LINERVENT

SAVE ENERGY
WITH DUCT SEALING



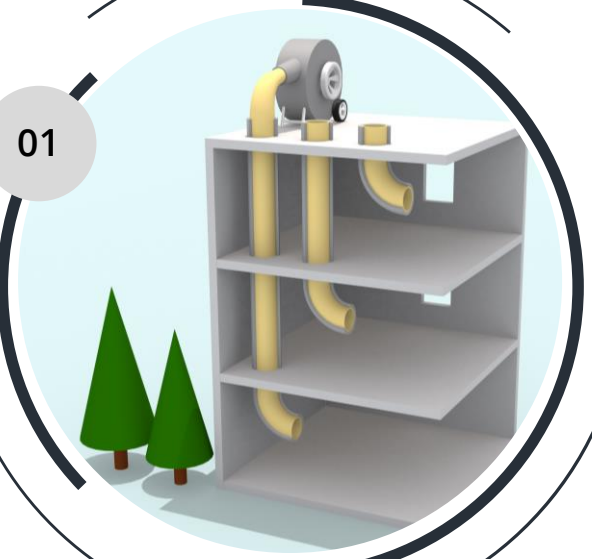
Contents

- **What is Linervent?**
- How does heat leave a building?
- Examples of buildings where Linervent has been used to save heat
- Definitions



What is Linervent?

01



Linervent is a method that seals ventilation ducts and restores the function of a building's ventilation system.

02



The technique used is called duct sealing and is based on a composite material being inserted into the ducts, forming a new flexible and tight duct on the inside of the existing duct.

03



Linervent can be used in all types of ventilation ducts and in all types of buildings.



Why seal ducts?

» According to Boverket, 8 out of 10 exhaust air ducts leak.

» Reuse of old brick and asbestos cement ducts.

» The leaking air is expensive to heat and, in the long run, bad for the environment. There is a lot of money to save.

» The economic aspect of duct sealing is only one of several reasons why ducts may need to be sealed.

» Meeting OVK is often an equally strong motivation for carrying out duct sealing.

» There are examples where Linervent has been used to sort out installations with repeated problems such as overloaded compressors in the heat recovery systems.

» FX and FTX systems installed where ducts leak often struggle to deliver what the supplier promised. With duct sealing, the FX/FTX supplier's calculation holds.

» To meet EU requirements on the energy efficiency of buildings, duct sealing is an effective and profitable improvement.

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How does heated air leave the house?



Ventilation

50%

Roof

25%

Walls and windows

25%

What makes more heated air than necessary escape?



Ventilation

- Higher extraction than required due to leaking ducts

Roof

- Poor insulation

Walls and windows

- Poor insulation
- Low energy class

How are heat losses remedied?



Ventilation

- Duct sealing and/or heat recovery

Roof

- Additional insulation

Walls and windows

- Additional insulation
- Windows with a higher energy class

Why is ventilation such a heat thief?

- Ventilation means that air is drawn out of buildings and replaced by new air from outside.
- When the ventilation ducts leak, more air than necessary is drawn out of the building.
- Too much air out = too much air in. The air drawn out must be replaced by new air from outside.
- When it is cold outside, the air drawn into the building must be heated, which means higher heating costs.
- So we will heat more air than we need if the ducts leak.



Duct sealing reduces heat losses

- Ventilation accounts for 50% of the heat loss, so the savings potential here is large.
- Duct sealing reduces the amount of warm air we draw out of the building (because the fans can be turned down).
- This also reduces the amount of cold air we draw in that needs to be heated.
- In this way we save on our heating.



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The consequence of leaking ducts

- If heat costs SEK 1.0/kWh, the cost of the air drawn out of a building is about SEK 5,000 per apartment and year for an average Swedish apartment with mechanical exhaust ventilation (fans) and correctly set air flows.
- In leaking duct systems the outflow from the apartments decreases and OVK is no longer met. The remedy is to put a bigger fan on the roof. The outflow from the apartments then increases to acceptable levels (at best). This sharply increases the outflow from the building, which increases costs.
- The fans can often double the heating cost for an apartment, from 5,000 per apartment to 10,000 per apartment (or more).
- With tight ducts you can keep heating costs down.
- The conclusion is that there is a lot of money to save on tight existing exhaust air ducts while OVK is met.



Building in Järfälla, 14 apartments on 7 floors and a basement

01 On inspection, the ventilation ducts turned out to leak heavily.

02 Point block in Järfälla where residents had not had working ventilation for many years

03 The ducts, made of asbestos cement, were sealed with the Linervent method. No remediation was needed, and the duct can easily be cleaned afterwards.

04 Residents of the stairwell got fully working ventilation, and the property owner a much lower heating cost.





Building in Järfälla, 14 apartments on 7 floors and a basement

Before

- Heating cost SEK 135,000 / year
- OVK not met, fan at 100% capacity

After the ventilation was sealed

- Heating cost SEK 56,000/year
- OVK approved, fan at 40% capacity

Total saving: SEK 78,500 / year

- Saving over the lifetime of the sealing: **SEK 2.0 million**
- The sealing pays for itself in about 7 years!

Building in Enköping, approx. 900 m2

01 Multi-family building in Enköping where fans were installed in a building that previously had natural ventilation.

02 Residents complained about poor ventilation, and many different measures had been evaluated without solving the problems.

03 The masonry ventilation shafts leaked heavily, so even with the fans at maximum the residents had no extraction from their apartments.

04 The ventilation was sealed with Linervent, which meant the fans could be turned down 50% while the residents got working ventilation again.





Building in Enköping, approx. 900 m2

Before

- Heating cost SEK 144,400 / year *
- OVK not met, fan at 100% capacity
- Electricity use SEK 6,300 / year

After the ventilation was sealed

- Heating cost SEK 64,100/year
- OVK approved, fan at 60% capacity
- Electricity use SEK 3,800 / year

Total saving: SEK 82,800 / year

- Saving over the lifetime of the sealing: **SEK 1.6 million**
- The sealing pays for itself in about 5 years!

Housing cooperative in Mölndal, 182 apartments in several three-storey buildings

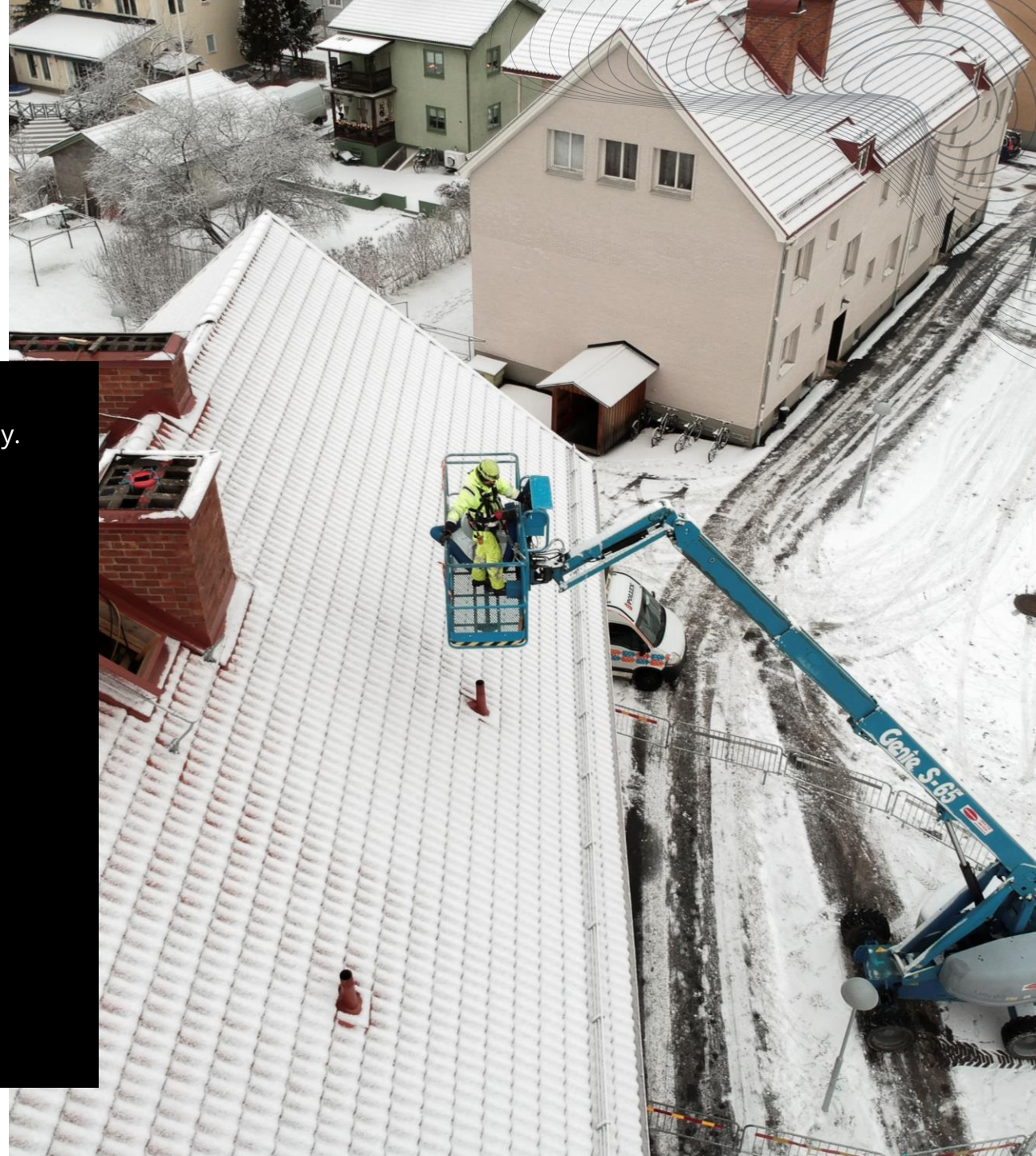
01 Housing cooperative in Mölndal where the ventilation worked poorly.

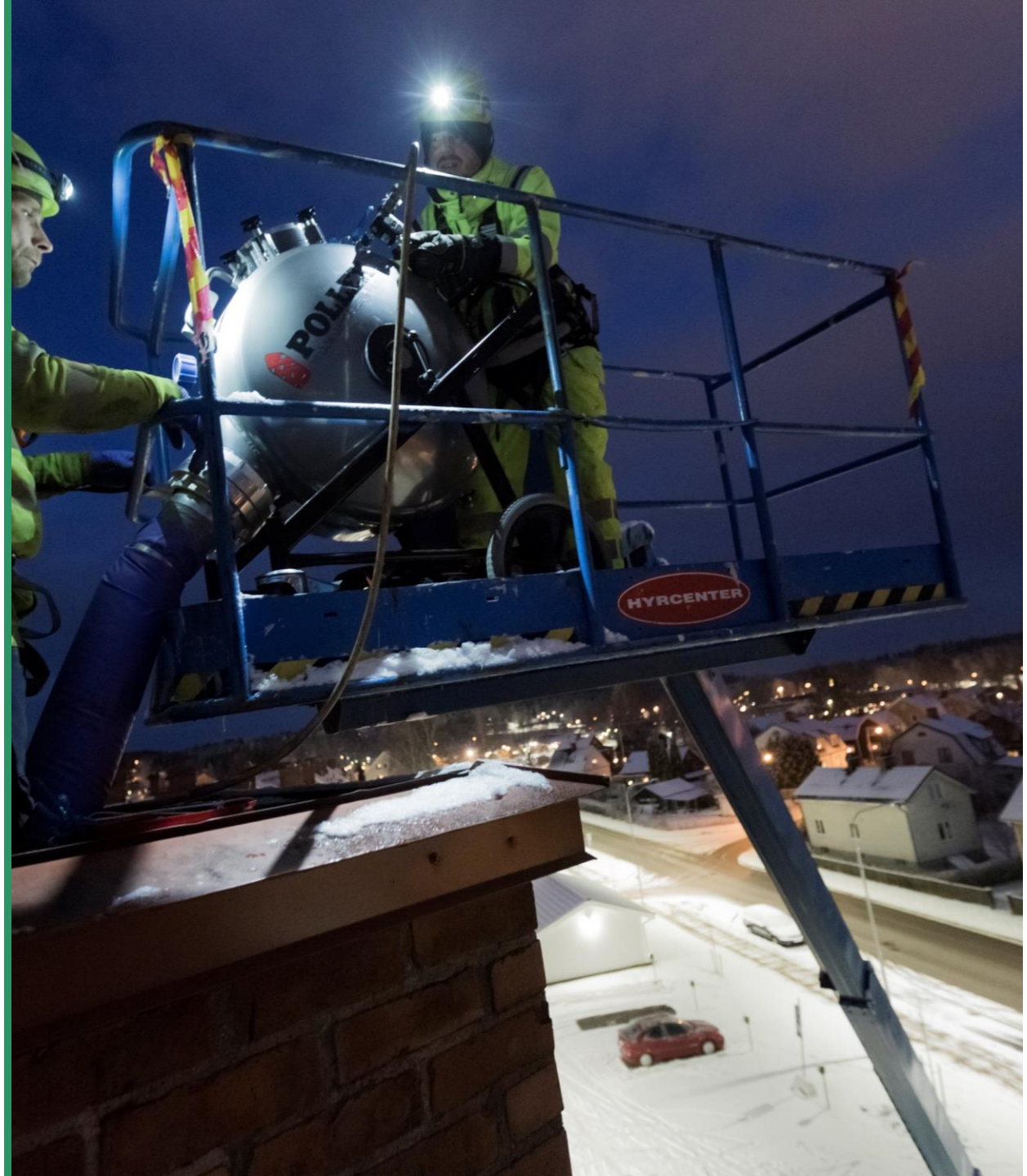
02 OVK was not met.

03 After an investigation, new fans were fitted on one of the cooperative's buildings, but OVK was still not met.

04 The next step was duct sealing with the Linervent method.

05 In the evaluation after the duct sealing, the result is that OVK is met and heating costs fell considerably.





Housing cooperative in Mölndal, 182 apartments in several three-storey buildings

New fans without duct sealing

- Heating cost SEK 4,700,000 / year
- OVK not met

With duct sealing

- Heating cost SEK 1,100,000/year
- OVK approved

Total saving: SEK 3,700,000 / year

- Saving over the lifetime of the sealing: **SEK 90 million**
- The sealing pays for itself in about 3 years!

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OVK

Mandatory inspection of ventilation systems required in Swedish multi-family buildings. OVK sets a minimum air flow out of the building.

Mechanical exhaust

A fan that draws air out of the building.

Mechanical supply

A fan that supplies air to the building, distributed through a ventilation system.

Natural ventilation

The building has no fans; temperature differences make the air move through the ducts

FX

Heat recovery with a heat exchanger on the exhaust air. That is, the heat in the air drawn out of the house is recovered.

FTX

The heat in the exhaust air is recovered and returned to the supply air, which is also mechanical.