

tech.topic

Recalibration of Temperature-Recording Instruments

The day the blow molding machine was installed and started, the controllers probably read temperatures right on the mark. However, sooner or later, a thermocouple (T/C) had to be replaced, new T/C wiring was installed and the T/C and its wiring aged. The result is that now the controller readout is off by 20°F or more.

When each controller was put into use, it was programmed to respond as follows: when the controller received a certain voltage from the T/C, it reported a certain temperature. However, any change in the T/C or the type, length or resistance of the wiring causes a different voltage than expected to be sent to the controller. If the controller was not recalibrated when the T/C or wiring was changed, the controller continued to report according to its original instructions. Recalibration is essential when any change is made. The blow molding machine need not be down during the procedure, although shutting the machine down is recommended.

WHAT TO DO?

It is relatively easy to recalibrate the controller. You need:

- A mercury thermometer that reads as high as any of your temperature settings
- A one-liter or one-quart stainless steel or other metal pot
- An electric hot plate equipped with a rheostat so that temperatures can be varied
- A quart of cooking oil
- A stirring rod

Put the pot on the hot plate, the oil in the pot and the thermometer in the oil. Next, with the actual wiring to be used to connect the T/C to the controller attached,

immerse the tip of the T/C in the oil. Turn on the heat and stir to keep the temperature of the oil uniform. When the temperature, as indicated by the thermometer, reaches the set point at which this controller is supposed to operate, check the read-out of the controller. If the two temperature readings differ, reset the controller pointer to agree with the thermometer.

Repeat this procedure with the T/C-controller combination, checking each at approximately the temperature of its set point.

If your plant has more than one blow-molding machine, it may be worthwhile to purchase a portable calibrating instrument. This instrument costs between \$400 and \$900, but it is faster and safer than the manual method described above.

The calibrating instrument's leads are hooked up to the controller's leads so that the calibrator can inject a reference signal to the controller, simulating the operation of a T/C. The controller is then adjusted until it and the calibrating instrument are at the same set point.

Recalibration of the controllers should take place about every six months. This periodic check takes care of any small changes in the system before they get large enough to cause trouble. Regardless of elapsed time since the last check, recalibration should always take place whenever any change is made in the controller-wiring-T/C system. Any such change is almost certain to upset the voltage-temperature read-out relationship.

For more information about blow molding, contact your LyondellBasell sales or technical service representative.