

## When do I do the leakage test?

Thankfully more and more new homes in Ontario are being 3<sup>rd</sup> party airtightness tested. Some do it to comply with [EnerGuide80](#), some builders want to distinguish their build quality by having it 'pass' an air test or to meet a branded standard like EnergySTAR and many, surprisingly, still don't get tested at all. Understandably many builders and architects are nervous about having their work tested, especially if it's their first time, but working with a reputable Certified Energy Auditors (CEA) should allay those concerns if you approach the build systematically.

### ***...I'll huff and puff and blow your house down!***

The truth is we're not out to get you. Most CEAs share the builder's desire to ensure better quality. In fact, many CEAs have been testing houses of all shapes sizes for many years and should be considered an asset. Over the past year, we've been working successfully with a handful of the best architect firms in the design phase to help iron out weak envelope details in the early design stages. We find the best results are realised through the [Integrated Design Process \(IDP\)](#) as all the key players come together early in the design phase to contribute expertise and share knowledge about the project well before ground is broken.

### ***What's an ACH50?***

The conditioned air volume of the house, including the partition walls and floor cavities, are all part of the heated air volume of the house. The "Air Changes per hour" (ACH) refers to how many times this equivalent whole air volume will be pushed out through the [blower door](#) at 50 Pascals of pressure difference between inside and outside the house. Century old homes generally leak air well over 10ACH and will lose more heat by air leakage than they do through the walls, whereas a new house under 3 ACH is considered "air tight" to the point of needing mechanical ventilation. The Passive House (PH) test method is different (pesky Germans!) in that it includes the conditioned air volume the volume occupied by the thickness of the exterior walls too.

### ***Setting the bar***

Most new houses can achieve air tightness levels of 2.5 – 4 ACH50 without putting a lot of attention to air barrier detailing. Most builders who take pride and know what to look for can hit 2 ACH fairly consistently. If you're planning to have a house tested for the first time, consider talking to a CEA who can coach you along the way so that expectations are met, especially if you're aiming to get under 2ACH. If aiming for anything lower than 2ACH, consider having the house tested BEFORE the drywall goes on. The EnergySTAR standard sets the bar at 2.0ACH or less, whereas the R2000 standard sets it's minimum air leakage at 1.5ACH. The Passive House (PH) has the most stringent standard set at a mere 0.6ACH\*.

### ***Not all tests are alike***

Broadly speaking there are two types of air tightness tests for residential applications; an “As Is” and a “Canadian General Standards Board” AKA a “CGSB” test. The tests are identical except that in the later, all intentional openings (fireplace flues, HRV vents, etc) are sealed up and as a consequence these test results are lower than ‘As Is’ tests. R2000, EnergyStar, HERS all require a CGSB test. EnerGuide tests are “As Is” test that are mostly done by depressurising the air from in the house, but can also be pressurised too. The PH test requires both a depressurisation and a pressurisation test to rule out bias due to unsealed flaps (clamp that seam!) in the air barrier.

### ***It’s my first time...***

On test day, some builders zip around nervously taping and sealing up joints in the air barrier, while others are resigned to a “let the chips fall where they may” attitude. The greatest opportunity for the builder is to have the site super and trades shadow the CEA during the test so they learn what to look for and how to treat the air barrier the next time they puncture a hole in it. The most common leakage points include missing attic hatches, doors without weather-strips, penetration leaks at the rim joists, fireplaces, and cold storage door frames that aren’t tied to the rough opening.

### ***Preparing for the test...***

If you’re doing a pre-drywall test, then the pressure’s off and you can note leaks by following the CEA around and seal them at your leisure later on. Ideally in pre-drywall tests, the sheathing on the outside of the house is the air barrier and if not acts as one to keep the volume of air leaking through walls low enough to prevent the poly from zipping off the walls. Ideally all ceilings to be insulated have their poly either supported by drywall, strips of resilient channel or 1”x3” strapping. If it’s the final test, then ensure all windows are cleaned and adjusted so they close and seal properly.

### ***Occupancy***

With careful attention to details, most tests go according to plan. Some tests don’t meet the target, but in most cases it’s due to obvious fixes, but some require extensive repairs and it is sad to see freshly painted drywall being ripped open to repair the envelop in a new house. The silver lining is that the occupant gets a higher quality product that’s more comfortable and cheaper to condition. As stated previously, hire and experienced consultant that can walk you through the process and check in periodically to ensure the target is within reach.

\*This target air leakage rate was set for a multitude of good reasons. It is achievable, it cuts energy loss, increased envelope durability and it the level at which most PH designed homes can supply heat through mere ventilation ducts.