www.blowerdoor.de

Blower Door Tests (EN 13829) for Quality Assurance: Getting Airtight Buildings in Retrofitting, too

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1st Example (built 1920 / attic storey development 1984): $n_{50} \geq 16\ h^{-1}$!

Roof Extension will not be properly sealed unless Airtightness is planned

The subject airtightness was not considered - Consequence: The rooms lying to the east didn't get warm sufficiently.

Thawed **snow** and the appearance of **fog** at **50 Pa pressurization** with **BlowerDoor** show how air is flowing at the internal walls, beam ceilings and attic areas, and that there are energy losses in spite of the 200 mm insulation thickness.

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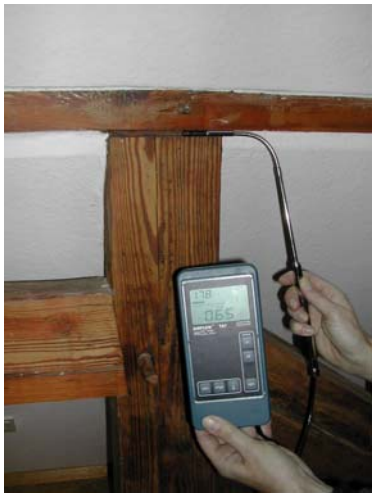
Typical leak in **attic storey developments**

Air draughts at the joint between post and center purlin with 0.65 m/s - also **without** BlowerDoor! (At windy weather.)



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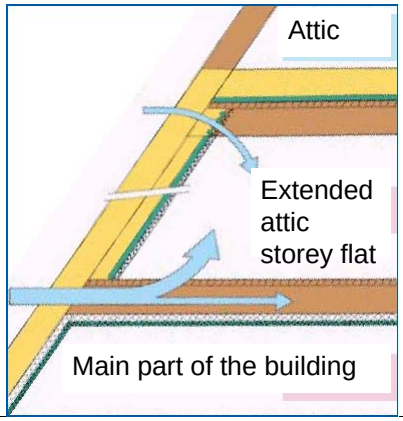
Beam Sealings: Cold draughts flow through the ceiling!

With 50 Pascal depressurization during the BlowerDoor test air is flowing at the ceiling opening with 3.4 m/s: There is an **incomplete** airtight layer at the ceiling joints.



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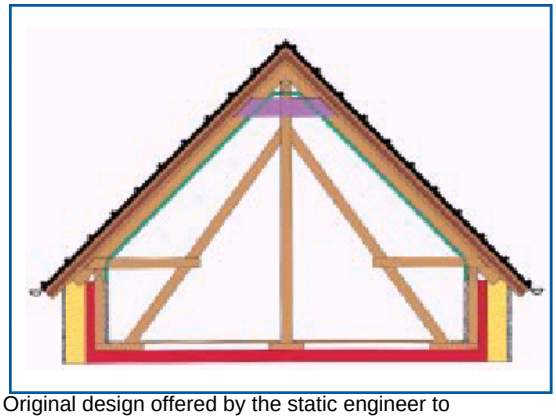
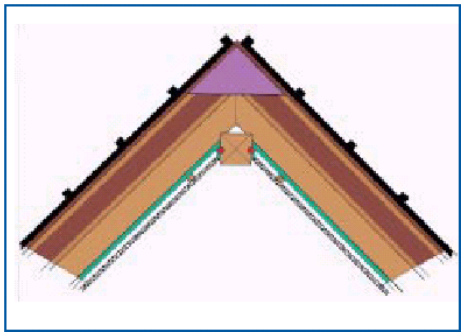
2nd Example (built 1928 / **attic storey development 1997**): $n_{50} = 1\ h^{-1}$!

The airtight layer was planned in detail and checked with the blower door during construction.



Original design offered by the static engineer to reinforce the ridge purlin for the rafters: **penetrating shackles** which cannot be easily, economically and permanently sealed…

… and the alternative that was built:
triangles at the tips of the locking rafters **outside the airtight layer**, which is attached along the ridge purlin



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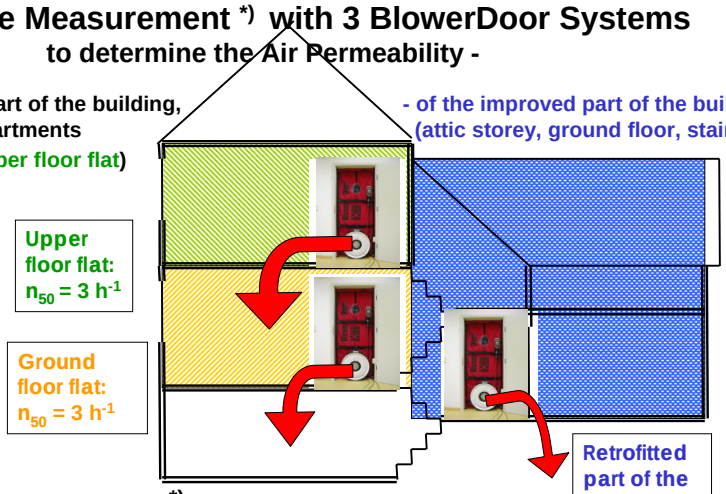
Guard Zone Measurement *) with 3 BlowerDoor Systems
to determine the Air Permeability -

- of the unchanged part of the building, consisting of two apartments (ground floor and upper floor flat)

- of the improved part of the building (attic storey, ground floor, stairway)



*) **pressure difference Δp = 0 Pa between main building and extension**

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A good n_{50} value can even be achieved when improving the attic storey of existing buildings!

The factors for success are

- provided the airtight layer is explicitly designed and subject to quality assurance.
- assessment of the existing building using BlowerDoor measurements at the energy diagnosis stage,
- inclusion of the target value for n_{50} in the building contract,
- and the location of leaks using depressurization during the construction phase.

The complexity of existing roof woodwork means that a great deal of prior experience in the field of airtightness is necessary.

Bringing in someone with an understanding of the BlowerDoor has been found valuable.