



## TEMPERATURE PROFILES

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Getting long life out of feed screws and barrels involves more than choosing wear resistant materials. As important as those proper choices are, other factors do contribute to their success or failure. This article will help you achieve maximum performance and increase longevity of your screws and barrels.

In the plastics industry, there are a great number of processors that do not understand the origin of the two heat sources used to transform the solids in the barrel into a homogeneous melt. The heater bands, which provide conductive heat, are a given and are the first heat source. The second source of heat is shear heat. Shear heat is the heat created when the material is forced against the screw surfaces, the barrel wall, the tip or mixer, and even itself. This second heat source is often times overlooked. It is a bit mysterious since there isn't an exact control on the machine that you can set to control this heat. Instead, it is controlled by screw design, RPM, back pressure, and heater band settings. If one or more of these factors are too far off, it may result in the screw "side loading" into the barrel I.D. causing premature wear and/or increased part rejection due to overriding temperatures.

Most molders have experienced times when they have had temperatures override in a particular zone when the heater bands weren't cycling. In this case, turning down the heater band settings would seem to be the correct thing to do when in fact, it is almost always the wrong response. The heat in effect here is shear heat. What should be done in a case like this, is to increase the heater band settings on the zones rearward of the overriding zone. The increase in temperature on the material before

the overriding area will tend to wet out that material and let it become more lubricious, thus reducing the amount of shear heat generated as the material travels towards the overriding zone. This will bring the overriding zone temperature back down.

Shear heat plays a big roll in obtaining a homogeneous melt. Molders that learn how to control it will see vast improvements in the life of their screws and barrels (in some cases, 2 to 3 times the life) not to mention the quality of the parts they produce.

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