

Convection Space Heating

Written By: Kelly Stinson, Manager of Research & Development and Renewable Products, Dimplex North America

Electric space heating products have not seen any major advances in years. In most cases electric heaters are treated as commodities; the only point for comparison being price. Given the push towards green energy solutions, the need for performance and package improvements in this relatively stagnant category has never been more apparent.

Before we look at where electric heat is going, it's important to familiarize ourselves with the three current categories of electric heaters: forced convection, natural convection and radiant.

Radiant heaters use infrared light to transmit the heat from the appliance directly to the occupant and other objects in the room. The amount of energy that can be transmitted is heavily dependent on the temperature of the heater. In order for a significant amount of radiant energy to be transmitted the heater must be hot enough to glow red or even white. Much like a heat lamp in a fast food restaurant, objects must be directly in front of the radiant heater to be heated. This type of heater is ideal for keeping warm in a cold space, like a garage or workshop. It will transfer heat to the objects or people in front of the heater without significantly heating the air in the garage or workshop. Use of a radiant heater outdoors is possible, as it will not work to heat the air, only the objects in front of it.

Forced and natural convection are similar, in that they transfer heat to the ambient air and that air carries the heat to the user and the rest of the room. As the name suggests, forced convectors use a fan to push air over the heating element and into the room, whereas natural convectors use the natural buoyancy of warm air to heat a room with no moving parts.

Forced convection will typically move air at high velocities and force the air movement in the room to circulate in an unnatural way. A fan will interrupt the natural airflow in a room and replace it with an artificial airflow. When the room has reached the set temperature, the fan will turn off and the natural airflow conditions of the room will resume. This change in airflow can lead to a perception of less comfort as the airflow in the room is constantly changing, warm one minute and cold the next. In addition, fans make noise - not a lot of noise but when a fan turns on or off the change in noise level in any room is noticeable and distracting.

The seemingly timeless electric baseboard has remained more or less unchanged for decades. Panel convection heaters are a more recent attempt to condense long baseboard heaters into a smaller space while maintaining all the quiet comfort of natural convection heat. The result is a narrower heater that fits more easily into a room's available space, however, the panel convector is installed higher up the wall and can be an unwelcome part of the décor.

A baseboard convector creates a wide, slow moving air curtain that travels up the wall and slowly spreads out across the room. A panel convector creates a much faster airflow over a smaller area. This

airflow is able to deliver the heat energy to the center of a heated space much faster than the slower airflow from a baseboard convector. The delivery time of the heat to the center of the room is critical for the overall comfort of the occupants. This is especially true when the room undergoes a change in condition, such as a door opening, a change to the set point of the thermostat, or even a drafty room. The faster the heater responds to change, the more comfortable the occupants. Baseboard heaters are generally less expensive than panel convectors, and the debate of whether the benefits of a panel convector are warranted by the cost are ongoing. While baseboard heaters dominate the marketplace for this reason, their size sometimes limits where they can be installed.

Each type of convector has disadvantages that won't allow it to be used in all applications. The consumer market would surely be attracted to a product that combines the advantages of a panel convector with a baseboard heater. A heater that installs like a baseboard, but creates airflow like a panel convector would bring together the best of both worlds. This type of heater would be very similar to a traditional baseboard, but like a wall convector, it would be much shorter. It would create a higher velocity of airflow and deliver heat to the center of a room quickly.

Dimplex North America Limited is launching a new Linear Convector this spring that will fundamentally change the electric heating category by combining the best of the panel convector and baseboard heater. While this new Linear Convector may look similar to a baseboard, the overall length has been reduced by as much as 42%, while simultaneously increasing airflow by up to 40%. The Linear Convector therefore delivers the size reduction of a panel convector while remaining far less conspicuous in a room. In addition, the end user can expect to enjoy energy savings of up to 10% due to reduced heat loss through outside walls, which is where electric baseboards are typically located.

From a contractor's point of view, it is easy to imagine, what ABS pipe did for plumbers, the Linear Convector will do for electricians. A Linear Convector's smaller size provides more options in where it can be placed. Traditionally, electric baseboard heaters have been installed under windows, which is still a viable location; but a shorter-length unit can be placed just about anywhere in the room. Smaller units are also easier to handle, store and transport. They will require less packaging, which would cut the amount of waste that has to be carried away from the site – and reduce the amount of material going into landfills and recycling mills.

It's difficult to think of another product innovation where reducing the size actually resulted in an improvement in performance *and* lower energy consumption; and all while using the same input. Dimplex has done just that with the introduction of the Linear Convector, marking the creation of a new category of electric heaters and proving that it is possible to do more with less. With more clean and renewable energy coming online every year, the future of electric heat is bright, especially for companies who are prepared to challenge conventional wisdom.

More effective design and better performing products are breathing new life into electric heating technology. As a result, today's consumers can enjoy more comfortable homes, quieter living spaces and lower energy bills – all while reducing their impact on the environment.