

PAPER TITLE**Thought Experiments for Evaluating Building Air Leakage Test Procedures****MAIN AUTHOR**

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ABSTRACT

Field tests of building air leakage by fan pressurization can be difficult to analyse because of factors such as wind, stack effect, complex building configuration, etc. These factors make it difficult to run controlled experiments to evaluate the influence of variations in test procedures under all the possible test conditions. One alternative is to conduct 'thought experiments' where all of the variables can be controlled in a few simple situations.

This paper attempts to construct thought experiments defining simplified models of the physics of building pressurization air leakage tests in the presence of wind and stack effect. Calculations from these thought experiments may be useful in understanding the consequences of various testing options, and may help guide the development of more accurate testing standards. These calculations may also be useful in suggesting experimental tests of alternative test procedures, and in suggesting alternative statistical analysis. Of course this document only constitutes a first step in this thought experiment development, but it may show the utility of this approach.

Some of the aspects of building air leakage testing that can be explored with simple models of test physics include:

1. location of the outside pressure tap and compensation for outside pressure bias
2. comparison of pressurization only tests, depressurization only tests, and averaging both pressurization and depressurization tests,
3. evaluation of wind errors and flow reversal as a function of wind speed
4. evaluation of stack effect errors and flow reversal as a function of temperature