

## Power Notes: Distributed Wattage

A heat seal bar on a packaging machine is basically a piece of rectangular steel with two holes. There is one through the middle to accommodate a heater and a second, smaller hole for a sensor to measure the temperature of the bar.

Assuming the bar is heated using a standard heater, would you have even heat across the total length of the bar? The answer is no. Although the heat is evenly distributed over the length of the heater, when the heat transfers to the heat seal bar the ends of the bar will always lose heat more quickly than the middle. This is a thermodynamic fact of life.

In order to compensate for this end or edge heat loss, we recommend the use of distributed wattage heaters that are made with 10 to 25% more wattage placed on each end of the heater. This technique insures that the temperature profile of the heat seal bar will be even over the bars entire length. An even temperature profile will produce consistent, effective heat seals every time with very little waste due to defective sealing.

In blister packaging, some of the same heat transfer principals apply. The center of a heated body is always the hottest. Blister packaging is accomplished by pre-heating a plastic sheet and then pulling the heated plastic into a mold by a process called vacuum forming. The plastic is heated by radiant heat coming from a heater placed below or above the sheet. When the sheet is not heated evenly (i.e. it is hotter in the center), the plastic on the outside of the sheet may not be pulled fully into the mold causing incomplete blisters.

Radiant heaters can be made to have wattage distributed evenly over them by placing 5 to 10% additional wattage on their perimeter. As a result the entire plastic sheet is raised to an even temperature thus preventing heat loss at its edge.