

**Alaska HomeWise: Ask a Builder**  
**By Cold Climate Housing Research Center Staff**

*The "Ask a Builder" series is dedicated to answering some of the many questions Fairbanks residents have about building, energy and the many other parts of home life.*

**I have double pane windows, every year I get large amounts of frost buildup on the pane facing the interior of the house. I thought these were fairly nice windows since the house is only 5 years old. I've tried the shrink wrap window plastic but that only works if I use it around the frame – in which case I can't close my blinds. Can you explain to me what is wrong and the steps to fix it?**

There are a couple of things that could be going on here. You may have high humidity levels in the house, especially if you don't have an adequate ventilation system in your home. Target indoor humidity levels for human comfort and health are between 30 and 50 percent. You should be able to buy a digital hygrometer that will help you monitor your indoor conditions. The windows are one of the first places you will see condensation forming because they are one of the coldest surfaces in the house. Here's the bottom line: the higher the humidity and the colder the surface, the greater the condensation potential. Several factors that will contribute to excess humidity in the home are: a crawlspace that doesn't have a good ground vapor barrier, appliances that aren't properly vented to the outside, particularly dryers and range hoods, aquariums, inadequate bathroom ventilation, firewood stored indoors, and high occupant loads, to name a few. As an example, a family of 4 will produce roughly 10 pounds of water per day through respiration and transpiration. The reality is that in a properly ventilated house in Fairbanks, levels of 30-50 percent humidity are difficult to achieve because the climate is so dry here. In terms of condensation potential, this works to our advantage. With a tight under-ventilated house however, it is quite possible to attain high humidity. In periods of extreme cold, the indoor humidity levels should be lower to reduce condensation problems. As you noticed, the shrinkwrap plastic is effective as it essentially turns your window into a "triple pane," improving performance. The other option is to insulate the exterior of the window. Rigid foam board is crude but effective, but that also has its obvious disadvantages. The easiest approach is to target the indoor humidity and identify potential problems in this area first.

**What types of boilers are out there and what do I look at? How do I know which type of boiler is the right one to get, and what size?**

Alaska is a cold and faraway place, but even way up here in Fairbanks, we have a wide variety of boilers. Some common brands include Weill Mclain, Burnham, Slantfin, Monitor FCX Condensing Boilers, Triangle Tube, Viessman, Buderus, Energy Kenetics, Low Mass Boilers, QuietSide, and even direct vent hydronic hot water heaters are pressed into service as radiant heaters for the home. Look for the AFUE efficiency and get recommendations from mechanical contractor and homeowners.

The best way to find out what size boiler you need for your home is to look at a heat/loss calculation for your specific house. You can have this calculation done by a plumber or through a home energy rating among other places. The calculation takes into account the R-values of walls, windows and roofs, and the exposed surface areas of each, then estimates how much heat will leave the building

at a specific temperature. For Fairbanks, -40 F is often used. The right size boiler will offset the heat that is expected to leave the building. There's an old rule of thumb that uses the square footage of your home to calculate the right boiler size. Unfortunately, this will often call for too large a boiler. A boiler that is too large for your home will operate inefficiently.

**Alaska HomeWise articles promote home awareness for the Cold Climate Housing Research Center (CCHRC). If you have a question, e-mail us at [akhomewise@cchrc.org](mailto:akhomewise@cchrc.org). You can also call the CCHRC at (907) 457-3454.**