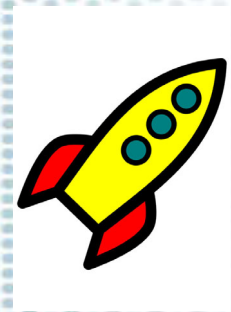

Ventilation in wet rooms

Does good ventilation compensate for bad work?

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Wet rooms and ventilation.
Airtight like a balloon… or????

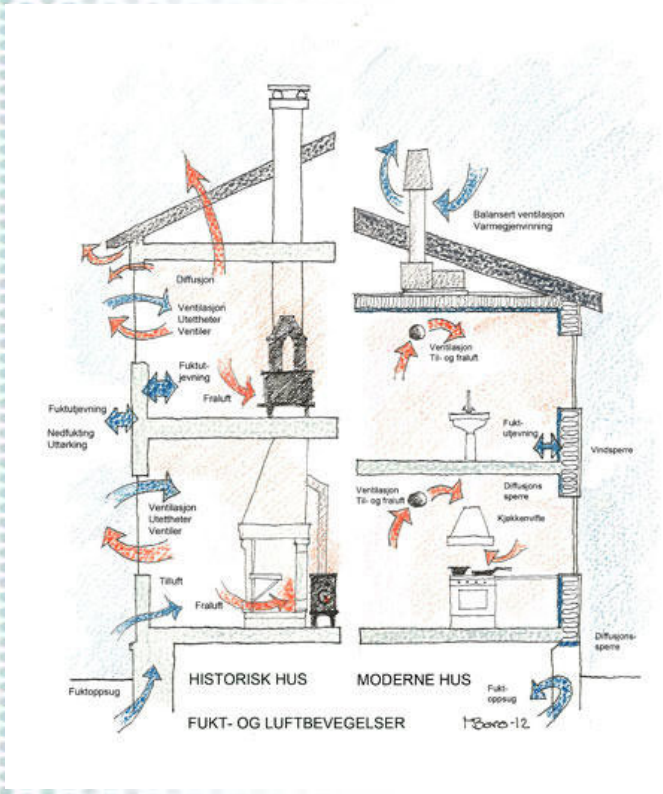

Photo: Norwegian Directorate for Cultural Heritage

Older houses:
- Diffusion open materials, simple structures leaking heat
- Wood burning created normal sub pressure

New houses:
- Diffusion dense materials, watertight structures, balanced ventilation.
- Balanced ventilation, demand controlled (air in = air out)
- Right job demands knowledge.

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In Norway we shall….

- Have ventilation that:
  - Secures satisfactory quality of air
  - Customised to the roooms' humidity levels
  - Secures sufficient ventilation

What does satisfactory and sufficient mean?

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Main requirements for ventilation

- Exchange the air in the room with sufficient amount of air
- Lead air from room with higher quality of air to room with lesser requirement for air quality
- Be buildt with durable materials and products, so that it can be maintained in a good manner
- Should not affect the indoor climate with noise, condense or over heating
- Constructed in a way that contributes to low energy requirements

Source: BVN 44.110

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Minimum amount of air (TEK 17)

Rom	Grunnventilasjon	Forsert ventilasjon
Kjøkken	36 m^3/h	108 m^3/h
Baderom	54 m^3/h	108 m^3/h
Toalettrom	36 m^3/h	36 m^3/h
Vaskerom/tørkerom	36 m^3/h	72 m^3/h

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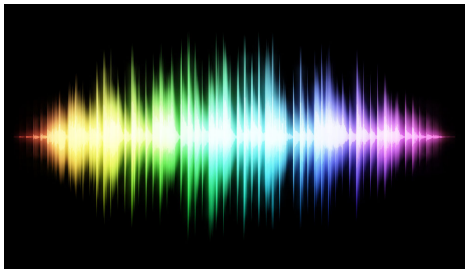
Conditions

- Ventilation system must be projected, dimentioned and regulated for each housing unit, in order to ensure the right amount of air, avoiding noise, overheating, and ensuring adequate fire safety.
- To avoid noise and unnessecary use of energy, the canals closest to the vents in the housing unit should be dimentioned for an air speed of maximum 2 m/s.



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Humidity issues in buildings ventilation compensates for

- Issues:
  - Leakage from pipe system
  - Humidity in building
  - Hight production of humidity from wet room, shower, drying laundry
  - Lack of ventilation

Source: Norwegian institute of public health

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Why airtight houses with ventilation?

- Good indoor air quality
- Ventilation can be controlled
- Security against humidity damage
- Better comfort
- Energy efficient
- Better fire safety

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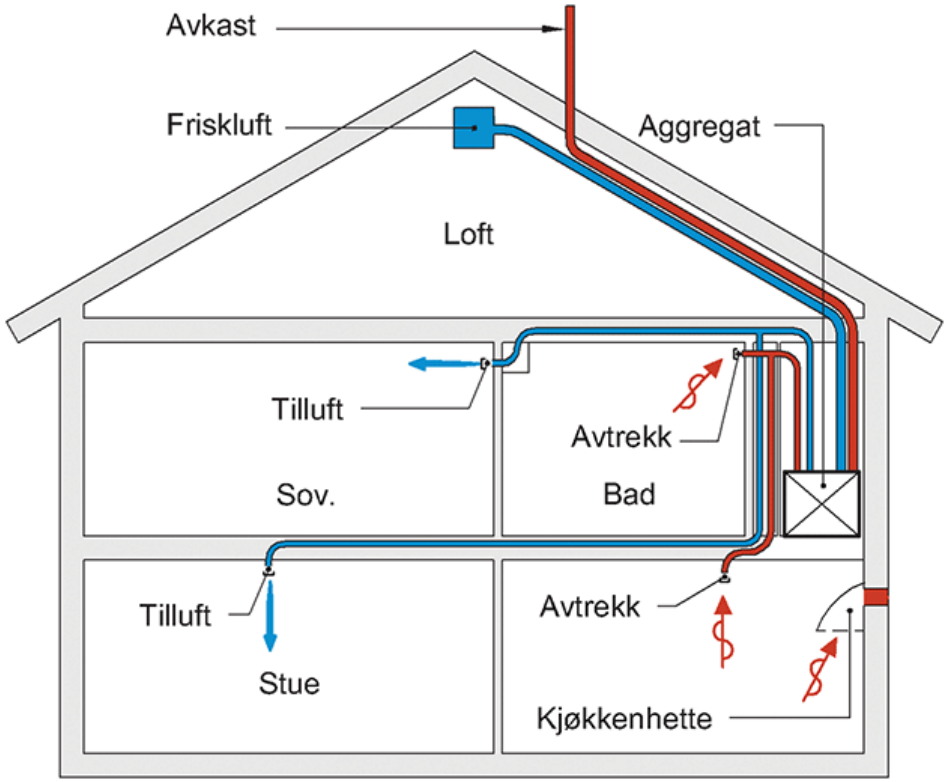
Principles of ventilation

- Balanced (often used)



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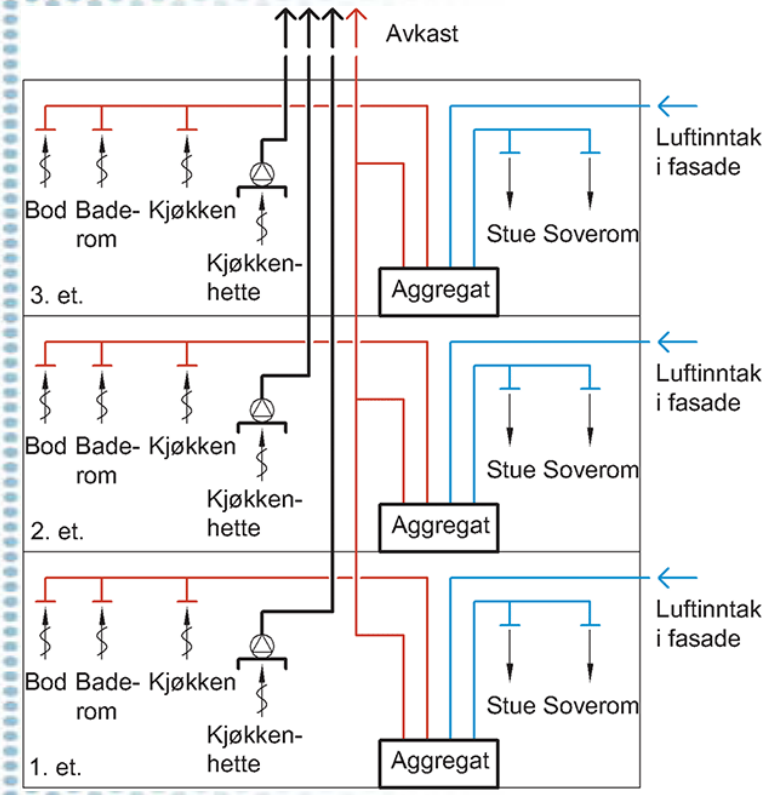
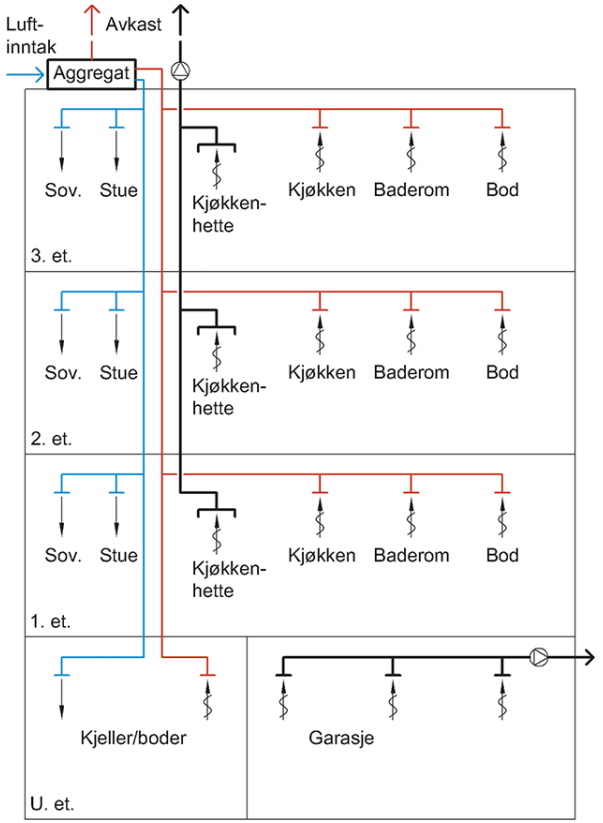
Principles of balanced ventilation in multi housing unit buildings





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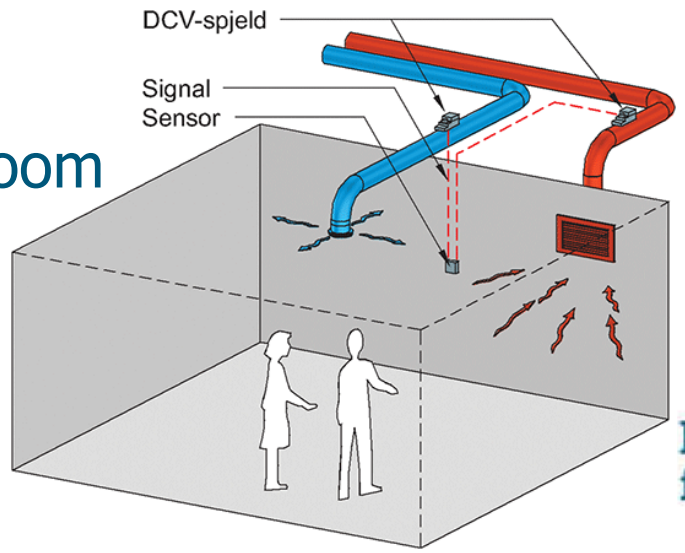
Demand-Controlled Ventilation (DCV)

- Maintains basic ventilation.
- Adjusted by:
  - Measured requirement from a sensor in the room, i.e. temperature or CO2 level.
  - Assumed requirement without sensor measurements in the room



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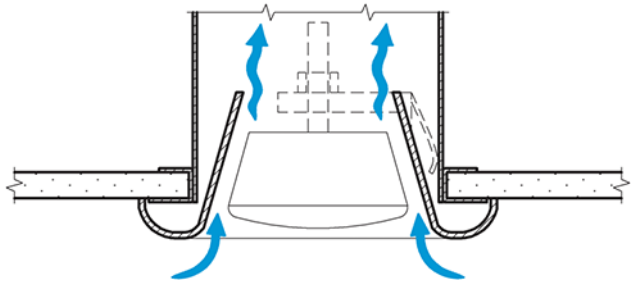
Placing of vents/canals

- Place supply air vent so to avoid shorting by exhaust- or overflow vents. NB: Wet rooms!
- Keep vents away from corners.
- In ceiling, at least 150mm from walls.
- In wall, at least 150 mm from ceiling.
- Think condensation



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Challenges for the users of buildings.

- Indoor climate
- Density of constructions
- Differences in air pressure
- Rot/Corrosion

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Risk

- K1- Indoor climate
- K2- Indoor pressure
- K3- Construction

- K1 x K2 x K3 = Risk=Probability x Consequence

What if we set the indoor pressure to 0?

Source: Norwegian institute of public health

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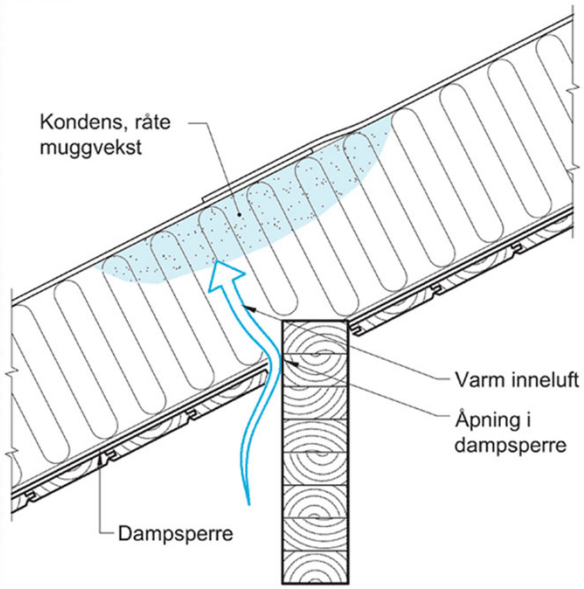
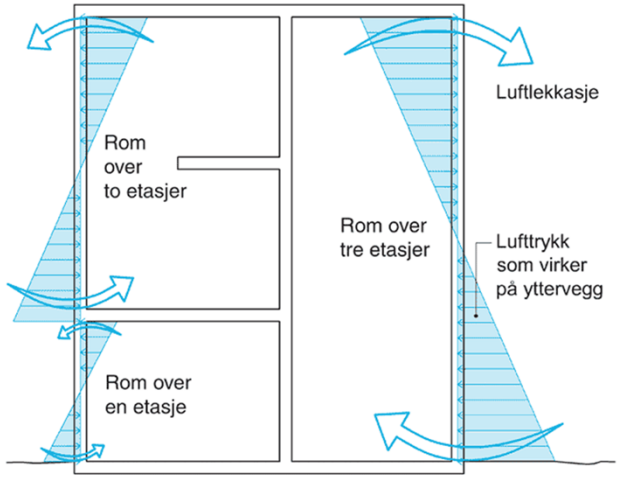
Wet rooms must be:

- Damp proof
- Airtight





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Practical advice

- Choose robust, diffusion tight constructions.
- Have adequate ventilation that:
  - Removes water molecules
  - Evens out pressure and creates a sub pressure in the room.
- Avoid unneccessary sources of humidity.
- Clean up any water spillage.

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Conclusion

- Build airtight, air density prevents humidity damage
- Ventilate correctly
- Good ventilation is a prerequisite for good indoor climate

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Thank you!

- Pressure
- Air leakage
- Diffusion
- Moisture in materials
- Adding humidity by use
- Outdoor air / Climate

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