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Memo: Infiltration Testing of Green Sentry Product

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To: Rob Feuer, Green Sentry

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The Window Sentry is a cover designed to reduce infiltration through and around window air conditioning units left installed during the heating season. On July 6, 2012, performance testing was conducted on a version of the Window Sentry product. The tests show that the unit is highly effective at reducing air leakage resulting from the installation of window ACs. At least 85% of the leakage from the air conditioner was eliminated by installing the Window Sentry.

The tested Window Sentry product consisted of two parts: an adjustable-width hard plastic cover and a compressible foam gasket accessory to seal gaps between window sashes when an AC is installed. An earlier prototype of the product is shown below which is very similar to the product tested.

Adjustable-width rigid plastic cover

Accessory compressible foam gasket (installed)

Testing was performed using two methods: a blower door and an orifice plate. The first test was basic 5-point (50-90 Pa) blower door test. This was performed under three conditions: with no AC installed and the window closed; with the AC installed, the foam gasket installed and no cover installed; and with the AC, foam gasket, and cover installed. The installation of an AC with a foam gasket is a best practice commonly recommended for homeowners. During testing the room was depressurized with a blower door and flow measurements were taken at several pressures. The air leakage in cubic feet per minute at 50 Pascals pressure (CFM50) was

determined for each condition by plotting the flow versus the pressure. The results of the test are summarized in the table below.

Table 1 – 5-Point Blower Door Test (with foam strip – best-practice AC installation)

Condition	Measured Flow (CFM50)
No AC, window closed	178
AC and foam strip installed, no cover installed	223
AC, foam strip and product installed	178

The results of the test indicate that product essentially eliminated infiltration created by a window AC. The installation of the window AC increased air leakage by 45 CFM50 and the product reduced the leakage by 45 CFM50. While this test is not as precise as other testing methods, with an estimated accuracy of +/- 5%, it provides a basis for comparison.

The same test was repeated without using the foam strip to seal the gap in the window. This simulates a typical window AC installation condition. The results are summarized below with an estimated accuracy of +/- 5%.

Table 2 – 5-Point Blower Door Test (without foam strip – typical AC installation)

Condition	Measured Flow (CFM50)
No AC, window closed	190
AC installed, no cover or foam gasket installed	297
AC and cover installed; no foam gasket installed	250

Again, the results show that the product is very effective at reducing infiltration. Under these conditions, the AC cover itself resulted in a reduction of 47 CFM50. The result concurs with the last test series result of 45 CFM50 reduction as a result of installing the cover.

Performance was then tested using an orifice plate mounted in a plastic shroud and a blower door fan. This method is more precise than the 5-point blower door test because it measures only the leakage through the area covered by the shroud. The shroud/orifice plate was taped to the wall completely surrounding the window where the AC and cover were installed. The foam gasket was used to seal the window gap in this test. The blower door was used to depressurize the room and pressure readings were taken across the product (between the inside of the shroud and outdoors) and across the orifice (between the inside of the shroud and the room in which it is installed). Pressure drop measured across the orifice and the orifice size were used to calculate flow in CFM50 for various situations, with the following results:

Table 3 – Orifice-Shroud Test (with foam gasket installed)

Condition	Measured Flow (CFM50)
No AC, window closed	16.2
AC and foam strip installed, no product	71.0
AC, foam strip, and product installed	22.9

Installation of the AC in the window with the foam gasket increased flow by 54.8 CFM50. Installation of the product reduced this flow by 48.1 CFM50, a reduction of 88%. This reduction of 48.1 CFM50 concurs with results of the previous two series of tests (45 and 47 CFM50).

Together with the accessory foam gasket, the tests indicate that the Window Sentry product appears to reduce air leakage from installed window ACs by at least 85%.

Questions regarding this testing may be directed to Sean Maxwell at Steven Winter Associates, Inc. (smaxwell@swinter.com).