

Zone Testing and Sample Project Baseline Testing¹

Don Michael Jones
Residential Building Analysis

The goal of Baseline testing in the sampling process is to clearly define the acceptable parameters of performance that houses of a consistent type are to meet. The baseline testing protocols will include thorough performance testing that accurately quantifies overall air leakage levels, zone leakage from attics, crawls and garages, air leakage into the basement, and leakage into the ducts from unheated spaces. These tests will be combined with other selected pressure measurements (across plumbing walls, rim joist cavities, floor cavities over garages, duct registers, etc), Infrared thermography and visual inspections to form as clear a picture of the overall thermal performance of the shell as is feasible.

Measuring and quantifying the leakage levels between unconditioned zones and the house and the ducts in the baseline houses will allow the project to define what the acceptable levels of performance are for the primary types of construction. Utilizing the initial measurements and inspection results, correction strategies will be developed and prioritized for areas where builder performance improvement is warranted. As the builder makes improvements to the houses, subsequent measurements and inspection data will be used to quantify and update the new “acceptable baseline performance” for that house construction type.

Another goal of the baseline process is to streamline the field performance inspection process. Since the builders in this project tend to build their houses in a consistent fashion, the initial baseline measurements will be used to establish what the minimum performance is during the subsequent sampling inspections. For example; if an acceptable leakage across an attic ceiling is 200 CFM@ 50Pa or less and the baseline testing establishes that level to be a zone pressure measurement of 47 Pa WRT the attic or higher, then the field inspector will only have to quantify the leakage level when the house to attic pressure is less than the minimum performance level (for that house/attic type).

Another example would be duct leakage testing. If the acceptable duct leakage from outside the heated space is less than 10% of the fan flow (between 100 and 150 CFM@ 25Pa) and baseline duct leakage testing, in combination with pressure pan measurement, establishes that the supply registers need to be less than 1Pa @50Pa and the return registers need to be less than 3Pa @50Pa to meet that criteria, then the field inspector will only have to quantify the leakage level when the pressure pan measurements are higher than the minimum performance level (for that house/duct type).

The key to this approach being an accurate measure of performance is that careful and thorough baseline testing be accomplished on a representative sample of construction types and that the construction approach of the builder be consistent. Using an attic zone pressure without quantifying the leakage rate is only advisable if the attic venting approach of the builder is consistent from house to house. Similarly, using a set of pressure pan measurements to judge the CFM@ 25 Pa leakage rate is only possible if the duct construction and location is consistent from house to house. The same set of pressure pan readings can mean something completely different if all the ducts are outside the heated space (an attic for example) rather than primarily inside the heated space with a few exterior zone attachment points (partition wall return top plates). Representative testing of each builder’s houses that have one of the primary duct routes (all outside, ½ outside, pieces outside, all inside with framing attachment points) will be used to establish an accurate relationship between quantified duct leakage testing and pressure pan measurements.

¹ This will hopefully clarify the pressure pan duct loss measurement technique mentioned in the Pilot summary. Please email Don or me if there are any further questions.