Troubleshooting Tools

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Vol. 27 #1, March 2000

Accurate temperature measurement on a moving product is difficult to obtain. Contact pyrometers are usually not adequate for this purpose. A non-contact measuring device is required. An infrared pyrometer is probably one of the best tools you can have for extrusion troubleshooting and analysis. Look at the higher cost instruments and spend a little bit more to obtain a quality instrument. You can be fooled into believing a reading from a low-cost instrument is accurate. Understand the pitfalls. The key features to look for are as follows:

- Laser indicator - this option is used to identify the spot where the infrared pyrometer is actually reading. It is well worth the investment.
- Spot size - pay attention to the spot size that is being measured so that you can be sure, particularly on narrow products, that you are measuring only the plastic materials and not surrounding materials. Smaller spot sizes are often worth the investment.
- It is desirable to have a specific wave length instrument for plastics (3.4 microns). This is more critical for accurate measurements of thin film-type products.
- Obtain adjustable emissivity. Black barbeque paint on the target, where possible, can be helpful.
- Purchase a tripod. It is very important to be able to continuously read a temperature and an inexpensive tripod will stabilize the measured location.
- Be careful of static, it can easily damage the instrument.
- Decide how you will occasionally calibrate the instrument.

Use the IRP to benchmark the entire process at different locations when it is running well. Take MD and U) readings. Record settings to be used as a baseline of good operating conditions during troubleshooting.

Hand-held pyrometers are very important and it is amazing how many plants that I go into and I ask for the pyrometer and they tell me that none are available. There are many different points that you can obtain:

- Needlepoint for measuring melt temperature
- Blunt points for measuring die surfaces
- Washers that can be used to screw the thermocouple wire onto a die for continuous measurement, fine wire thermocouples for applications where the time constant is important.
- Air nozzles for ovens
- Thin band thermocouples for roll temperature measurement
- Carrying case
- Constantly replenish supply

Purchase a low-cost 10 to 30X microscope. A simple l0X microscope that you can purchase in Radio Shack for $20 is often enough to be able to look at occlusions or surface texture right at the line.

It is important to select scales in the proper accuracy range for your process. Take the time to calculate the accuracy of the scale you are about to purchase to make sure it is in the range that you need.

- Russ Gould, RG Associates

See also:

- Immersed thermocouples
- IR temperature probes
- Pyrometers
- Troubleshooting polymer processing operations

Return to Consultants' Corner