



TEACH Passiv

FACT SHEET No. 16

PHPP - Airtightness

This Fact Sheet focusses on Air Tightness as it relates to meeting the Passivhaus standard and its effect in PHPP. In order to meet the Passivhaus standard, the airtightness of the building (by an airtightness test when installing a fan in the exterior door or window that pressurises and depressurises the building (at 50 Pascals pressure above and below ambient atmospheric pressure)) should be a maximum of 0.6 ac at n₅₀.



This 0.6ac value “has to be regarded as an upper limit. You should strive for lower values” (PHPP Manual).

The difficulty is that even reaching this target requires exceptional detailing and on-site construction, sequencing and management efforts.

The payback however in bettering this airtightness requirement has massive repercussions in lowering

your Space Heating Energy requirements. Therefore in the example below in an example project of 200m² that is just meeting the Passivhaus standard at 15.49 kWh/(m²a) (this still meets the Passivhaus standard as the 15.49 kWh/(m²a) is rounded to the requirement of 15 kWh/(m²a)) and is meeting the Airtightness requirement at 0.6ac:

The **Total Annual heating demand (Q_H)** in this example is 3098 kWh/a (this is then divided by the Treated Floor Area (TFA) to give the Heating Demand for the building (based on it's TFA).

By bettering this value by only 0.1 (i.e by lowering the Airtightness from 0.6 to 0.5) the Total Annual heating demand is lowered to 3000 kWh/a ie a reduction of over 3% from the original 3098 kWh/a figure.

Air change rate at press. test n₅₀ 1/h 0.50

Bettering the airtightness by a factor of 2 i.e. lowering from 0.6 to 0.3 and the Total Annual heating demand is lowered to 2805 kWh/a ie a reduction of over 10% from the original 3098 kWh/a figure.

Air change rate at press. test n₅₀ 1/h 0.30

Airtightness and the heat losses due to uncontrolled air leakage therefore have big repercussions on Space Heating Demand but as described above require diligent detailing and construction. Therefore it is recommended that you do not lower the 0.6ac figure when preparing PHPP in order to meet Passivhaus requirements as the airtightness requirement is very demanding and instead reap the benefits in lower heating bills when the airtightness requirement is bettered on completion.

Special thanks to Donal at [Gilroy Energy](#) whose airtightness equipment is shown above.

This [Blog post on Airtightness from 2010](#) is still relevant today.



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