

## Gatehouse Blower Door Test Results

A blower door test is a tool that is used to depressurize a house or building to help quantify air leakage and estimate its impact on heating and cooling costs. The blower door test can also be used to determine points of infiltration in a building. This test is applicable to both existing and new construction projects. In existing buildings, running the test helps identify leakage points around windows, doors, outlets, can lights, and more to seal for energy cost savings. Sealing points of infiltration can also help improve occupant comfort.

The primary values used to report blower door results at the Gatehouse were ACH50 and In<sup>2</sup> LBL Effective Leakage Area (ELA). Interpreting these results helps determine how leaky a building is and gauge the need for air sealing. ACH50 is what code uses to evaluate the leakiness of a structure. The Illinois Energy Conservation Code (IECC) requires an ACH50 of 5. This means that when the house is depressurized to 50 Pascal, the air changes per hour (ACH) for the dwelling should be 5 or less. Lastly, ELA is used to estimate the sum, in square inches, of the leakage area in the envelope.

Interpretation of the blower door test results for the Allerton Park Gatehouse indicates that this building is somewhat leaky (322.3 in<sup>2</sup> or 3.5% at 4 Pa) – as can be expected in aging buildings. This building measured ACH50 of 14.81, which is over the IECC 2012 code target of 5. A large part of the leakiness at the time of the test was attributed to the house's open chimney flue, contributing significantly to the overall leakage yet easily correctable. Another source of significant leakage came from the building's air ducts – one solution being geothermal heating and cooling if Allerton chooses to follow this stated objective. Additional sources included leakage from around windows and doors. There are ample opportunities for air sealing in this building. It should be noted that all facilities should have their chimney flues closed and insulated when vacant and when the fireplace is not in frequent use.

Results of tightening the building envelope and reducing identified sources of leakage will include: 1) reduced heating and cooling costs; and 2) produce a more comfortable living environment for building occupants. **Modification made to the building envelope (including window replacements) will not, however, have any effect on capacity requirements for heating and cooling including tonnage requirements for the facility's planned geothermal system.**



**Blower door setup at Gatehouse site**



**Blower door test in operation**



**Richard Burton, Allerton Park Facilities Manager,  
marks leakage points for sealing**