

# **O-HEAT**

Omaha Home Energy Analysis and Testing  
6323 N. 115<sup>th</sup> Circle  
Omaha, NE 68164  
[www.o-heat.com](http://www.o-heat.com)  
402.250.2791

To: The Green Family  
Re: Home energy efficiency survey

## **INTRODUCTION**

On October 1, I conducted a walk-through energy efficiency survey of your residence at 1234 Your St. Omaha, NE. The purpose of the survey was to identify opportunities to save energy while improving the comfort and safety of the occupants. The walk-through survey can reveal the general condition of the house and some specific issues. Other important factors can only be examined with blower-door (envelope leakage) testing, duct leakage testing and/or infrared photography.

The house is 11 years old and has a new heat-pump and furnace, with revised ducting serving the main floor. Mrs. Green expressed no concerns about the house, except that the two main floor bedrooms have a history of being cold in winter and hot in summer.

The rate of energy loss is affected by many factors, including the size, number and location of envelope (from the inside to the outside of the house) leaks, air duct leaks, and the amount and quality of installation of insulation.

## **FINDINGS AND RECOMMENDATIONS**

The house appears to be generally well-built. On the other hand, I did not see specific efforts at air-sealing. The trimwork is neat, without large gaps between the wall and trim, but the gaps are not caulked. Holes where plumbing penetrates the wall (e.g. under sinks) are small, but not sealed. The finished ceilings and walls in the basement may hide major air leaks. Similarly, the attic floor may have major leaks, covered by insulation. Builders typically leave large holes around plumbing, ducting, furnace flues and wiring that pass from the basement to the attic. These form pathways that carry conditioned air out of your house. If it doesn't show, it is usually not considered a problem by the builder. Such major leaks can only be discovered using blower door testing, and blower door testing is often more effective when combined with infrared photography.

The following recommendations will not only save money, they will improve the effectiveness of your heating/cooling system, and that may make the main floor bedrooms more comfortable.

The duct boots behind the ceiling-mounted heat registers are not sealed to the drywall. A gap of 1/16" to 1/8" exists between the sides of the boots and the ceiling. These gaps connect the interior directly to the attic. The boots are buried under blown-in fiberglass insulation, which does almost nothing to stop the flow of air. When the heat or A.C. is running, the furnace fan pushes expensive conditioned air

through these gaps. In winter, when the furnace fan is off, the stack effect (warm air rising) drives warm, humid air out of the house into the attic. This lost air is replaced by cold outside air entering through leaks lower in the house. In summer, the opposite happens. Cool, conditioned air falls out of the house through low leaks, and hot, humid air comes in through leaks from the attic.

The return air grills are located low on the walls. Return air travels up through the wall cavity, through a hole in the floor of the attic, through a duct boot, into a return duct in the attic. The weak points of this system are the wall cavities, which probably leak, and the connection of the attic floor to the duct boot. Sealing the wall cavities would be difficult, but the duct boot can be sealed to the attic floor fairly easily.

The furnace filter slot cover fits loosely. This is an important leak to fix, because it is close to the furnace fan, where (negative) pressure is highest. This leak pulls a lot of air into your duct system from the attic. Worse, it is over the garage, a source of carbon monoxide, gasoline fumes, pesticides, etc. You can replace the loose cover with a flexible magnetic cover or duct tape.

The attic walls (knee walls) are insulated with fiberglass batts, some of which are sagging. Gravity tends to make batts slump over time. Batt must be neat and in full contact with the wall to be effective. Convection currents can wash heat out of vertically-oriented fiberglass that is not covered with an air-barrier. A solution is to cover the batts with a vapor-permeable air barrier, such as house-wrap or foam board, and seal the edges so that the fiberglass is completely enclosed.



*Illustration 1: Kneewall insulation, Green Residence*

The door to the deck from the master bedroom sags a bit. It might be possible to tighten the screws. Then the weatherstrip will be more effective.

A metal duct/hose from the dryer to the wall will help prevent a fire. Braided stainless steel water hoses on the washer will help prevent a flood.

Sincerely,

Mark Loscutoff  
RESNET Certified Home Energy Rater