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Purchasing a Portable Electric Heater? Don't Get Zapped by Misinformation

By Mark Pierce, Cornell University
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Don't be fooled by unscrupulous sales and marketing people. While portable electric heaters are one of the easiest heaters to use for supplemental heat in a home, they are not magic. No matter who developed a particular model or what the marketing descriptions may claim, all portable electric heaters deliver exactly the same amount of heat per watt of electricity consumed.

The primary difference between each of the three basic types of portable electric heaters on the market is in the method used to transfer their heat. The first, natural convection heaters, have electric heating elements that are immersed in a special type of oil. As the elements warm up, the heat is absorbed by the oil and then transferred to the room via natural convective air currents. The second type, fan-forced convection heaters, use a fan that blows air over heated coils and out into a room. Radiant heaters, the third type, have visible wire coils or quartz tubes that glow red-hot when the heater is turned on. Heat transfer occurs via radiation directly to people and objects in a direct line of sight to the heater.

Don't confuse the transfer method used by various heaters with the physics of converting electricity into heat. All three types of heaters will produce 3.4 British thermal units (BTUs) of heat for each watt of electricity consumed via a process known as electric resistance. This process works by forcing electricity through a device called a resistor. Resistors impede the flow of electricity and create heat as a by-product. The key point to keep in mind is that the difference in portable electric heaters is not in how much heat they create -- they all produce exactly the same amount per watt -- but in how the heat that is produced gets transferred to a room.

The following information should help you select the type of portable electric heater that best fits your supplemental heating needs.

Natural convection heaters, often designed to look like older style steam radiators, provide even-warmth and are a good application in a room where you want to maintain a slightly higher temperature than the rest of a house or apartment for extended periods of time. The surface temperature of this type of portable electric heater does not get nearly as hot as fan-forced convection or radiant heaters making them safer in terms of fire or burn risks.

Fan forced convection heaters heat the air within a room quickly. This type of heater is considered a good choice when you want to warm up a room quickly but do not plan to maintain that higher temperature over several hours. For example,

this type of electric heater would be a good choice if you wanted to quickly heat up a bathroom or a bedroom on a cold morning as you get ready to go to work. But remember that the space directly in front of these heaters gets so hot that it could be a fire hazard if flammable items are not kept a safe distance away. In addition, the outer housing of many units can get so hot they can cause burn injuries. If you plan to purchase a fan-forced heater, make certain to get one with a *tip-over switch* and an *over-heat sensor*. A *tip-over switch* will automatically turn the heater off if it gets tipped over. An automatic *over-heat sensor* will turn the heater off if the fan fails. Without the fan blowing air over the heating element, the heater can become dangerously hot.

Radiant heaters transfer heat directly to people and objects within a direct line of sight of the heaters' glowing coils or tubes. Use of radiant heaters is recommended when you want to feel warmer while you are in a cold space. For example, if you are sitting and working at a sewing machine or workbench in a cold basement or garage and want heat to flow directly to your body so that you feel warmer in this cold space, this heater would be a good choice. While radiant heaters provide warmth almost instantly to objects, they heat rooms, even small rooms, very slowly. Like fan-forced convective heaters, they also get hot enough to cause a fire or severe burns if not used carefully.

While portable electric heaters may increase comfort levels in cool spaces of your home during winter, it is unlikely their use will significantly reduce overall home heating costs. In New York State it costs 132% more for each BTU of heat produced from electricity compared to each BTU produced via natural gas. Compared to heating fuel oil, electricity is 87% higher per BTU, and 40% higher per BTU than propane¹.

When shopping for a portable electric heater, make your selection decision based on the heat transfer method that best fits your needs. Styling and features such as timers or remote control may also be a factor in your selection. And of course the purchase price is an important consideration. Do not let marketing terms such as "miracle heater," "revolutionary technology," or "state-of-the-art-technology" affect your decision. Since electric resistance converts nearly 100% of the energy in the electricity to heat no "revolutionary technology" is possible. The amount of heat that can be produced from each watt of electricity is set by basic physical laws and cannot be changed. All types of portable electric heaters will deliver the exact same amount of heat per watt of electricity consumed.

¹ These cost differences were calculated using New York State average costs for each fuel type as of October 2008. In addition the heat content of fuel oil, natural gas and propane was decreased by 20% to factor in the inefficiencies associated with fuel fired heating appliances.