

## Air Sealing

### An Essential Element of Every Energy Efficient Home

#### System Overview:

A Northlands homeowner set out to turn his home into an energy efficiency showpiece. He did this by adding additional insulation to his ceilings, walls and floors; replacing all the old slider, and aluminum windows; and upgrading the mechanical systems.

One of the things he has paid the most attention to during the renovation is air sealing. Air sealing means there are no gaps or holes in the vapour barrier – so no air can get through - an essential part of any energy efficient home, especially in the north.

Keeping your heat in and the cold air out means your home will feel cozier, with fewer drafts, and you will use much less heating fuel. Spray foam, house wrap, acoustical sealant and close attention to detail were used to seal this home. Every staple, nail hole or other penetration of the vapour barrier (right) was carefully sealed.

Arctic Energy Alliance performed a blower-door test during the mid-renovation evaluation. Based on the air sealing alone, estimated savings of over \$1,000 per year are projected.



**Figure 1 – Attention to detail when sealing the vapour barrier will pay off when they move back in.**

#### Technical Data:

The following calculations were performed using the HOT2000 program with the base building details:

<b>Air Tightness Measurement</b>	<b>Start</b>	<b>Mid Point test</b>	<b>Improvement</b>
Air Changes per Hour (ACH) @ 50 pa.	11.72	4.54	61%
Equivalent Air Leakage Area (ELA) inches <sup>2</sup>	168.8	49.7	71%
Equivalent Air Leakage Area (ELA) centimeters <sup>2</sup>	1089.0	320.6	71%

**Figure 2 – Blower-Door Test Results**

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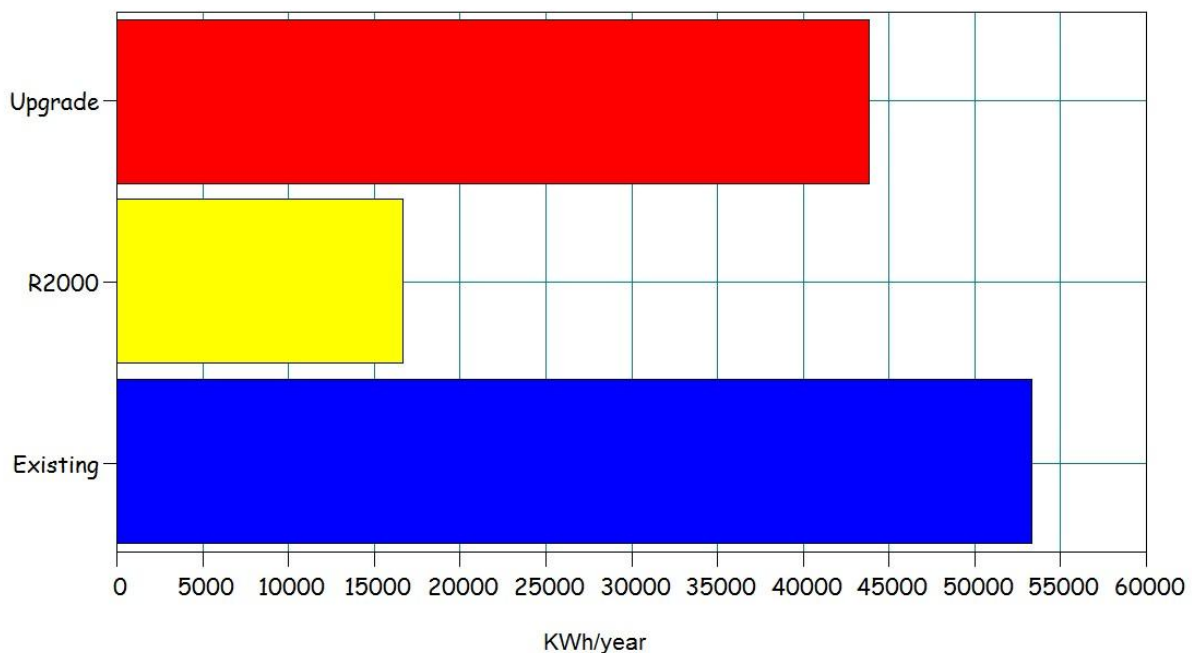
### Performance Data:

The following savings are based on ecoENERGY standard house conditions and Yellowknife 2009 Fuel prices.

		Units
Total energy savings	34	GJ/Year
Litres of fuel saved	870	L/Year
kWh of electricity saved	150	kWh/Year
Financial savings	\$1,090	\$/Year
Greenhouse gas reduction	0.5	Tonne/Year

**Figure 3 - Estimated Performance Data**

The following graph shows how the energy consumption of the standardized 'Upgrade' home and the original 'Existing' home compared to an energy efficient 'R2000' Home. The air sealing has made a big difference: 16% savings. The additional insulation and new mechanical systems are expected to make the home even more energy efficient than an R2000 home.



**Figure 4 – R2000 Energy Consumption Comparison**