

Ask Jon Eakes

Are "Thermal Mass" wall mounted electrical radiant heaters worth the money?

Last Updated: Monday, January 31st, 2011, Created: Friday, November 16th, 2007

"I HAVE RECENTLY RECEIVED A BROCHURE CONCERNING A SUPPOSED NEW KIND OF HEATING WHICH IS SUPPOSED TO BE CHEAPER AND MORE EFFICIENT...CAN YOU GIVE YOUR ASSESSMENT OF THIS PRODUCT AND THE PROS AND CONS ?" -- Grant, Montreal

There is currently a marketing blitz from the company Echotherm Canada, selling electric heating which originate from Europe with thermal mass and radiant plates. I am sure that these are quality heaters that will not only look good but may effectively heat your house (see my qualification about placement below) -- the real question is do they do that any better than inexpensive old fashioned base board electric heaters, is there a reason they work well in Germany and may not in Canada and especially, are they worth their fairly hefty price tag? If they are claiming large reductions in heating costs over present base board electric heaters, they are probably exaggerating. Electricity is electricity and all electric radiators use it at about the same efficiency. The total quantity of heat required in a home is not determined by the heating unit but by the walls, windows and occupancy habits. What can make a difference is that radiant type of heating can feel warmer to a human, leading to reducing the actual room temperature, but even here the actual dollar savings in most studies have been marginal or not at all -- most related to lifestyle. A lot of coming and going with opening and closing of doors tends to reduce the advantage of radiant types of heating. Thermal mass helps to spread out the heat, something that could be useful if it were to be able to spread the heat out for many hours, such as some phase change thermal electrical heaters from Germany can do -- but at great capital cost. Other units advertise an Aluminum thermal mass. Aluminum is a material that conducts heat well, but is not very massive -- hence not prone to holding heat for hours as is cast iron (just test that with your frying pans). Aluminum as thermal mass is a bit of a non-sequitur -- it is simply not massive. Ecotherm, to its credit, now uses an inexpensive cast iron thermal mass, much like the old water radiators that we know in Canada -- hence this will even out the on/off cycles of old baseboard heaters that heated so unevenly. But read on to discover how electronic thermostats have totally eliminated this advantage. By the way, their claim that air will not be dried out by their heaters doesn't hold. Heating systems do not dry out air -- winter time air leakage in the house is what dries out air. Proof: highly energy efficient air tight houses that use old fashioned base board heaters need dehumidification systems (often simply ventilation systems) to keep the air from being too humid. The real key topic here is where you place the source of heat. In a mild climate where outdoor temperatures are not extreme, such as Vancouver, France and Germany, good looking wall mounted units like the ConvectAir and EcoTherm radiators work quite well. In really cold climates, like most of Canada, we very purposefully place forced air heating ducts as well as baseboard heaters right under windows and we allow the hot air to flow up along the wall and over the window rather than having it push out into the room. The reason for this is that the window is the coldest part of the wall, and it needs that extra flow of hot air to combat condensation on the windows. With triple or quadruple pane windows and perfect insulation and air sealing, we can drop that rule -- but for most of us it remains a guide of good practice designed to maintain a healthy mold free house. Many housing products that are legitimate in milder climates simply are not appropriate for houses in our climate. What can be better than old fashioned electric baseboard heaters is if that electrical heat is evened out rather than the radiator getting very hot, very cold etc in continuous cycles. Adding thermal mass helps to even out those cycles but slows down response time to air temperature changes. By the way, thermal mass in heating units is not at all a new invention but something done for a long time in Europe -- where it must be noted it does not get as cold as in Canada and they are used to living at 18C not 20 or 22 and hence mild slow heating units provide perceived comfort easier

than in Canada and the general experience has been that products successful in Europe work well in Vancouver but not in colder regions of Canada. The real key is that today with our modern wall mounted "made in Canada" electronic thermostats operating an old baseboard heater, those hot cold swings have disappeared and those old baseboard heaters become about as efficient as electricity can get in heating. In addition most of the noise of expansion and contraction disappears as they don't go through such large temperature swings as with the old unit mounted thermostats. I admit that these "designer units" look great but their actual utility in our climate and especially their claim of dollar savings doesn't ring true to me. In fact current research at the Canadian National Research Council appears to be challenging the radiant heating industries claim that radiant heating is more efficient than forced air heating from a cost of fuel point of view -- we will see when the research is finished. These classy high tech radiant heaters look great -- but they don't excite me from a technical point of view and they certainly don't excite me from a cost point of view. Jon

Keywords:

Radiators, Aluminum, Controversy, Baseboard, Alternative, Energy Conservation, Heating

Article 2084

www.joneakes.com