if the ventilation system meets all sound insulation requirements, it may be perceived as disturbing. However, if the ventilation system has higher sound insulation than the window, the overall impression is completely different and the ventilation system is not perceived as disturbing.

*Further sound values related to the wall thickness can be found in the sound insulation reports and the brochures $e^2$60 Sound Insulation and ALD Sound Insulation.

Maximum possible sound insulation

Exterior wall air outlet outlets

Standard sound level difference of up to 75 dB

The exterior wall air outlets ALD, ALD-SV and ALD-S serve as passive air supply for living rooms and bedrooms. They are mainly used in combination with LUNOS exhaust air units. A constant negative pressure is created by the exhaust fans in the functional rooms such as the bathroom and kitchen and in this way fresh air is transported into the house via the exterior wall air outlets.

This ensures user-independent ventilation in accordance with DIN 1946-6, if planned in accordance with standards.

New flexible material of the sound insulation element

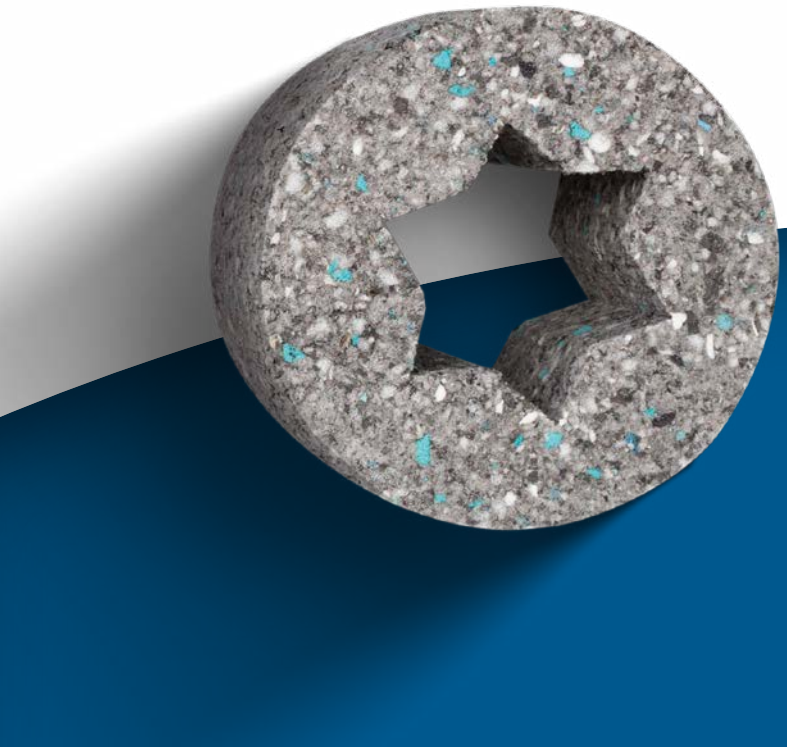
The sound insulation elements were optimised by LUNOS. The new flexible material made of granulate is a composition of technical foams which, due to the manufacturing process, achieve a high specific weight while maintaining a high degree of flexibility. This makes it possible to achieve sound insulation values that were not possible in this way before.

The new soundproofing elements, which are made of insulating materials of different densities, significantly reduce the sound input via ventilation. It is precisely this modular property of the new multi-component foam that optimises the sound insulation properties of the exterior wall air outlets over the entire frequency range. In addition, the geometry and the staggered arrangement of the star-shaped sound absorbers provide a large sound absorbing surface and thus more effective sound insulation. Thanks to the new material, the ALD-S no longer requires the sound reflector.

ALD and ALD-SV are equipped for all applications. Three volume flow rates can be set using the reduction panel: 15, 20 and 25 m^3/h. This allows optimum and comfortable ventilation of different room sizes with different air requirements of ALD and ALD-SV. If high volume flows are required with better sound insulation, the ALD-SV ensures sufficient fresh air supply.

With an even arrangement of the sound insulation elements, the ALD-SV can achieve a volume flow of up to 30 m^3/h at 8 Pa.

For particularly high sound insulation requirements the ALD-S is the first choice, because in combination with the LUNOtherm-S it reaches values of up to 75 dB at a volume flow of 10 to 15 m^3/h.



SOUND DIAGRAM*
USING THE EXAMPLE ALD-S

*For further information, please refer to the sound insulation report and the ALD sound insulation brochure.

ALD
Technical data

ALD

Ø: 154 mm

V̇:	at 8 Pa	at 4 Pa
⊠	25 m³/h	18 m³/h
○	20 m³/h	13,5 m³/h
◎	15 m³/h	10 m³/h

Sound insulation

Wall thickness	$D_{n,e,w}$
360 mm	50 – 65 dB(A)
500 mm	56 – 69 dB(A)

ALD-SV

Ø: 154 mm

V̇:	at 8 Pa	at 4 Pa
⊠	25/30* m³/h	18 m³/h
○	20 m³/h	13,5 m³/h
◎	15 m³/h	10 m³/h

Sound insulation

Wall thickness	$D_{n,e,w}$
360 mm	53 – 66 dB(A)
500 mm	61 – 71 dB(A)

ALD-S

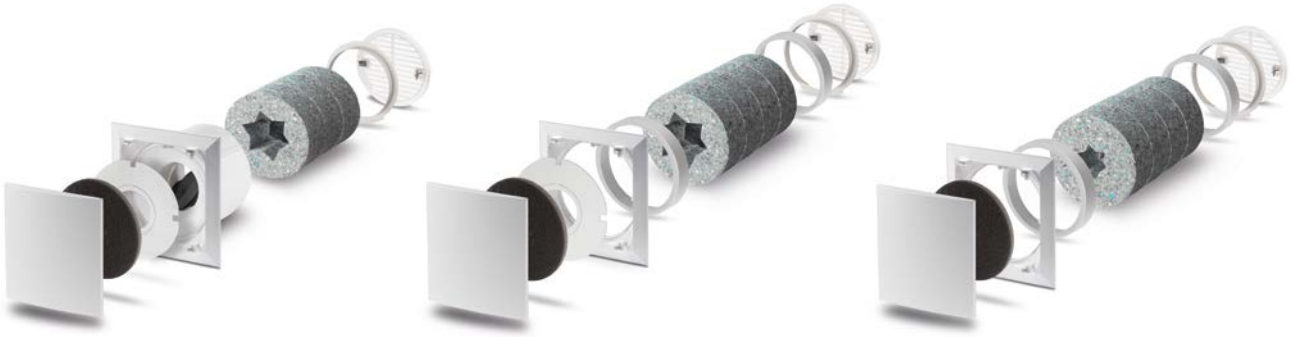
Ø: 154 mm

V̇:	at 8 Pa	at 4 Pa
⊠	15 m³/h	10 m³/h

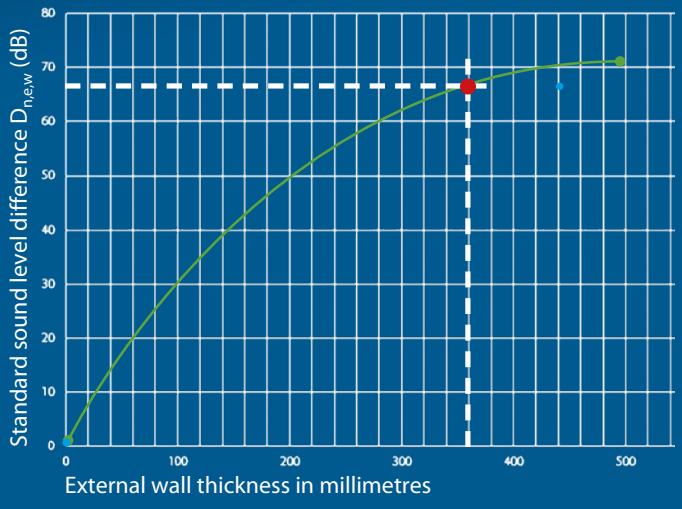
Sound insulation

Wall thickness	$D_{n,e,w}$
360 mm	56 – 71 dB(A)
500 mm	67 – 75 dB(A)

The specified standard sound level differences apply to the above-mentioned volume flows with a circular duct completely filled with sound absorbers.
*Volume flow of the ALD-SV with an even arrangement of the sound insulation elements. All data are mathematically rounded.



The standard sound level difference of the ventilation unit is required for an external wall thickness of 360 mm.



The e²60 with sound insulation

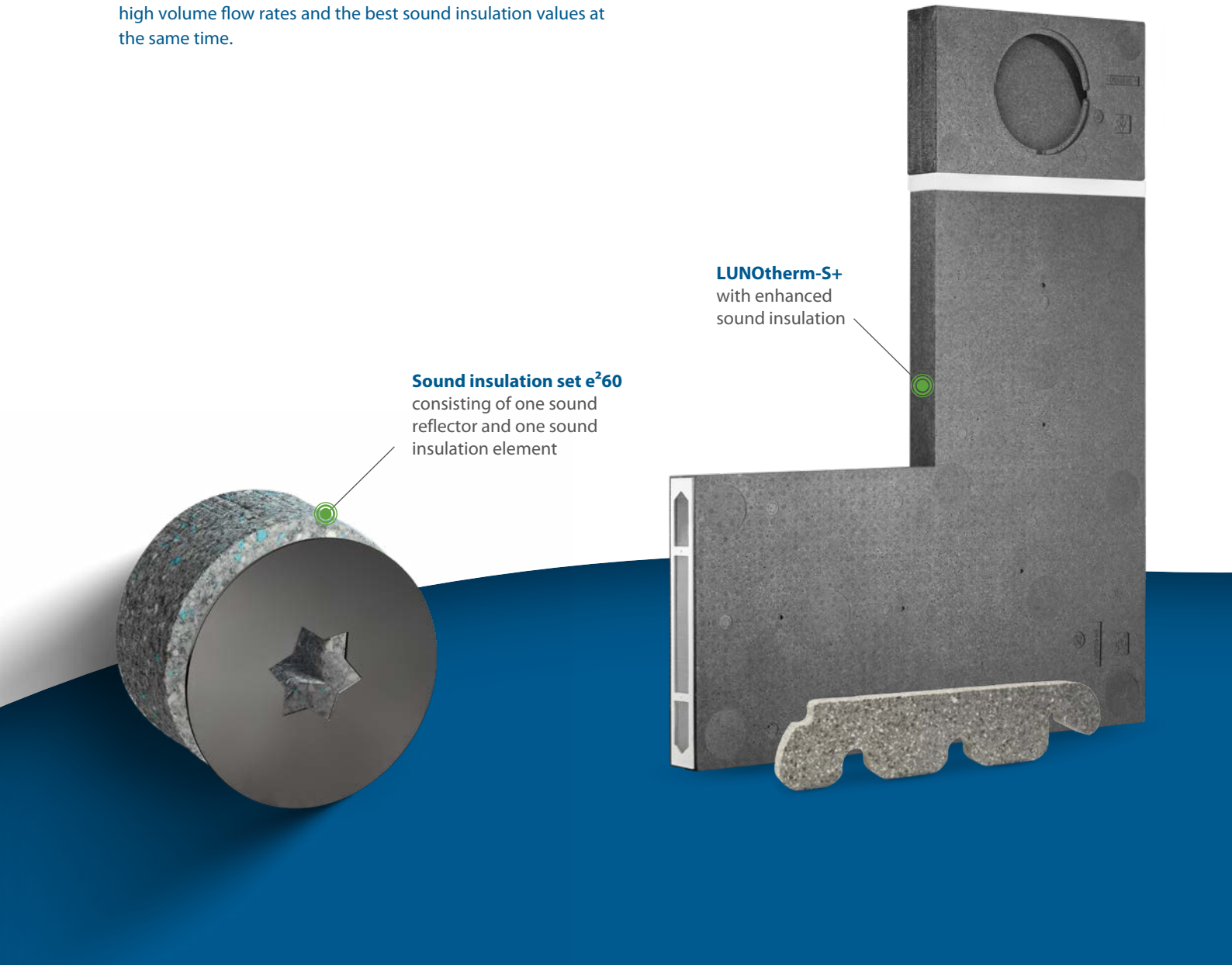
Ventilation with heat recovery

The e²60

The e²60 is a highly efficient ventilation unit with heat recovery. It enables a steady volume flow of up to 60 m³/h and at the same time provides the highest level of sound insulation. The e²60 is a further development of the well-known e². In addition to the high efficiency, emphasis was also placed on a particularly high pressure constancy.
This means that even in areas with very high wind loads, such as on the coast or at high altitudes, a constant volume flow can be delivered without any problems. This volume flow constancy makes it possible to equip the e²60 with even more sound insulation elements.
The result is a ventilation unit with heat recovery that achieves high volume flow rates and the best sound insulation values at the same time.

e²60: Standard sound level difference of up to 67 dB

The various combinations of sound insulation elements were optimised in LUNOS' own sound measurement room. The new, flexible material made of granulate was installed alternately with a sound reflector made of stainless steel in the wall-tube of the e²60 and achieves maximum values for the standard sound level differences. Of course, the achievable sound insulation depends on the wall thickness of the outer wall in which the e²60 is installed. With a wall thickness of 456 mm equipped with the LUNOtherm-S+ and three sound insulation sets, **the e²60 reaches the peak value of 67 dB.**



e²60
Technical data

e²60		
Max. degree of heat supply:		96 %
Heat supply level accor-ding to EN 13141-8 at reference volume flow:		20 m³/h: 96 % 40 m³/h: 90 % 60 m³/h: 85 %
Energy efficiency class:		A+
Sound insulation:	Wall thickness	$D_{n,e,w}$
	360 mm 500 mm	49 – 58 dB(A) 58 – 67 dB(A)

e²60short		
Max. degree of heat supply:		89 %
Heat supply level accor-ding to EN 13141-8 at reference volume flow:		40 m³/h: 83 % 60 m³/h: 80 %
Energy efficiency class:		A
Sound insulation:	Wall thickness	$D_{n,e,w}$
	360 mm 500 mm	49 – 58 dB(A) 58 – 67 dB(A)

The specified standard sound level differences apply at the volume flows listed above with a wall-tube completely filled with sound absorbers.
All data are mathematically rounded.

e²60
For outer walls from 280 mm wall thickness

e²60short
For narrow outer walls from 200 mm wall thickness

For further sound values in relation to the wall thickness, please refer to the sound insulation reports and the e²60 sound insulation brochure.

The facade elements LUNOtherm-S and -S+

Sound insulation almost invisible

LUNOtherm-S: The facade element with significant higher sound insulation

With the development of the patented LUNOtherm facade element, LUNOS has fulfilled the desire for a smooth facade, interrupted only by the windows. Here all the advantages of exterior wall air outlets, such as high air throughput, draught-free, hygienic and sound insulation, can be achieved in connection with an almost invisible exterior appearance. LUNOtherm is inserted into the insulation layer of the thermal insulation composite system (ETICS). The supply air or exhaust air opening is then located in the window lintel or the window reveal. LUNOtherm can be installed above or next to the window, so that the combination with a roller shutter box is also possible without any problems.

LUNOtherm-S and LUNOtherm-S+ have the general building authority approval Z-56.212-3628 according to DIBt. They can be installed in an ETICS approved by the building authorities and can also be over- or underinsulated.

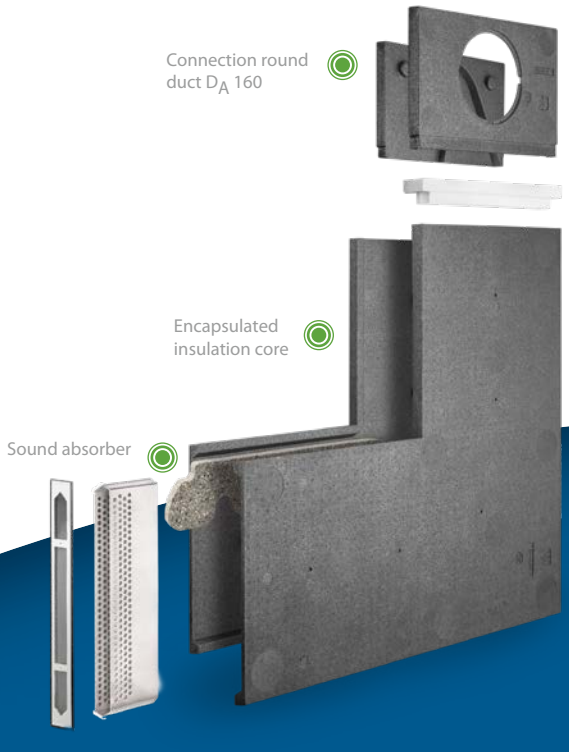
The LUNOtherm-S and -S+ façade elements have been optimised for high sound insulation and are also very easy to process. The deflection of the air and thus also of the sound by a further 90° ensures the high sound insulation properties.

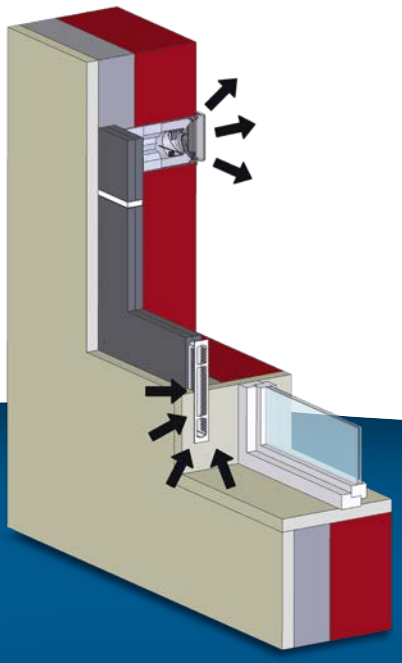
Together with the new sound absorber 9/SD-LS, the LUNOtherm-S becomes the LUNOtherm-S+, which easily achieves values of up to 75 dB. Even when installed, the LUNOtherm-S can of course be retrofitted with the new sound absorber to become the LUNOtherm-S+.

A significantly lower weight and an adaptable standard size additionally provide for better handling in logistics and on the construction site and also for greater freedom in the positioning of the round ducts.

In combination with the ALD-S, the LUNOtherm-S+ can achieve a standard sound level difference of up to 75 dB.

LUNOtherm-S+





LUNOtherm-S and -S+
combined with e^2

Facade elements
Technical data

LUNOtherm-S

Suitable for installation in an ETICS approved by the building authorities. Installation with over-insulation or under-insulation possible.

Dimensions:	(H x W x D) 930 x 700 x 60 mm shortenable up to (H x B) 630 x 400 mm
Dimensions external grille:	(H x W) 345 x 53 mm
Additional sound absorbers:	9/AD-LS retrofittable

LUNOtherm-S+

Suitable for installation in an ETICS approved by the building authorities. Installation with over-insulation or under-insulation possible.

Dimensions:	(H x W x D) 930 x 700 x 60 mm shortenable up to (H x B) 630 x 400 mm
Dimensions external grille:	(H x W) 345 x 53 mm
Additional sound absorbers:	9/AD-LS included in delivery

LUNOS Lüftungstechnik GmbH
Werk Falkensee
Z-56.212-3628
MPA Dresden

LUNOtherm-S and -S+
One size with 60 mm thickness for all insulation thicknesses

Inner screen & outer hoods with sound insulation

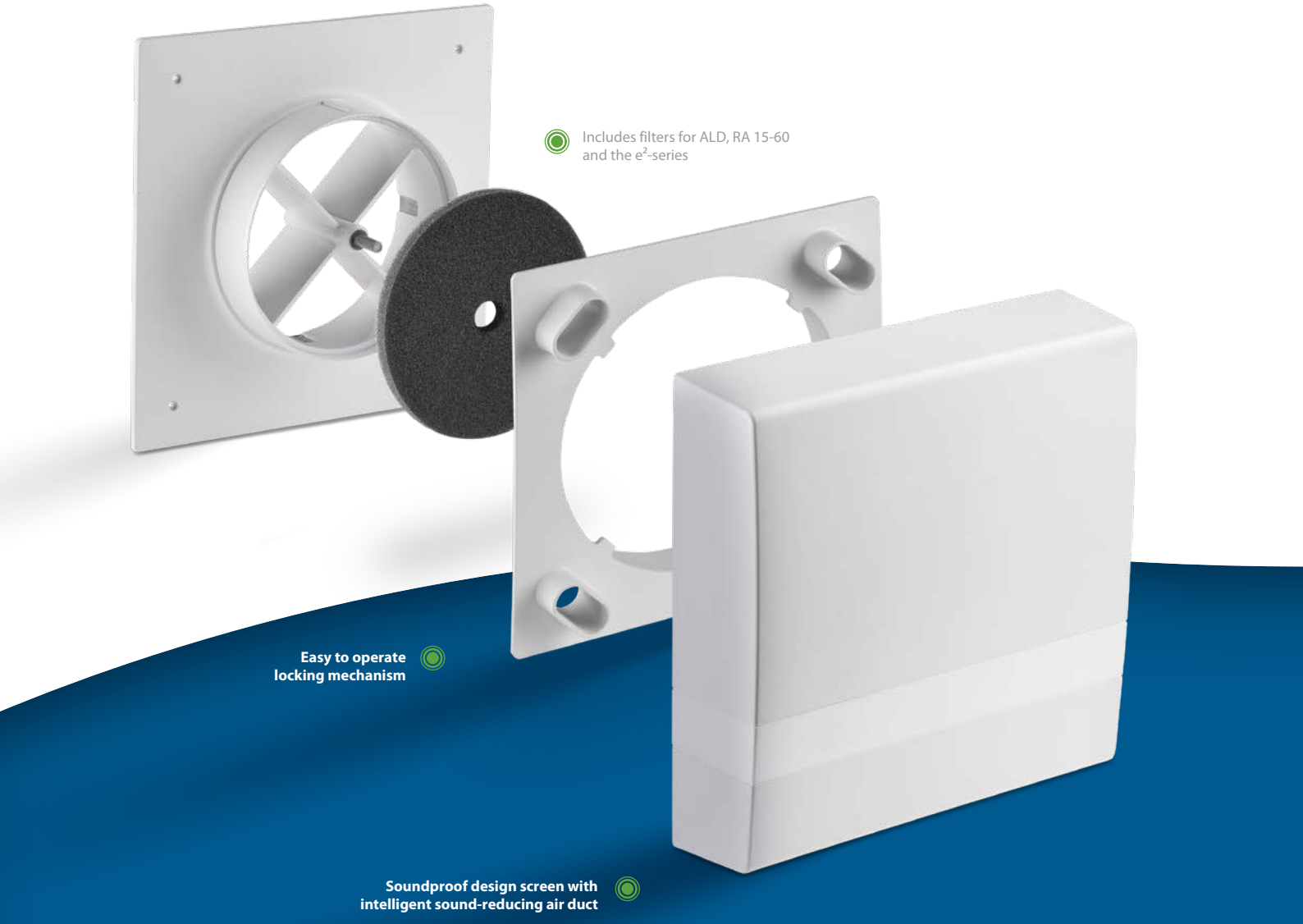
Sound insulation inner screen and sound insulation outer hood

Sound insulation inner screen from LUNOS

The sound insulation inner screen increases the standard sound level difference again by up to 6 dB, depending on the ventilation component and the length of the round duct. It is particularly suitable for the e^2 series and, in addition to the sound input, reduces further the already silent of the ventilation unit. The sound insulation inner screen is supplied with washable filters of filter class G2 and G3 as standard and can be closed by a simple snap-in function using a spring element.

Additional sound insulation for the outer hoods

The outer hoods in aluminium and stainless steel are available for one- and two-channel ventilation. This means that in addition to the e^2 series and the exterior wall air outlets, the e^{go} and $Ne^{xx}t$ series can also be equipped with them. Due to the extended sound insulation, the standard sound level difference can also be increased by up to 6 dB compared to the standard external grilles. In addition, a circumferential seal ensures a controlled discharge of the con-taminated exhaust air.



Screens & hoods
Technical data

Sound insulation inner screen

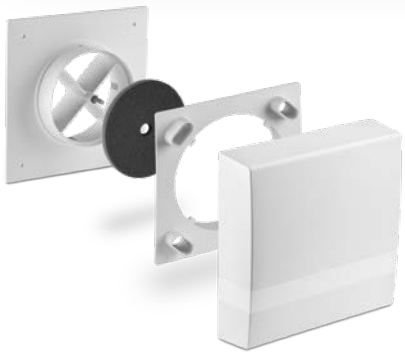
Opening and closing by spring element with locking function

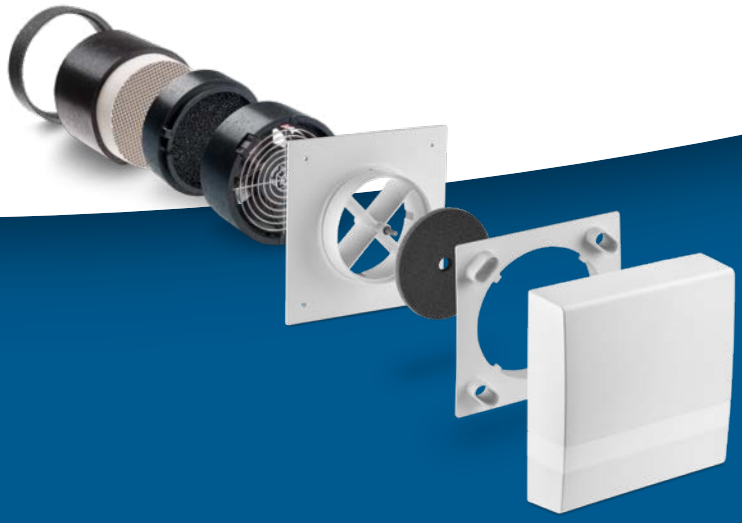
Dimensions: (H x W x D) 250 x 250 x 78 mm
Filter: one each filter class G2 and G3
Pollen filter: 9/FIB-PL available as accessory

Outer hoods

Available for one-channel ventilation and two-channel ventilation.

Dimensions: (H x W x D) 235 x 205 x 72 mm,
Universal hoods: 235 x 213 x 74 mm
For round ducts: Ø 160 mm
One-channel ventilation: 1/HWE, 1/HAZ and 1/HES
Two-channel ventilation: 1/HWE-2 and 1/HAZ-2
Universal hoods: 1/KWE and 1/KAZ





POSSIBLE APPLICATIONS

The e² series can be optimised further when combined with the sound insulation products.

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