

Climate for a Feeling of Wellness

Regulated apartment ventilation
with LUNOS ventilation systems



LUNOS


LUNOS

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(This chapter applies only in Germany)

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Product overview

For more than 50 years

A breath of fresh air



› Quality is something that survives over time.

It began with an innovation: LUNOS devised a ventilation stone as a passive ventilation system for kitchen cabinets ventilated from outside – in the 50's and 60's the years of the "economic miracle", when new, practical lifestyle concepts were in demand. A little later, LUNOS advanced to become one of the best known manufacturers of apartment ventilation systems. They used solutions that were compatible overall and extremely long-lived and components, which provided for a perceptible improvement in living climates and a thoroughly healthy building substance. And continue to do so to this day. This has made LUNOS one of the leading companies involved in remediation and new building.

› LUNOS stands for more than living climate.

LUNOS ventilation systems generate demand-driven, clean and hygienic ventilation of all apartment spaces and guarantee dry, mold-free walls. In addition, they offer considerable savings in heating costs – with low purchase and operating costs. And of course they offer the quality and security which we guarantee with our name.



With LUNOS

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Pure air

› A continuous supply of pure air – in spite of sealed joints.

Formerly, vital fresh air was sucked in through door and window joints. Now, modern building mantels indicate very low levels of sealing leakage, regardless of whether new building or following remediation. This is because low levels of air escape are the only way that energy consumption can be reduced to a minimum, such as e.g. in the case of the German standard low-energy house (NEH), in accordance with the German Energy Saving Ordinance (EnEV).

A fully effective window ventilation without unnecessary energy losses is difficult to achieve for the consumer. Mostly, there is too much or too little ventilation and both are incorrect. Fresh air therefore needs new ways to enter. LUNOS offers this in the form of apartment ventilation systems which bring in clean air, regulated and as required, and which quickly and discreetly transport the exhaust air to outside, along with all pollutants. Simultaneously, they keep humidity levels low and give mold and dust mites no chance of survival. Allergic persons can breathe freely at last. Thanks to the effectively filtered ventilation, suspended matters remain outside the door. Likewise, traffic noise does not penetrate into the living space through the effective acoustic insulators. LUNOS systems allow only the goodness from the environment into the house.

And it achieves this at the correct level: We feel well where the humidity of the room air is permanently less than 50% r.h. and persons and buildings remain healthy. Therefore LUNOS ventilation systems control demand-driven air changes based on the moisture level.

› Demand-driven, regulated living-space ventilation with LUNOS

In comes:	<ul style="list-style-type: none">• Fresh, filtered air – always sufficient, without any perceptible draft
Out goes:	<ul style="list-style-type: none">• Moisture and odor-intensive air from kitchen, bathroom, WC etc.• Pollutants and outgassing from paint, carpets, furniture, etc.
Inside remains:	<ul style="list-style-type: none">• Heating thermal energy
Outside remain:	<ul style="list-style-type: none">• Suspended matter (through filter inserts)• Noise (through sound-absorbing, air transfer devices)• Wind (through wind-pressure protection on the air transfer devices)• Mold and house dust mites (through constant low humidity)

*20% Mold gives a clear message: In every fifth apartment in German buildings, ventilation is too low! (Bishop, W.: First results of the nationwide inquiry concerning the causes of moisture damage and mold contamination in apartments, Chimney-Sweep Craft No. 7/02, in 2002)

the house "breathes"

For the well-being of persons and the benefit of the brickwork





The LUNOS

Demand-driven

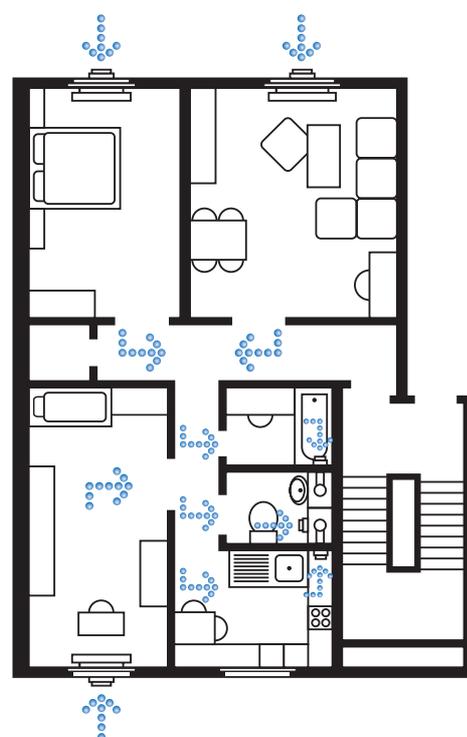
6 · 7

LUNOS ventilation system

› The principle

LUNOS ventilation systems are based on a demand-driven ventilation of the entire residential area. According to requirement and the level of moisture, ventilators transport the exhaust from the bathroom, kitchen, WC or wash-room into the open air or into exhaust air shafts. In this way, a slightly reduced air pressure is formed in the living space. Due to this low air pressure, fresh, filtered air flows into the living and sleeping areas, children's rooms and working areas through the air transfer devices. In the doors, overflow openings guarantee the ventilation link between air supply and air exhaust spaces.

A fresh air change therefore occurs continuously: From outside initially into the residential area and then into the exhaust air spaces. Without noise, without any draft and without pollutants. The wind-pressure protection and the volume flow limitation in the air supply elements guarantee the absence of any drafts. The acoustic dampers, which are likewise integrated, guarantee that fresh air exclusively, instead of noise, gets into the house, also on streets with heavy traffic.



› It leaves you in peace: Acoustic insulation.

Residential and traffic areas are moving increasingly closer together. However, persons feel good only within "quiet walls". Therefore the high demands, which arise when building under acoustic insulation conditions (German IV-V noise level range), can be simply fulfilled with LUNOS ventilation systems. Acoustic specialist appraisals provide documentary evidence of the excellent LUNOS values.



ventilation system

apartment ventilation: The correct amount is a determining factor

Summer/Reduction operation

Summer/Reduction operation (30 m³/h): The moisture control is switched off. In this status the ventilator permanently operates a minimum air change. This stage is necessary in summer if warm moist air is transported into the house from the outside, to which the moisture control would react with an unnecessarily high volume flow. Furthermore, this stage can be used as a night-time reduction operation.

Winter moisture operation

Winter operation (30 - 90 m³/h): The moisture control is active. If the relative humidity in the exhaust air increases above 50% r.h., then the ventilator runs on a characteristic that increases the exhaust air volume flow according to the moisture level until the moisture is carried off. Thus the volume flow is increased slightly at an early stage and the moisture is transported out without being noticed. Not only is the value of the relative humidity evaluated, but also the duration of the moisture entry.

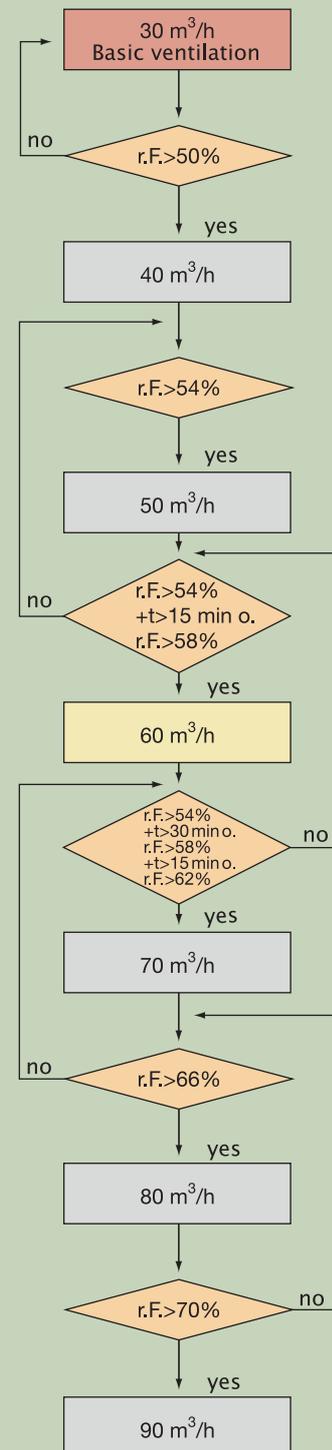
Required ventilation "On"

Required ventilation (60 m³/h): The moisture control is switched off. The volume flow of the ventilators in this stage corresponds to the requirements on the ventilation of interior bathrooms. It can be switched simultaneously with the bathroom lighting.

The control elements can be placed centrally or in every exhaust air space. Thus the required ventilation in the bathroom and toilet should be switched together with the light switch, while an adaptation from winter to summer/reduction operation can be implemented centrally for all ventilators.

› As much air as necessary, as little as possible: Demand-driven ventilator regulation

With LUNOS ventilation systems, the inhabitants no longer have to bother about anything. Summer as well as winter: Always a pleasant, healthy room air climate.



Solution 1 for multi-story apartment

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Decentralized ventilation

With this example, the air is sucked off from the kitchen and bathroom with ventilators arranged decentralized and carried off over the roof via a common exhaust-air duct section. A slightly reduced air pressure results from this in the living area, where fresh air flows into the living and sleeping-area via the air transfer devices. Overflow openings, such as door grating or similar, provide for a ventilation link between the air exhaust and air supply areas.

› The air supply side

ALD 36,5

Air transfer device with rectangular cross section.

Wind-pressure protection, filter and acoustic damper.

$$\dot{V}_{8Pa} = 24 \text{ m}^3/\text{h}$$



ALD-R 160

Air transfer device with round cross section.

Wind-pressure protection, filter and acoustic damper.

$$\dot{V}_{8Pa} = 30 \text{ m}^3/\text{h}$$

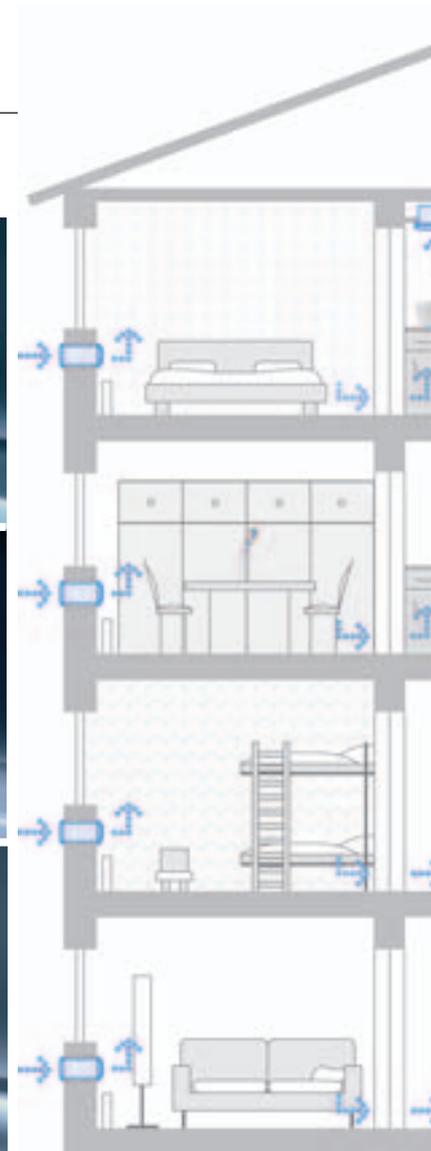
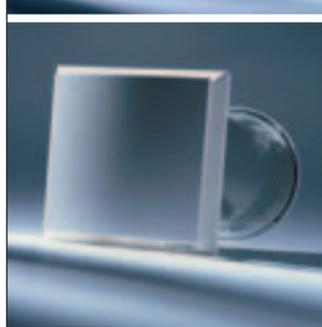


ALD-R 110

Air transfer devices with round cross section.

Wind-pressure protection, filter and acoustic damper.

$$\dot{V}_{8Pa} = 10 \text{ m}^3/\text{h}$$



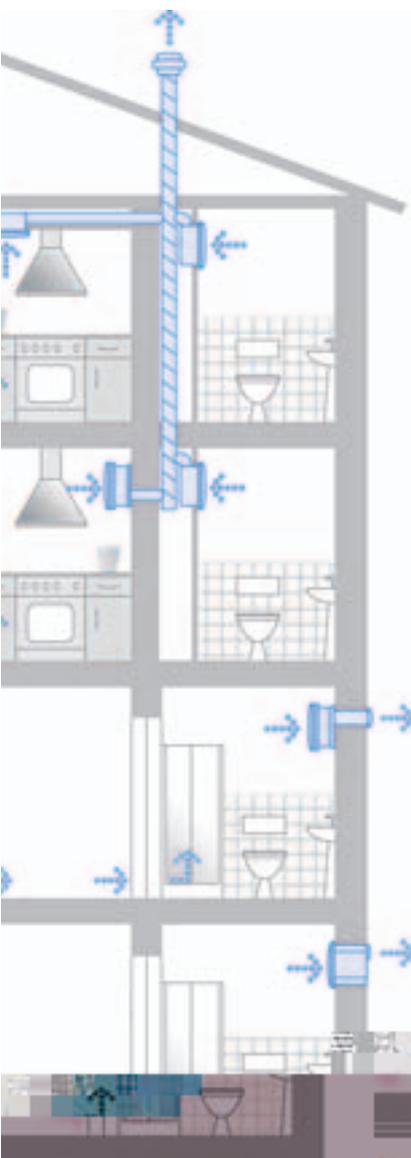
construction

Decentralized ventilation



For all LUNOS components, the following applies:

- › Simple installation
- › Quiet
- › Demand-driven
- › Sound-absorbing
- › Energy-saving
- › Low capital outlay
- › Low operating costs
- › Fire protection can be integrated



› The exhaust-air side

Skalar-F

Ventilator flush-mounted in plaster for flat (12 cm), wall-flush installation.

Exhausts air into a duct section.



Saphir-F

Ventilator mounted on plaster for installation on the wall.

Exhausts air into a duct section or through the wall to outside.



LRK-F

Ventilator flush-mounted in plaster for narrow shafts or for wall-flush installation in the outside wall.

Exhausts air into a duct section or to outside.





Solution 2

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Apartment-related ventilation

In this case also, the used air is sucked off from the kitchen and bathroom. However, this occurs with exhaust air devices arranged centrally in the apartment, which then carry off the air, either via a common duct section or through the external wall. Because of the slightly reduced air pressure resulting in the living area, fresh air flows into the living and sleeping areas through the air transfer devices. Overflow openings, such as door grating or similar, also guarantee here a ventilation link between the exhaust and air supply areas.

All LUNOS advantages at a glance:

- › Concealed installation of the ventilation device
- › Quiet ventilation of several rooms
- › Demand-driven
- › Sound-absorbing
- › Energy-saving
- › Low capital outlay
- › Low operating costs
- › Variable installation
- › Fire protection can be integrated

› The air supply side

ALD 36,5

Air transfer devices with rectangular cross section.

Wind-pressure protection, filter and acoustic damper.

$$\dot{V}_{BPa} = 24 \text{ m}^3/\text{h}$$



ALD-R 160

Air transfer devices with round cross section.

Wind-pressure protection, filter and acoustic damper.

$$\dot{V}_{BPa} = 30 \text{ m}^3/\text{h}$$



ALD-R 110

Air transfer devices with round cross section.

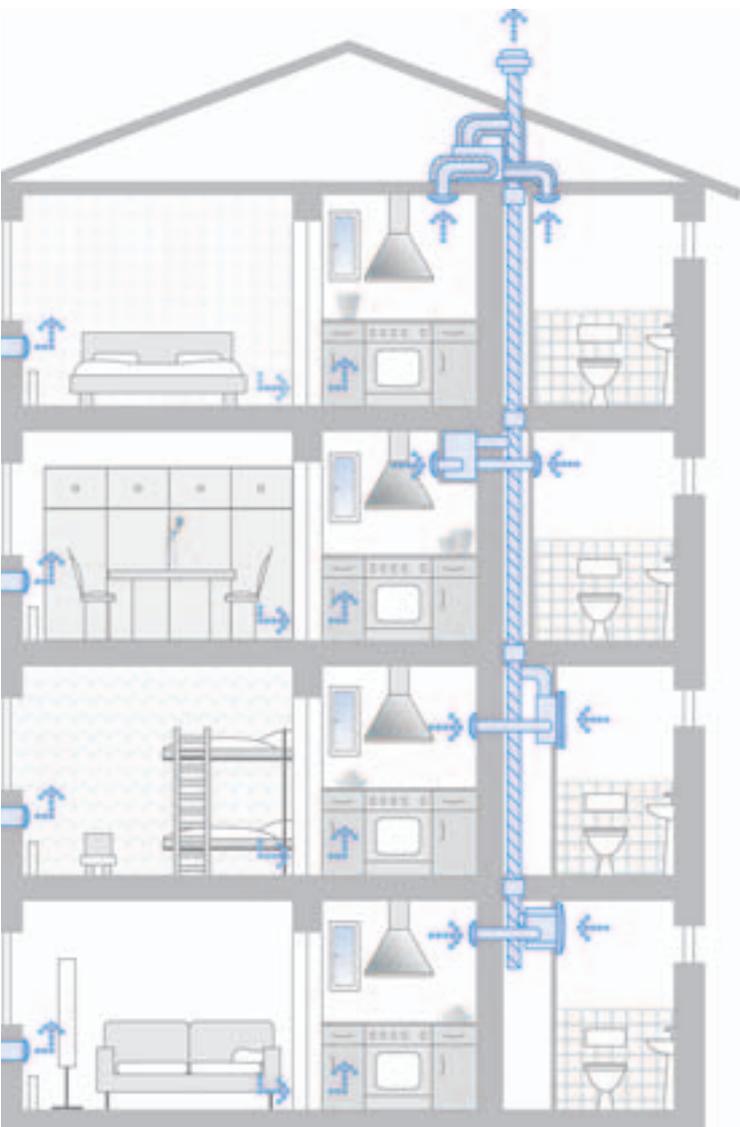
Wind-pressure protection, filter and acoustic damper.

$$\dot{V}_{BPa} = 10 \text{ m}^3/\text{h}$$



for the multi-story apartment construction

Apartment-related ventilation



› The exhaust-air side

Lunomat F

Central ventilator for installation in the partition wall, cabinet or ceiling area.

Exhausts air from max. three rooms into a duct section or to outside.



Skalar-2-F

Ventilator flush-mounted in plaster for flat (12 cm), wall-flush installation.

Exhausts air from two rooms into a duct section.



LRK-2-F

Ventilator flush-mounted in plaster for narrow shafts or for wall-flush installation in the outside wall.

Exhausts air from two rooms into a duct section.





Solution 1

Decentralized ventilation

12 · 13

Decentralized ventilation

With this example, the used exhaust air is carried off from bathroom and kitchen, either via a short duct section over the roof or the ventilators are mounted on, or in, the external wall. The exhaust air is transported directly to outside in this case. Because of the slightly reduced air pressure resulting in the living area, fresh air flows into the living and sleeping areas through the Air transfer devices. Overflow openings, such as door grating or similar, also guarantee a ventilation link between the exhaust and air supply areas.

› The air supply side

ALD 36,5

Air transfer devices with rectangular cross section.

Wind-pressure protection, filter and acoustic damper.

$$\dot{V}_{8Pa} = 24 \text{ m}^3/\text{h}$$



ALD-R 160

Air transfer devices with round cross section.

Wind-pressure protection, filter and acoustic damper.

$$\dot{V}_{8Pa} = 30 \text{ m}^3/\text{h}$$

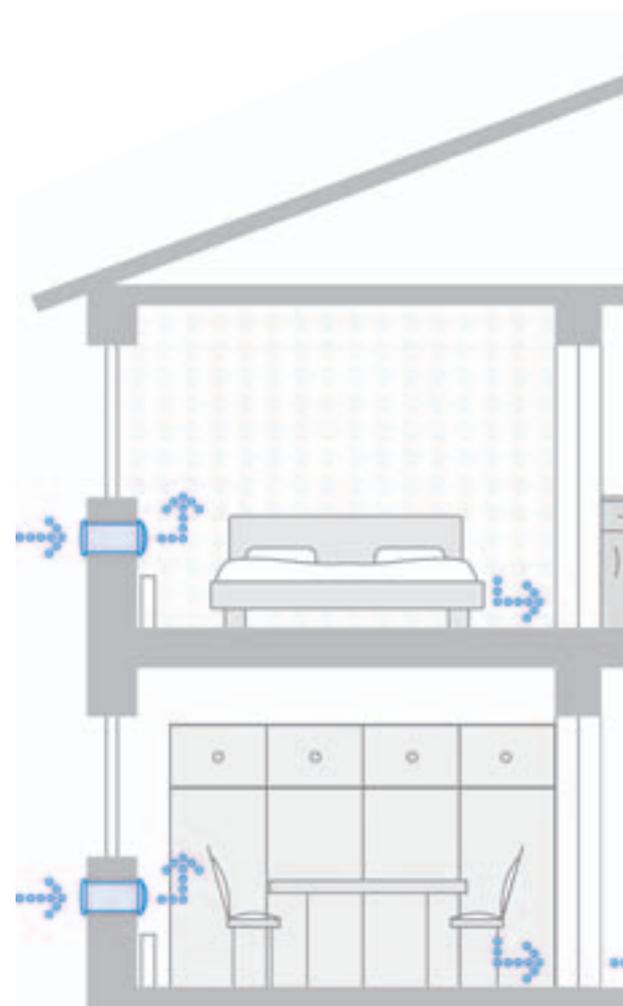
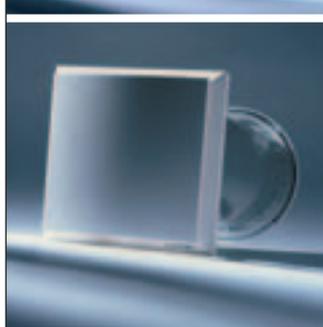


ALD-R 110

Air transfer devices with round cross section.

Wind-pressure protection, filter and acoustic damper.

$$\dot{V}_{8Pa} = 10 \text{ m}^3/\text{h}$$

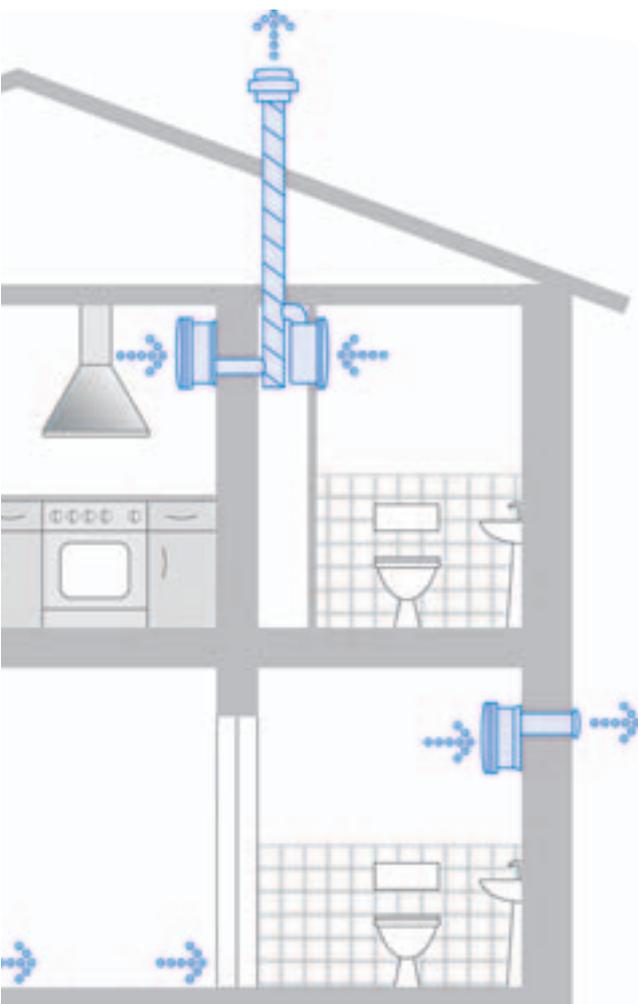


for single-family houses



The LUNOS advantages at a glance:

- › Quick installation
- › Quiet
- › Demand-driven
- › Sound-absorbing
- › Energy-saving
- › Low capital outlay
- › Low operating costs



› The exhaust-air side

Saphir-F

Ventilator mounted on plaster for installation on the wall.

Exhausts air into a duct section or through the wall to outside.



Skalar-F

Ventilator flush-mounted in plaster for flat (12 cm), wall-flush installation.

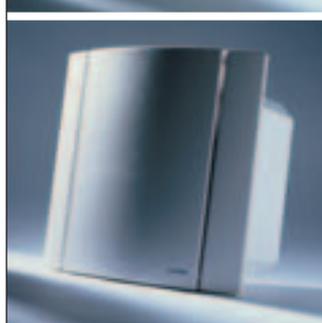
Exhausts air into a duct section.



LRK-F

Ventilator flush-mounted in plaster for narrow shafts or for wall-flush installation in the outside wall.

Exhausts air into a duct section or to outside.





Solution 2

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Central ventilation

› The air supply side

ALD 36,5

Air transfer devices with rectangular cross section.

Wind-pressure protection, filter and acoustic damper.

$$\dot{V}_{8Pa} = 24 \text{ m}^3/\text{h}$$



ALD-R 160

Air transfer devices with round cross section.

Wind-pressure protection, filter and acoustic damper.

$$\dot{V}_{8Pa} = 30 \text{ m}^3/\text{h}$$

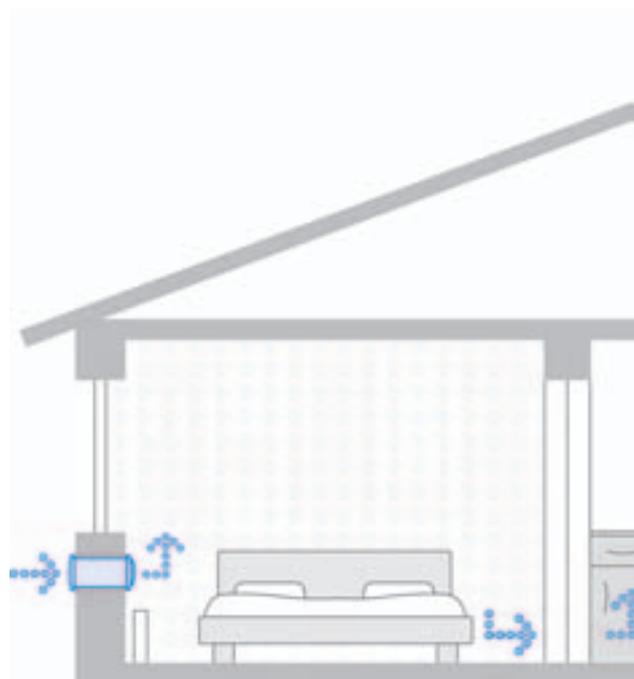


ALD-R 110

Air transfer devices with round cross section.

Wind-pressure protection, filter and acoustic damper.

$$\dot{V}_{8Pa} = 10 \text{ m}^3/\text{h}$$



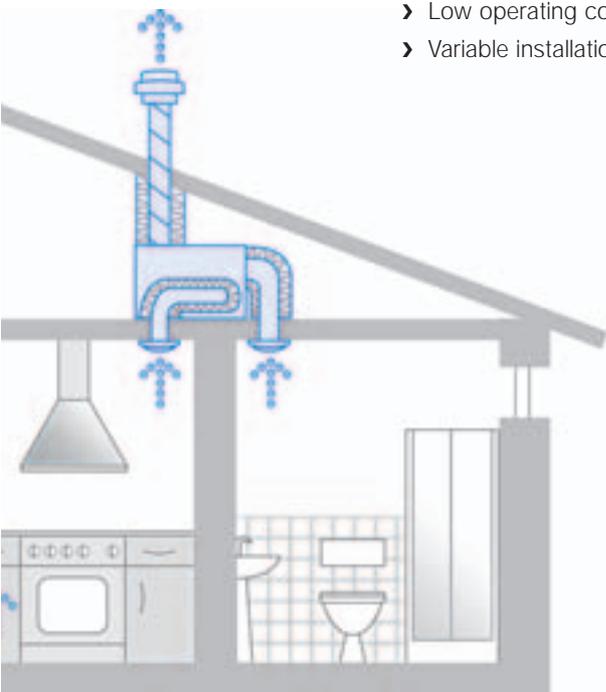
for single-family houses

Central ventilation

Here, the used exhaust air is sucked off from the bathroom and kitchen via the LUNOMAT F ventilator centrally attached in the roof area and carried off via a short duct section over the roof. Because of the slightly reduced air pressure resulting in the living area, fresh air flows into the living and sleeping areas through the air transfer devices. Overflow openings, such as door grating or similar, also guarantee a ventilation link between the exhaust and air supply areas.

The LUNOS advantages in overview:

- › Simple installation
- › Quiet ventilation of several rooms
- › Compact ventilation device
- › Demand-driven
- › Sound-absorbing
- › Energy-saving
- › Low capital outlay
- › Low operating costs
- › Variable installation types



› The exhaust-air side



Lunomat F

Central ventilator for installation in the partition wall, cabinet or ceiling area.

Exhausts air from max. three rooms into a duct section or to outside.

Legal requirements,

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Ventilate efficiently

› Specifications and requirements

Regardless of whether the construction involves renovation or new building: Buildings must be sealed off in accordance with the German Energy Saving Ordinance (EnEV). This legal stipulation always applies, also in case of old-building renovation, if at least 20% of the building is replaced or renewed.

The same applies in case of increase of the building volume by at least 30 m³ or extension by a room. As well as this, legal building regulation specifications apply, among other things, for fire and noise, as well as historical building preservation.

› For this reason, LUNOS: Completely in tune with German EnEV

LUNOS systems work demand-driven on the basis of the moisture value. The volume flow is increased or decreased according to exhaust air moisture content. Thus ventilation is always implemented as much as necessary and as little as possible. The German Energy Saving Ordinance (EnEV), in association with DIN V 4701-10, stipulates the prerequisites for the calculation of this decreased air change:

German EnEV, Appendix 1:

(...) 2.10

d (...) .

DIN 4701-10, 5.2.4:

(...) A d

$n_{A,min} = 0.35 \text{ 1/h.}$

The minimal calculation of system air changes is then

This decreased system air-change is employed for the calculation of the ventilation heat losses in DIN V 4108-6.

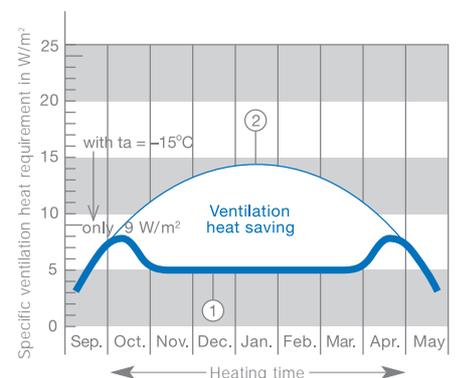
› This will be supported: Programs for energy-related modernization

Before you start any building work, inquire about promotion resources available in the form of subsidies or loans with favorable interest terms. With LUNOS, building can pay off in many ways. Among other things, there exist interesting programs for CO₂ minimization and living space modernization: Grant programs from the Kreditanstalt für Wiederaufbau (Credit Bank for Reconstruction) (KfW), as well as grant programs from states, communes and municipalities.

All LUNOS systems are tested by independent, government-recognized test bodies and are certified by the Deutsche Institut für Bautechnik (German Institute for Structural Engineering) (DIBt) for use in accordance with the German Energy Saving Ordinance (EnEV).



The sample diagram opposite indicates clearly the economizing potential of the moisture-regulated ventilation systems from LUNOS:



1 Ventilation heat requirement with moisture-dependent apartment ventilation
2 Ventilation heat requirement with 0.8x air changes

benefits and costs

Whoever regulates the ventilation enjoys many advantages

› Cost estimates

For multi-story apartment construction

3 Room apartment, floor space approx. 70 m²

Decentralized ventilation, e.g. with Skalar F
ALD-R 110
Switch from € 800.-

Apartment-related ventilation e.g. with Lunomat F
ALD-R 110
Switch from € 600.-

Solution for individual rooms e.g. with Junior
Switch from € 90.-

For single-family houses

4 Room single-fam. hse., floor space approx. 90 m²

Decentralized ventilation e.g. with LRK F
ALD-R 110
Switch from € 900.-

Central ventilation e.g. with Lunomat F
ALD-R 110
Switch from € 800.-

Solution for individual rooms e.g. with Junior
Switch from € 90.-

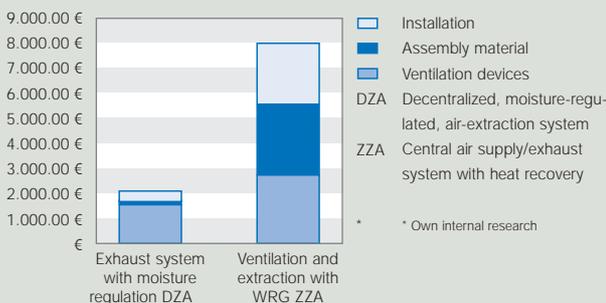
A precise cost statement cannot be given due to the different factors involved in the installation of a ventilating system. The numbers indicated here can therefore be used only for a rough orientation for the building part costs.



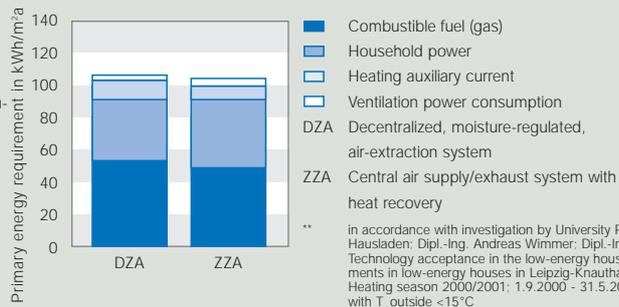
› This is worth it: Saving as early as the planning stage.

The sample calculation for a 120 m² single-family house indicates clearly the advantages of LUNOS compared to other systems, such as heat recovery. With approximately the same operating costs, you save considerably on purchase and installation costs.

Capital outlay*



Operating costs**



** in accordance with investigation by University Prof. Dr.-Ing. Gerhard Hausladen: Dipl.-Ing. Andreas Wimmer; Dipl.-Ing. Jan Kaiser, Technology acceptance in the low-energy house - Field measurements in low-energy houses in Leipzig-Knauthain, 2002; Database: Heating season 2000/2001: 1.9.2000 - 31.5.2001 with T_{outside} <15°C

LUNOS – living

Is not dependent on the architecture,

18 · 19

System components

The cleaner.

› LUNOS system components: They suit every building.

Whether the building involves planned construction or retrofitting, a single-family house, a prefabricated building, a multi-floor construction or an office building, whether mounting is on plaster or flush in plaster: With LUNOS the optimal ventilation elements can be found for every property, wall and roof type.

The fresh air donor.



ALD 36,5

Air transfer device with rectangular cross section, wind-pressure protection, filter and acoustic damper

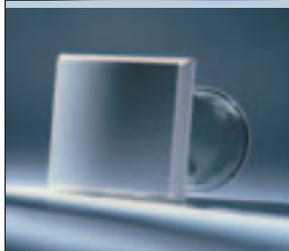
Cross section:	125 x 250 mm
Volume flow at 4 / 8 Pa:	18 / 24 m ³ /h
Standard sound-level difference in opened status:	46 dB



ALD-R 160

Air transfer device with round cross section, wind-pressure protection, filter and acoustic damper

Cross section:	160 mm
Volume flow at 4 / 8 Pa:	21 / 30 m ³ /h
Standard sound-level difference in opened status:	52 dB



ALD-R 110

Air transfer device with round cross section, wind-pressure protection, filter and acoustic damper

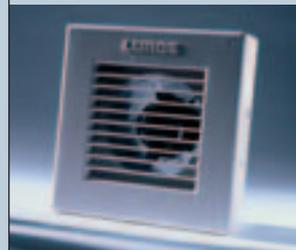
Cross section:	110 mm
Volume flow at 4 / 8 Pa:	7 / 10 m ³ /h
Standard sound-level difference in opened status:	48 dB



The „power station“.



The individual room ventilation.



space ventilation

but only on the individual ideas

Reference objects

Saphir-F

Ventilator mounted on plaster for installation on the wall.
Exhausts air into a duct section or through the wall.

Volume flow:	30 bis 90 m ³ /h
Moisture range of adjustment:	50 % bis 70 % r.h.
Max. pressure difference:	235 Pa
Power consumption:	7,5 bis 27,5 W
Sound pressure level:	28 bis 45 dB(A)

Skalar-F /2-F

Ventilator flush-mounted in plaster for flat, wall-flush installation
(12 cm installation depth). Exhausts air from one (F) or max. two
rooms (2-F) into a duct section

Volume flow:	25 bis 80 m ³ /h
Moisture range of adjustment:	50 % bis 70 % r.h.
Max. pressure difference:	58 Pa
Power consumption:	5,5 bis 35 W
Sound pressure level:	27 bis 45 dB(A)

LRK-F /2-F

Ventilator flush-mounted in plaster for narrow, wall-flush installation
(14 cm installation depth). Exhausts air from one (F) or max. two
rooms (2-F) into a duct section.

Volume flow:	30 bis 115 m ³ /h
Moisture range of adjustment:	50 % bis 70 % r.h.
Max. pressure difference:	55 / 72 Pa
Power consumption:	9,5 bis 44 W
Sound pressure level:	33 bis 58 dB(A)

Lunomat-F

Central ventilator for the ventilation of max. three rooms

Volume flow:	50 bis 120 m ³ /h
Moisture range of adjustment:	50 % bis 70 % r.h.
Max. pressure difference:	72 Pa
Power consumption:	12,5 bis 44 W
Sound pressure level:	33 bis 58 dB(A)

Small ventilator Type J

Ventilator for the ventilation of individual rooms

Volume flow:	90 m ³ /h
Power consumption:	18 W
Sound pressure level:	44 dB(A)

- From above to below:
- > Reichenberger Str., Berlin; new building according to German EnEV with acoustic insulation
 - > Knauthain, Leipzig; new building according to German EnEV
 - > Landsberger Allee, Berlin; new building according to German VwSchVO
 - > Märkische Allee, Berlin; remediation according to German EnEV with acoustic insulation
 - > St. Lorenz, Luebeck; remediation according to German EnEV





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