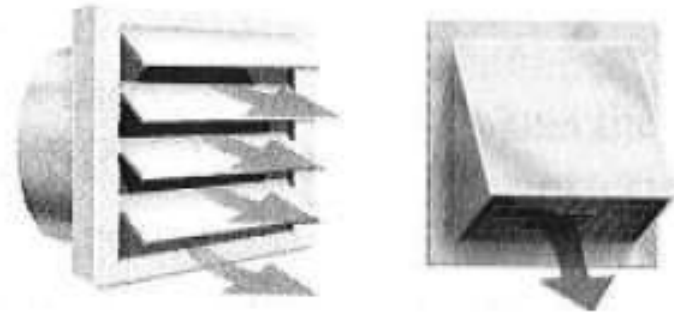


Determination of the airflow at exhaust and supply air valves



Definition

Supply air and exhaust air valves are the interface between the ventilation duct system and the living area. The supply air valves should supply the living areas with fresh air and the exhaust air valves should remove the used air. There are various models from various manufacturers, e.g. poppet valves or displacement diffusers.



Supply air valves are more difficult to measure. Due to their shape, the air inlet is different for each model, and the incoming air influences the measurement result by uncontrollable turbulence.



Source: Measuring Residential Ventilation, J. Stratton, Et al.

Task

Building regulations for the energetic optimization of buildings are becoming more and more stringent and lead more often to the need for mechanical ventilation systems, as this is the only way to ensure the necessary hygienic air exchange, which is essential for the health and well-being of the residents.

In order to ensure that the specified air volumes are exchanged, the supply air and exhaust air valves must be controlled.

The air flow should be determined as precisely as possible so that no energy is wasted for over-ventilation, or the health of the residents is endangered by under-ventilation.



Possible consequences of incorrectly adjusted supply air and exhaust air valves

- Draughts /Breeze
- Appearance of moisture damage / mould
- Pollutants (CO₂, radon, etc.) are not sufficiently dissipated by under-ventilation.
- Waste of energy due to over-ventilation



Measuring of exhaust air valves

The BlowerDoor Exhaust Fan Flow Meter offers a simple application method for measuring exhaust air valves precisely.

As the air is continuously extracted, there are no turbulences which could negatively influence the measurement, as is the case with supply air valves, for example.

This was demonstrated in 2012. On the right you see the results of a study by the renowned Lawrence Berkeley National Laboratory, California:

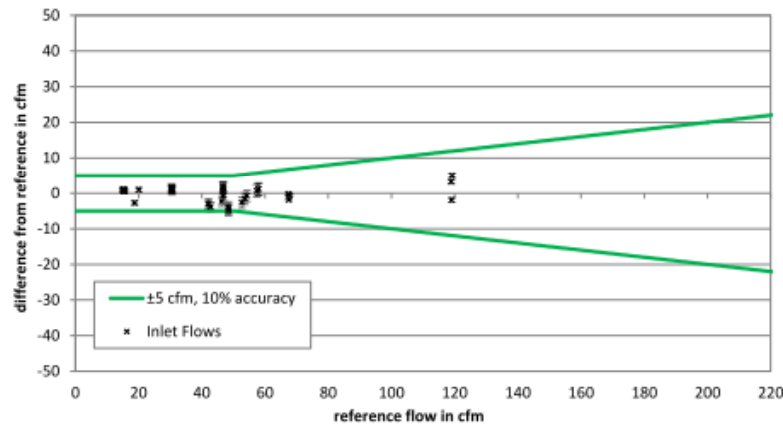
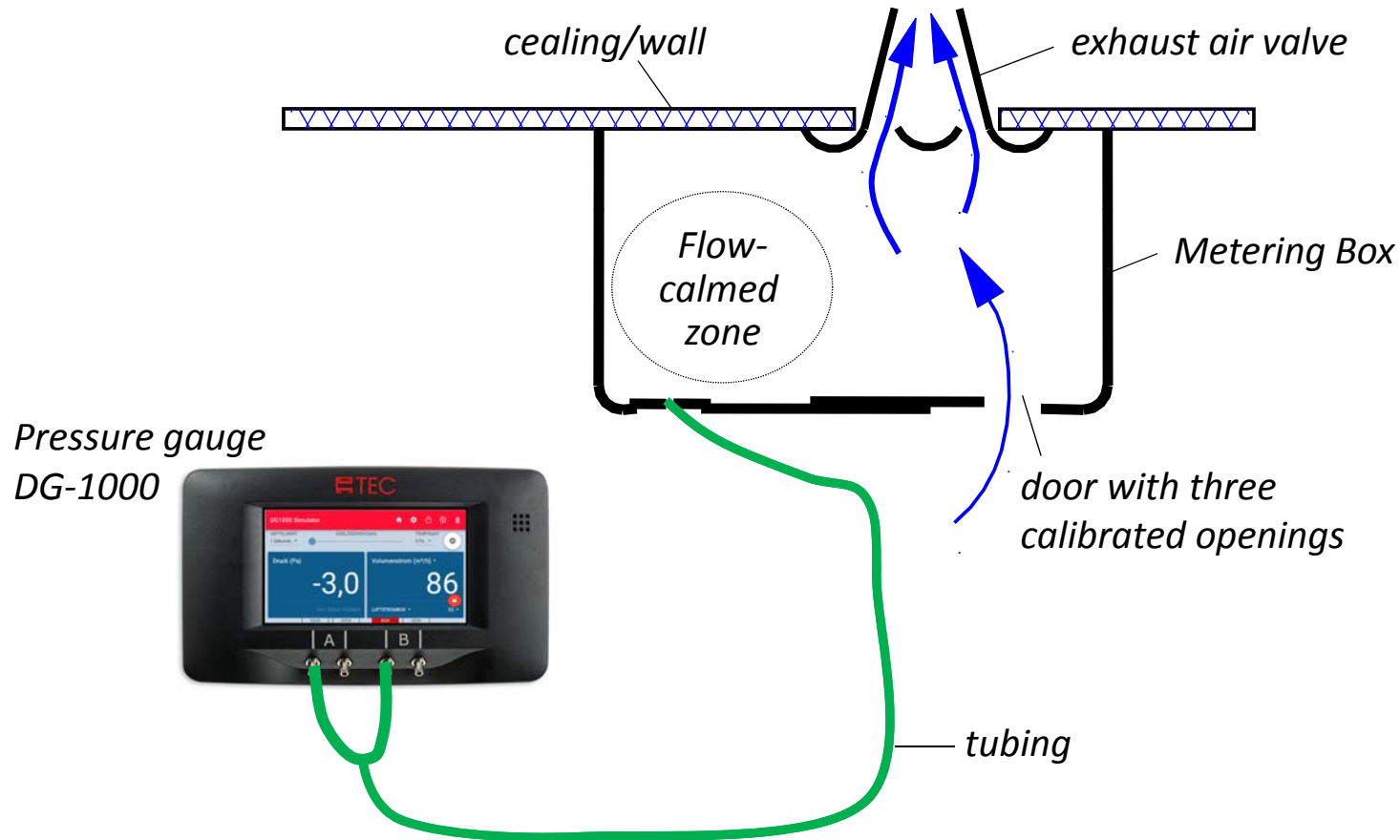


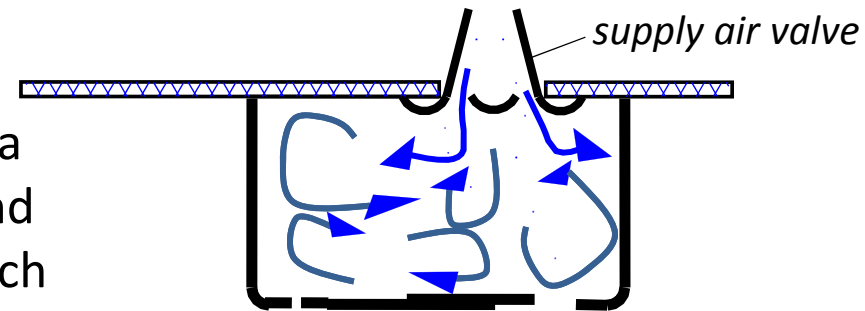
Figure 16: Energy Conservatory Exhaust Fan Flow Meter - laboratory test results compared to acceptable accuracy range (note: inlet flows only)

Measuring principle of the Exhaust Fan Flow Meter for exhaust air valves



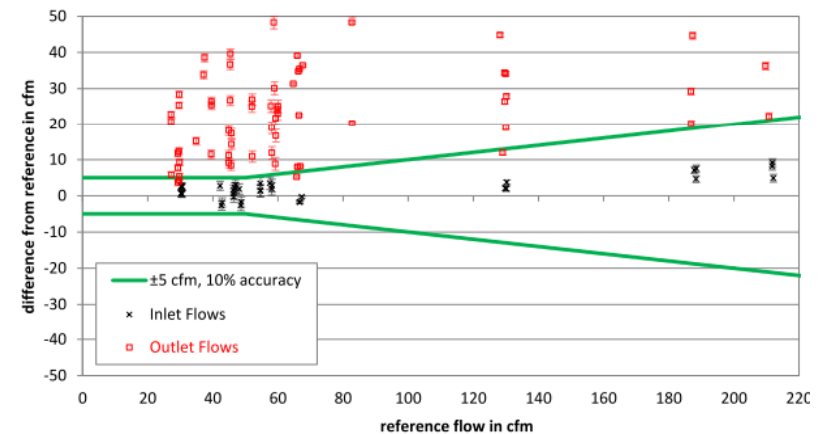
Measuring of supply air valves

By placing any kind of measuring device on a supply air valve strong turbulences occur and change the pressure ratios at the valve, which make a passive measurement difficult.



In order to measure supply air valves, the so-called “compensation method” should be used with our BlowerDoor FlowBlaster. The pressure ratio is compensated by a DuctBlaster fan and thus enables precise volume flow measurements. Only in this way is a really exact measurement possible.

The proof can also be found in the investigation of the renowned Lawrence Berkeley National Laboratory in California ([measurement without compensation in red](#)) :



Adjustment of supply air valves with Flow Blaster

With the BlowerDoor FlowBlaster, the compensation method achieves a uniform flow that corresponds exactly to the amount of air actually blown out. In the graphic below is the examination by the Lawrence Berkeley National Laboratory of our BlowerDoor FlowBlaster on supply air valves (**measurement with compensation in red**) :

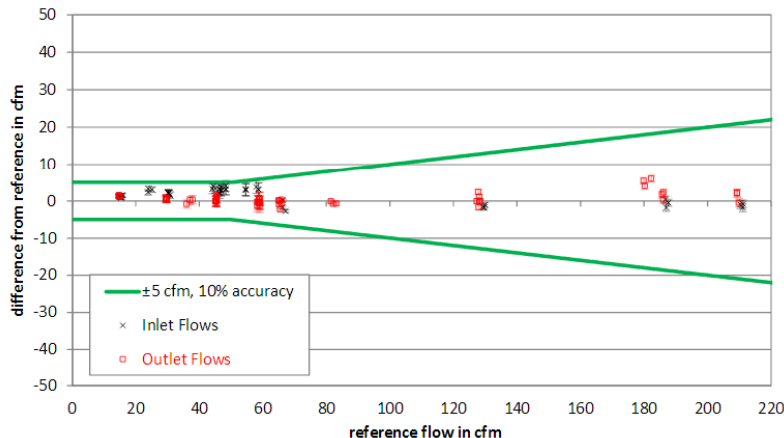
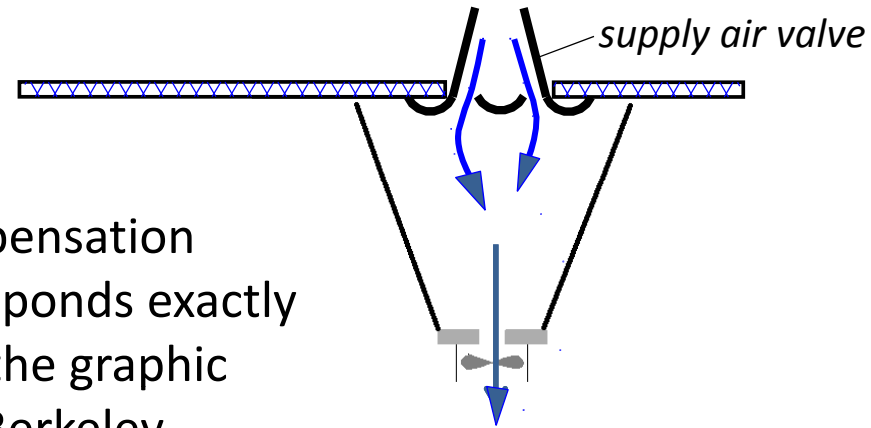


Figure 17: Energy Conservatory FlowBlaster™ - laboratory test results compared to acceptable accuracy range

Literature

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