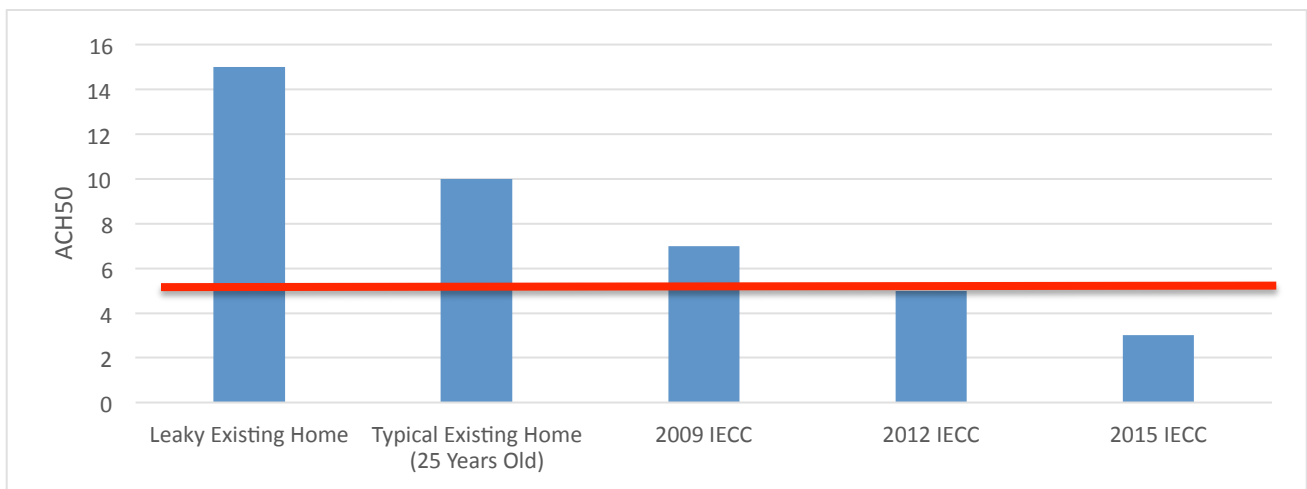


Air Leakage and Blower Door Testing

Air Leakage and Code

A typical existing home can be very leaky by today's standards. The metric used to measure the leakiness of a home is air changes per hour (ACH), often measured at 50 Pascal's (ACH50). In many existing homes this number can approach or even exceed 10 ACH50. For context, the International Energy Conservation Code (IECC), which sets minimum standards with regards to energy efficient construction, requires all new construction to meet certain air leakage requirements. In the 2009 edition the limit was 7 ACH50 (air changes per hour @ 50 pascals), which was then tightened to 5 ACH in the 2012 edition, and again to 3 ACH50 for the most recent 2015 edition. It is widely accepted throughout the industry that anything less than 5 ACH50 is considered to be a tight home.



Blower Door 101

To measure a home's air leakage, we use a tool known as a blower door. To conduct a blower door test, a fan is mounted into a frame of an exterior door, which pulls air out of the house thus lowering the air pressure inside. Because the outdoor air pressure is now higher than the air pressure inside the home, the outdoor air is pulled in through all penetrations, crack and openings in the buildings envelope.

To measure the airflow, a manometer is connected to the fan and includes reference hoses inside and outside of the home that monitor airflow and pressure. The manometer measures airflow at cubic feet per minute reading (CFM) measured at 50 Pascal's. Using this number and the volume of the home, we can calculate the infiltration or leakage rate.



Key Areas to Seal

Air leaking through the building envelope wastes energy and increases utility costs. If you have a leak in the building envelope, you are losing the conditioned air (heated or cooled) that you want inside the home for comfort. Either the air inside your home is not going to reach the desired temperature, or your AC unit or furnace is going to have to work harder to get it there, thus wasting energy and increasing costs. A well-sealed home uses a combination of caulk, tapes, foams and building materials to try and make the home as “air tight” as possible.

Where possible all seams, joints, and openings in the building envelope should be sealed during construction. Direct leaks are the most obvious, such as crack around windows and doors. These areas allow outside air to come directly into the home. Indirect leaks are more difficult to find but represent a significant amount of air leakage in a new home. Indirect leaks occur where air penetrates the exterior at one location and the interior at another.

The Benefits of a Tighter Home

- ⤴ Lower utility bills
- ⤴ Reduced heating and cooling loads
- ⤴ Improved comfort
- ⤴ Improved indoor air quality
- ⤴ Reduce/eliminate moisture problems

Builders First Time


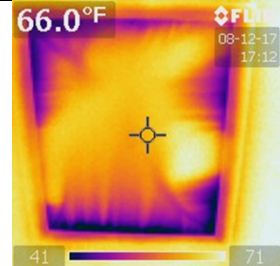

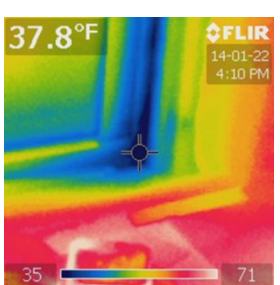

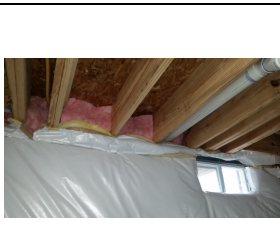


Newport Ventures recently completed a blower door test for a New York builder who had never before conducted the test on a home. Because the New York energy code will soon require blower door testing and limits on air leakage rates, this particular builder was interested to know where he stood with regards to these upcoming requirements.

The initial visit (walls framed and insulated) included a walk-through of the home to determine known leakage areas and to point out potential problem areas. Additionally, we performed a Thermal Bypass Inspection, a requirement for the ENERGY STAR Homes Program the builder was participating in.

Shortly after the walls and ceilings were sheet rocked, Newport made the second visit to the home and conducted the blower door test. The home tested at 3.06 ACH50 and we were able to identify several air leakage points (*detailed below*) that could be better sealed to improve the test score. These areas included recessed lights, outlet/switch boxes on both interior and exterior walls, plumbing walls for showers and tubs, the wall above the gas insert fireplace, bottom plates, rim joist, windows and doors. With a quick review of where and how to seal the different leakage points in this home we are expecting our final test numbers to be around 2 ACH/50 when the home is finished.

Images Detailing Leakage in the Home

	<p style="text-align: center;">Recessed Lights</p> <p>This home had 20+ high hats installed with none of them sealed to the gypsum with caulk. Major point of air infiltration in the home with direct communication to the attic above.</p> <p style="text-align: center;"><u>Sealing Tips:</u></p> <ul style="list-style-type: none"> • Use air tight cans • Caulk the gypsum to the canister
	<p style="text-align: center;">Attic Hatch</p> <p>Notice the dark colors around the perimeter. This attic hatch was just set on top of the trim with no gasket.</p> <p style="text-align: center;"><u>Sealing Tips:</u></p> <ul style="list-style-type: none"> • Gasket the perimeter of the opening • Caulk the trim around the opening to the ceiling
	<p style="text-align: center;">Kitchen/Bath Vents</p> <p>This kitchen vent pipe opened up direct communication path from the attic space above to the interior wall along with the kitchen.</p> <p style="text-align: center;"><u>Sealing Tips:</u></p> <ul style="list-style-type: none"> • Seal the opening between conditioned space and attic/ceiling areas
	<p style="text-align: center;">Windows</p> <p>The window shown had fiberglass tucked around the perimeter. The dark area around the perimeter shows the unwanted air leakage around the window.</p> <p style="text-align: center;"><u>Sealing Tips:</u></p> <ul style="list-style-type: none"> • Purchase windows that seal tightly when closed • Foam or caulk around the perimeter
	<p style="text-align: center;">Soul/Bottom Plates</p> <p>Image reveals that the plates are not touching and that air will leak through those openings.</p> <p style="text-align: center;"><u>Sealing Tips:</u></p> <ul style="list-style-type: none"> • Caulk or foam to foundation • Use gasket materials
	<p style="text-align: center;">Cantilevered Floors</p> <p>Image shows cantilevered floor that is stuffed with fiberglass batts. During blower door test air was coming in each of those bays.</p> <p style="text-align: center;"><u>Sealing Tips:</u></p> <ul style="list-style-type: none"> • Put in an air barrier on the inside of the home. • Seal on all 6 sides of each floor joist area.