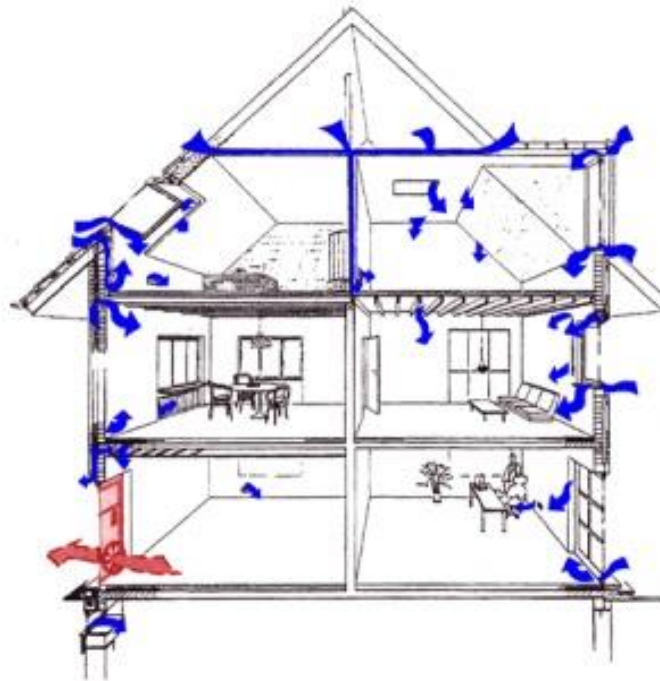# Building Physics

Air Permeability Test
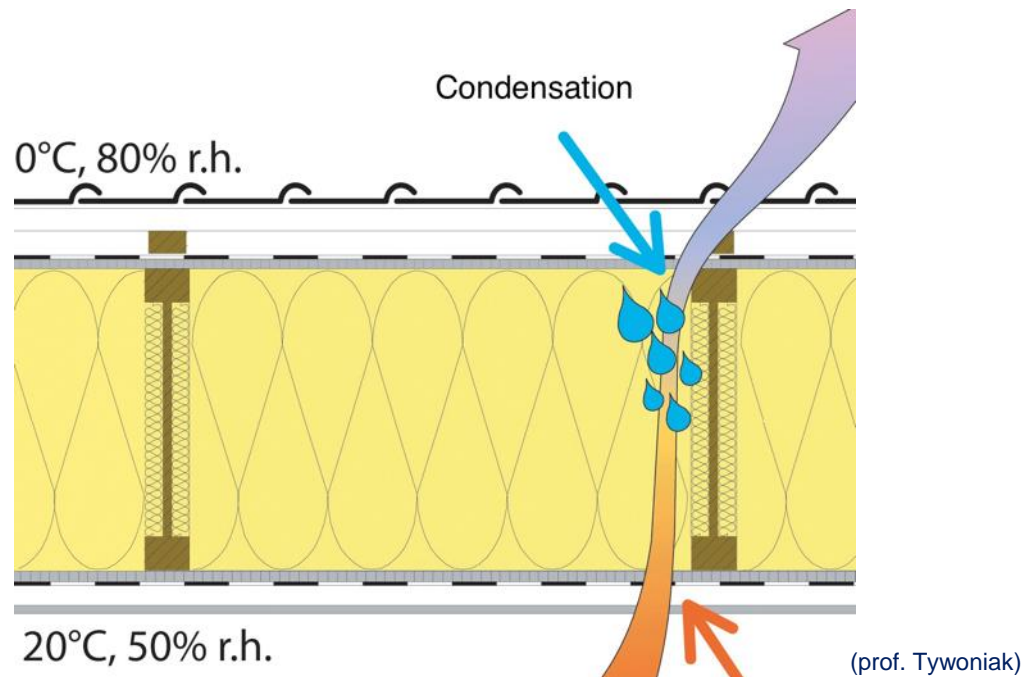
František Vlach

09/2018

Why is it important?

- Energy savings – losses of heat through leakage – economical and enviromental heating, efficiency of air-conditioning and recuperation of heat from exhausted air.
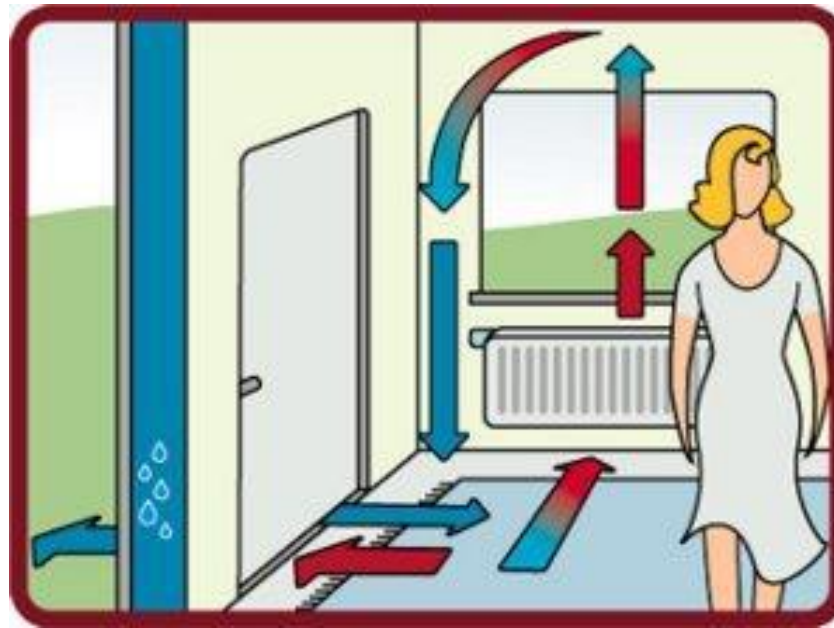
(blowerdoor)

Why is it important?

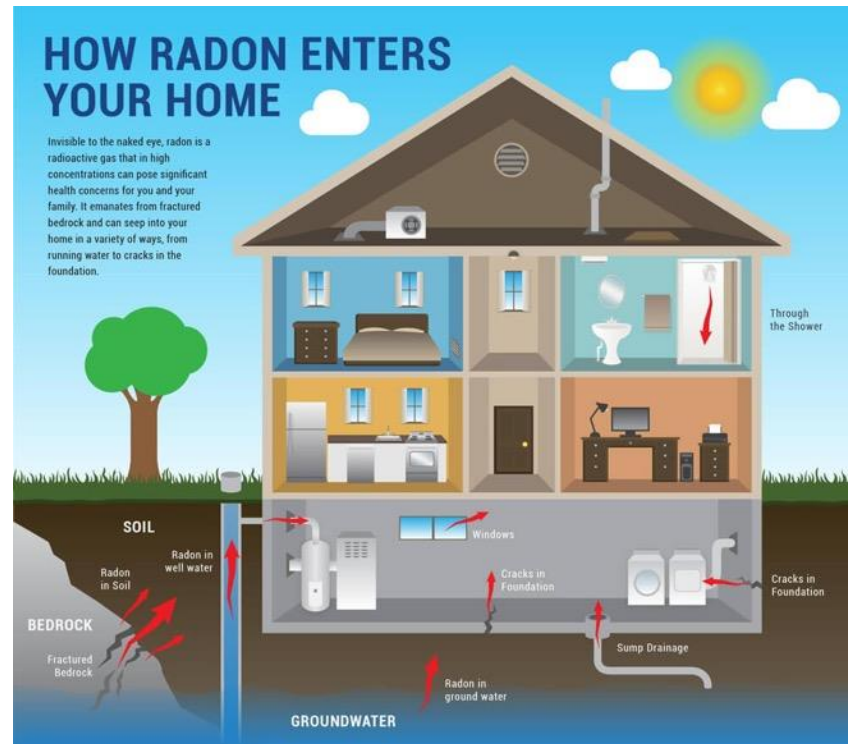- Building physics – protection of structures from condensation

0°C, 80% r.h.

Condensation

20°C, 50% r.h.

(prof. Tywoniak)

Why is it important?

- Internal microclimate – thermal comfort – draft – feeling cold

(wellina)

supported by

Visegrad Fund

Why is it important?

- Protection against radon (Rn)

(iradon)

Ways of air flow

Figure A
Common attic
air leak zones
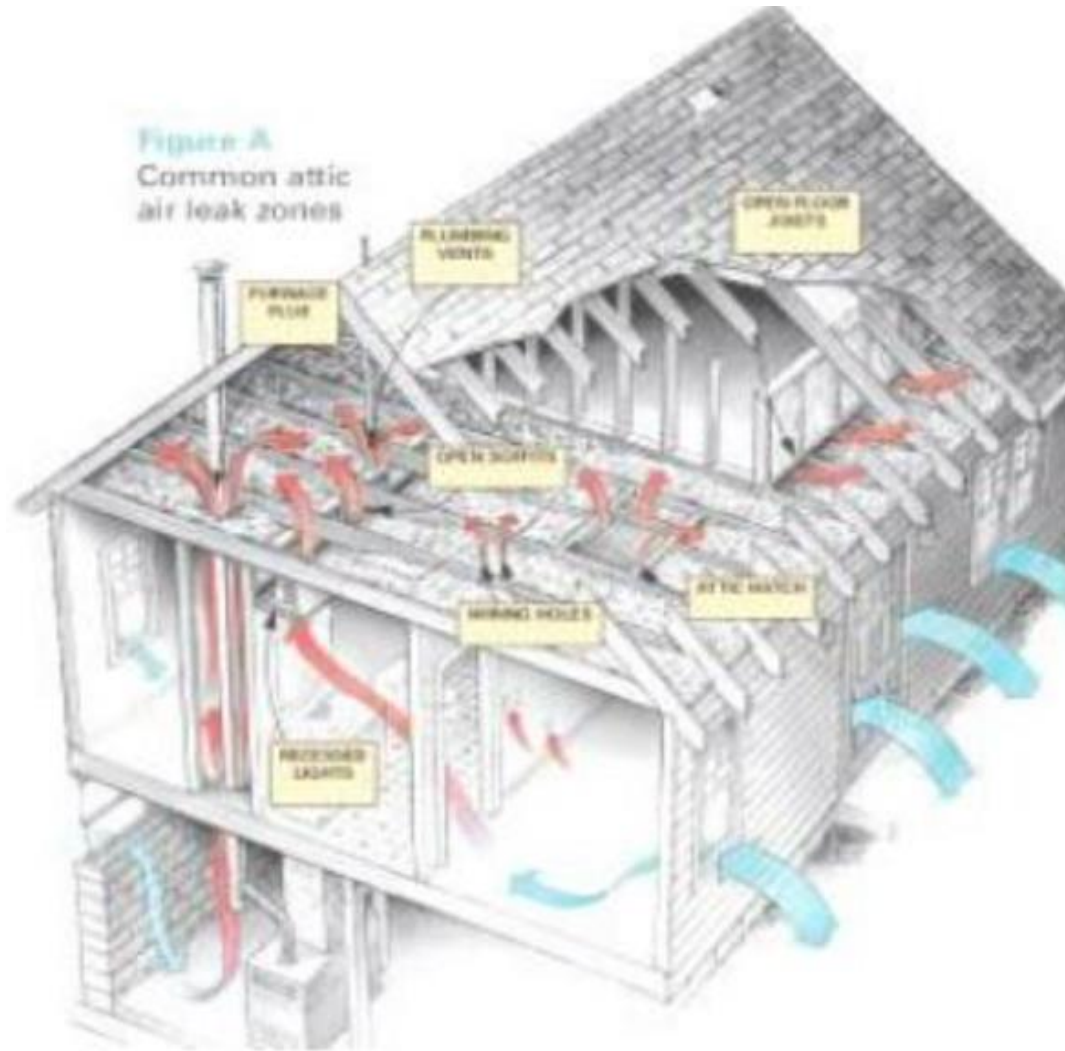
Requirements

$$n_{50} = V_{50} / V$$

Where: *V is the building air volume*

V_{50} is measurement of the airflow at 50 Pa

n_{50} is exchange rate of air in building

Type of building	n_{50}	
Building with window ventilation	4,5	
Building with mechanical ventilation	1,5	
Building with recuperation of heat from air	1,0	
Passive house	0,6	(0,12)

supported by

Visegrad Fund

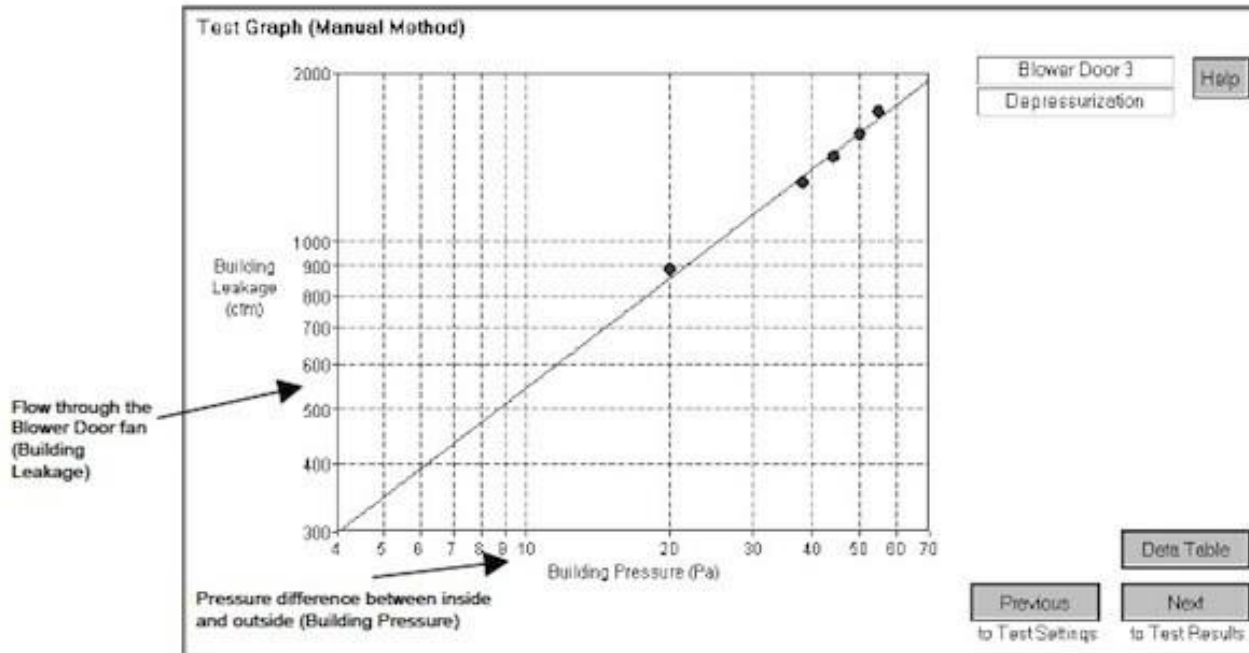# Measurement and diagnostics

$$n_{50} = V_{50} / V$$

Where: *V is the building air volume*

          V_{50} is measurement of the airflow at 50 pa

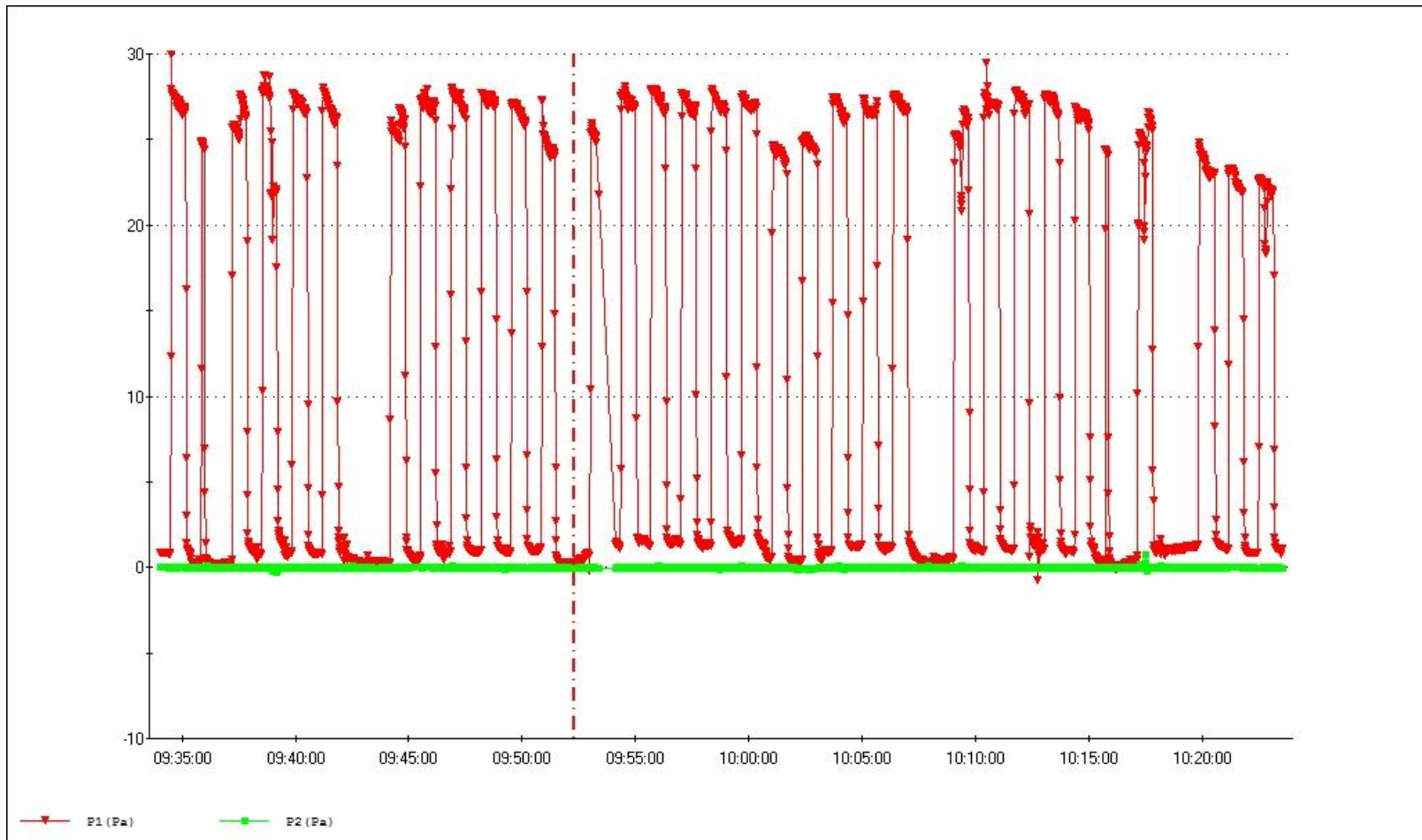# Measurement and diagnostics

High air flow for 50 pascals = large air leakage
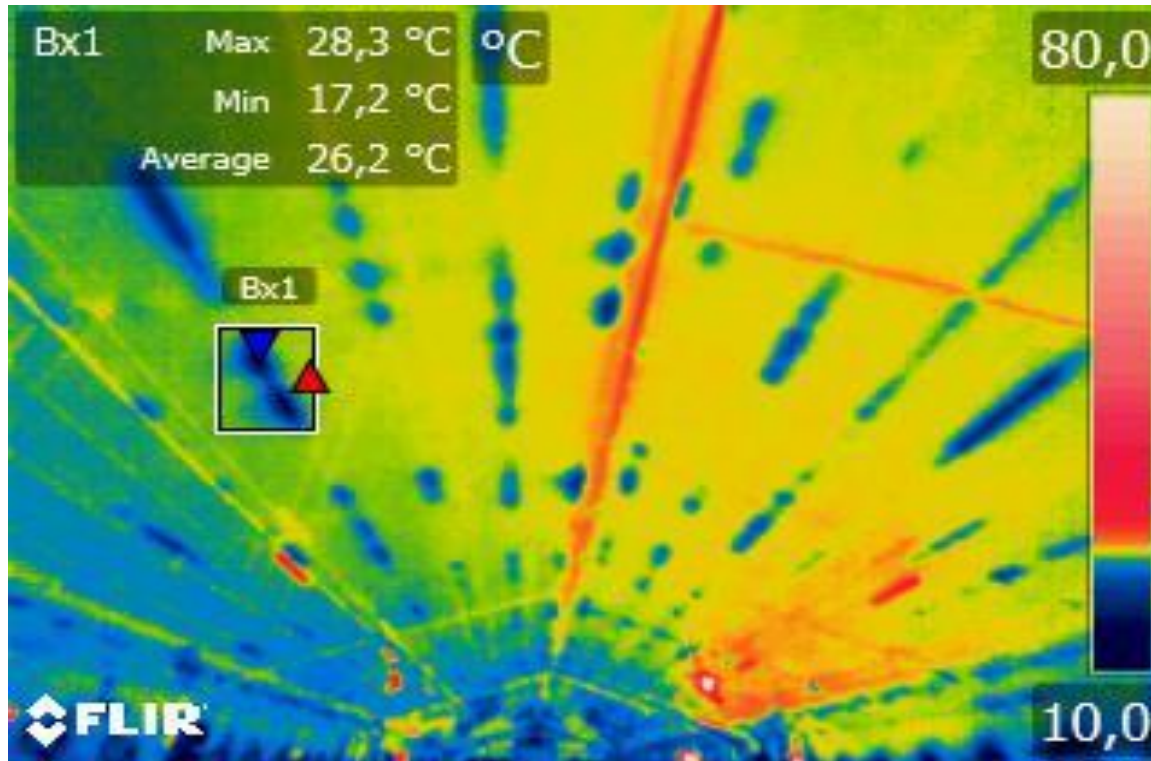
Low air flow in 50 pascals = small air leakage

Practice - examples
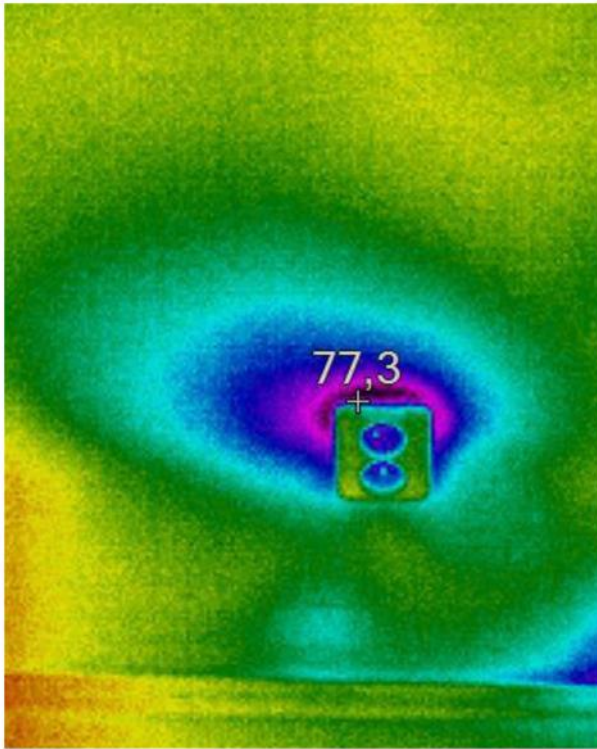
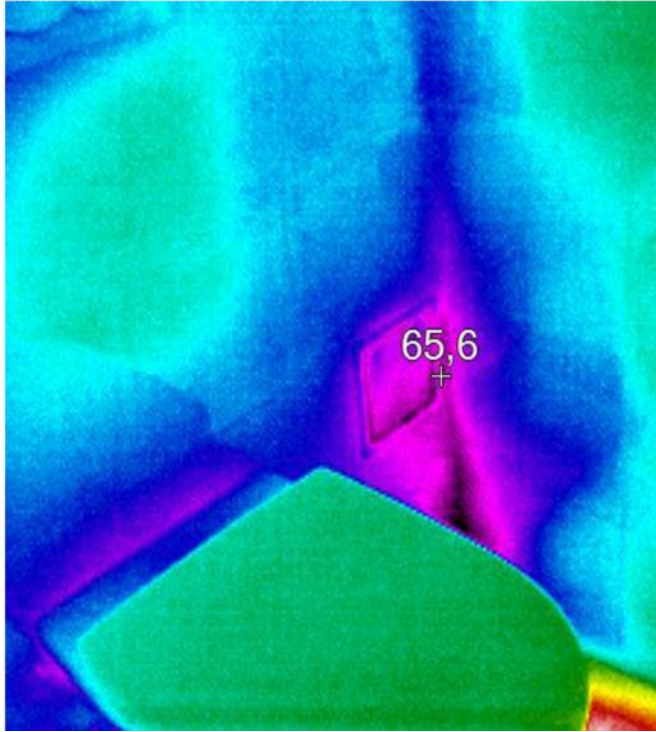# Practice - examples

Practice - examples

This hall is not good for hen breeding.

Due to leakages.

Practice - examples

This flat is dangerous. In wiring is water – condensation.

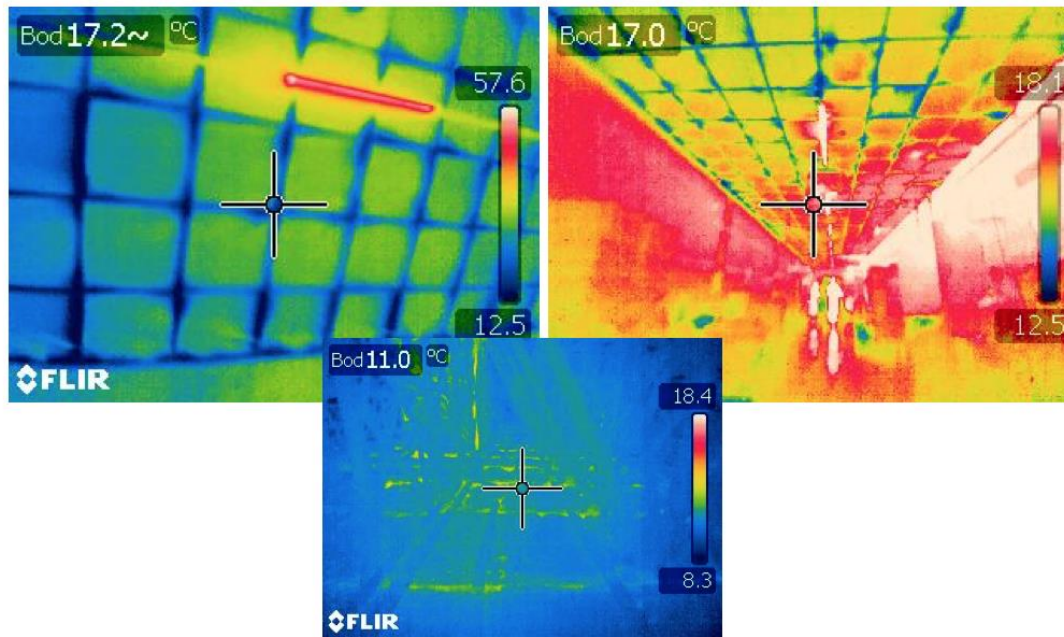Due to leakages.

Practice - examples

Discomfort in WC. People complain about it.

Due to leakages.

Practice - examples

Practice - examples

Energy losses through roof (bad foil). New Lidl shops are designed to have flat roofs.

Due to leakages.

Conclusion

Design tight envelopes

As few installations as possible through the envelope of the building

Quality controling (use Blowerdoor test)

Thank you for your attention