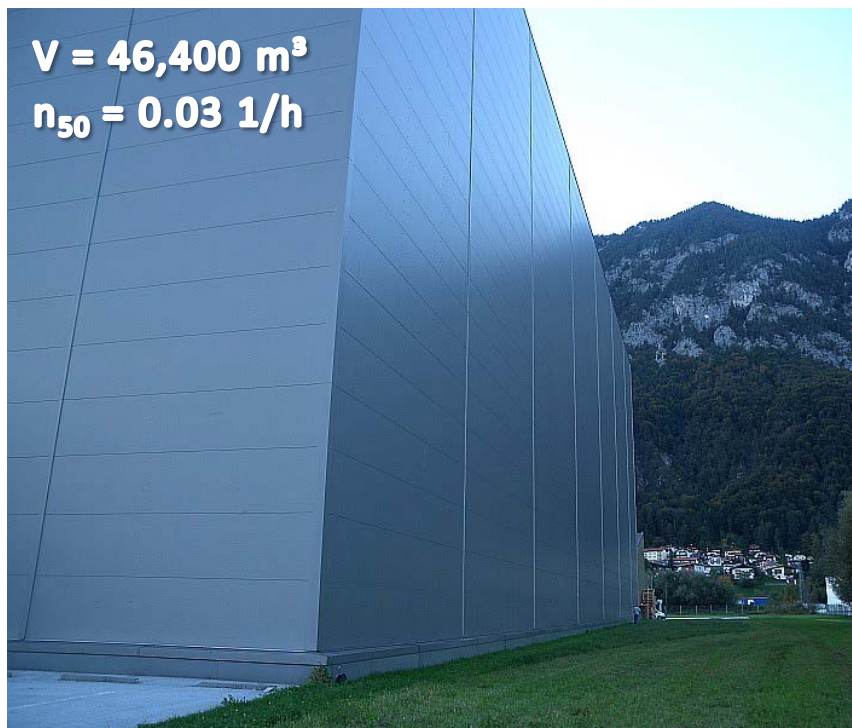


Good thing takes time!

Air permeability measurements of *very dense* buildings and apartments



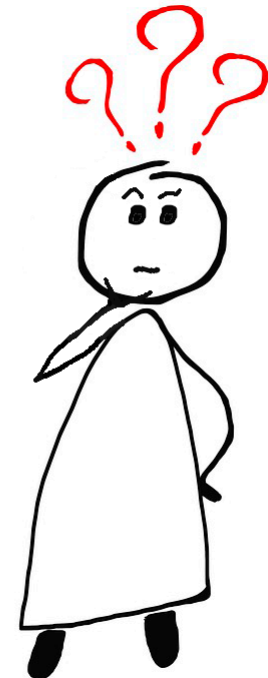
Observation

Observations show that very dense buildings, such as

- Storage halls with air exchange rates at 50 Pa of 0.03 1/h (e.g. oxygen reduction in storage halls for chemicals or food)
- Passive houses with air change rates < 0.6 1/h
- or apartments with similarly small air change rates n_{50}

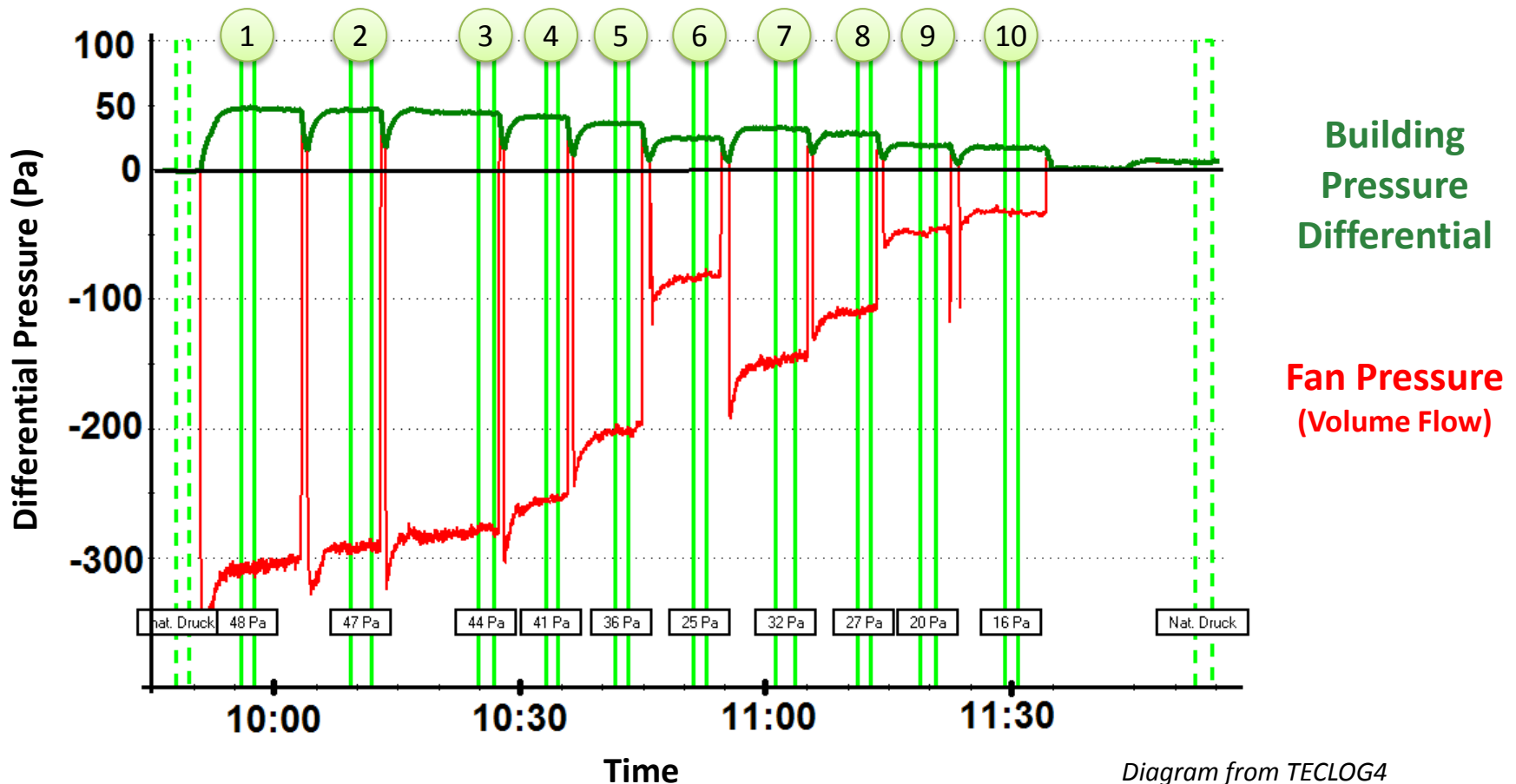
have a behaviour that needs getting used to when measuring air permeability:

It takes longer than usual
– sometimes several minutes –
until a stable and constant pressure
difference is achieved!



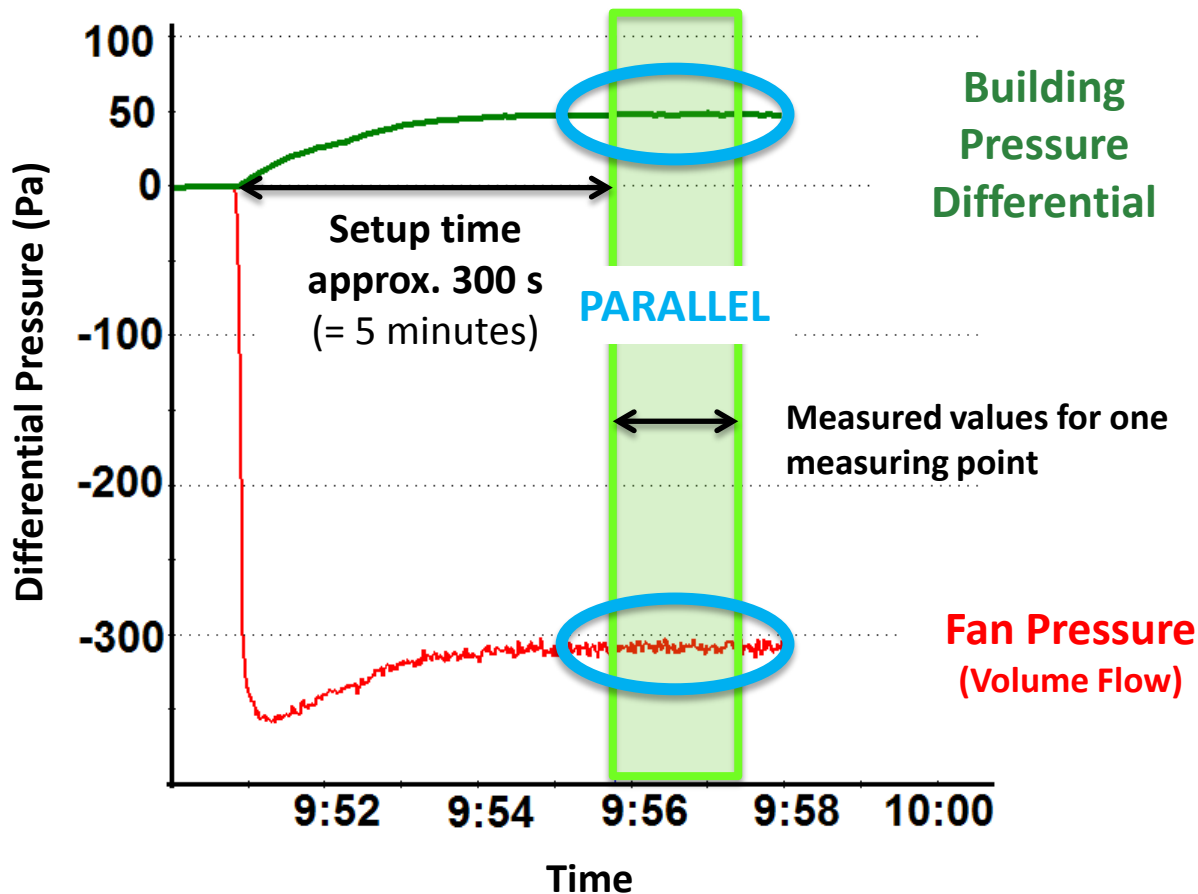
Example: Measurement of a storage hall with $n_{50} = 0.03$ 1/h

Overpressure measurement with 10 measuring points in 2 hours



Individual Consideration

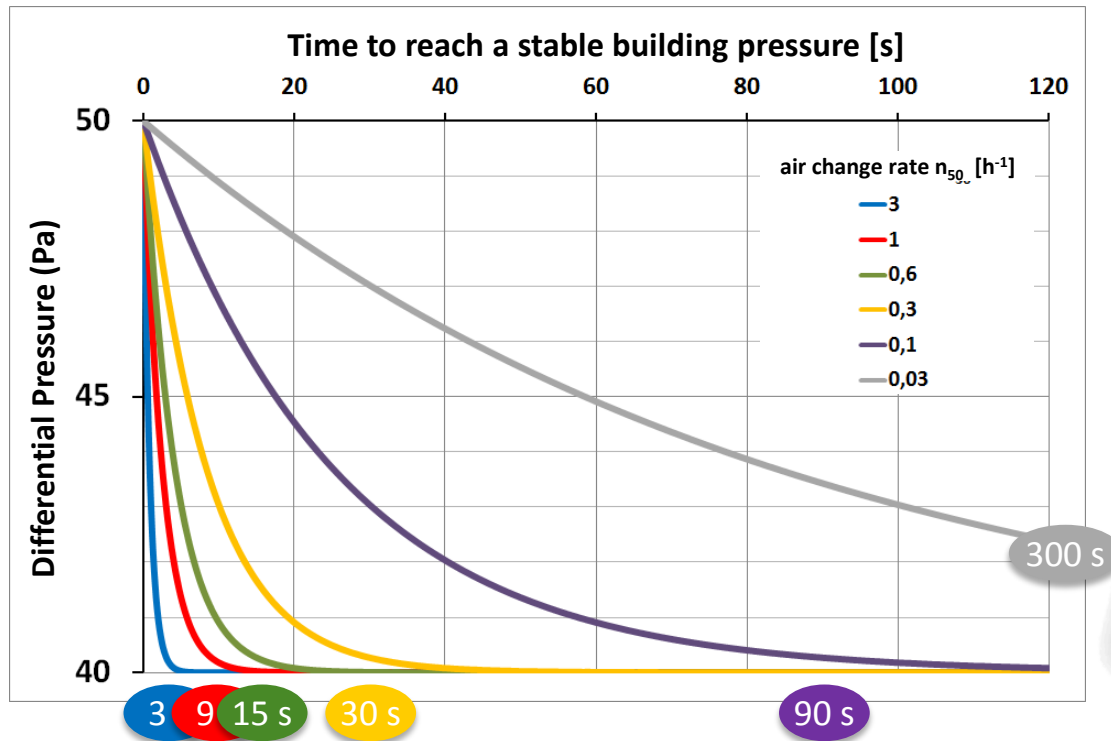
Curve of one pressure difference from 0 Pa to +50 Pa



Extract from the measurement series recorded with the TECLOG software (see previous page).

Is it possible to determine the time to reach a stable building pressure for the practice?

Yes!



An overview table of the time required to reach a pressure stage in function of the air change rate based on calculations by J. Zeller can be found in the reader to the BuildAir 2019 and in our CompetenceCenter.

The lower the air change rate, the longer it takes to reach the target pressure.

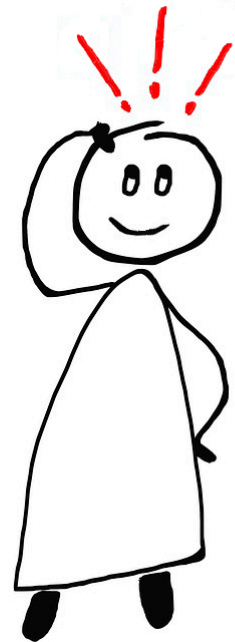
Results for practice

→ **Only patience** when controlling the measuring stages:

- For air change rates from 1 1/h to 0.6 1/h, it makes sense to control the fan more slowly (reduce speed adjustment).
- For air change rates from 0.6 1/h to 0.3 1/h, a semi-automatic measurement usually leads to good results (see [BlowerDoor Standard/MiniFan](#) manual).
- If the n_{50} values are less than 0.3 1/h, it is helpful to observe the curves of building pressure and volume flow using the TECLOG software and to select the measuring points (see [BlowerDoor MultipleFan](#) manual).

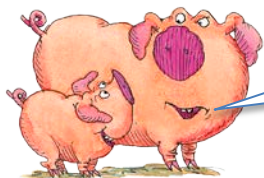
→ It makes sense not to readjust the measuring fan!

→ For very low air change rates, it is sufficient to wait until the target pressure is reached with a deviation of less than ± 0.5 Pa.



Literature and Links

- Brennan, T., Nelson, G., Olson, C. (2013): Repeatability of Whole-Building Airtightness Measurements: Midrise Residential Case Study. In: Workshop on Building and Ductwork Airtightness Design, Implementation, Control and Durability: Feedback from Practice and Perspectives, Washington D.C.
- Leprince, V. (2018): Mesure d'étanchéité à l'air à petit débit
- Rolfsmeier, S.: Air permeability measurements of very airtight buildings and apartments, in: Reader BUILDAIR 2019 or in: [BlowerDoor CompetenceCenter](#)
- Zeller, J. (2019): unpublished study on the temporal progress of reaching stable building pressure
- DIN EN ISO 9972 (2018)
- DIN EN 13829 (2001)
- Reference Guide [BlowerDoor Standard](#) and [BlowerDoor MiniFan](#) (2018) and Reference Guide [BlowerDoor MultipleFan](#) (2018)



„Patience is when
you can wait longer!“