

# Improving Product Quality in Printing and Graphic Arts

---

Infrared thermometry, at relatively low temperatures, has proved beneficial to printing companies. Both the basic products printers use, and the finished material they produce, have been significantly improved where infrared sensors have been applied.

Temperature is vital in determining the quality and consistency of printing products such as inks and lithography plates and in drying printed stock in web processes. Yet, it is only since infrared thermometers came into widespread use by printing equipment and materials manufacturers that it has been possible to guarantee the consistency of printing materials, and printers were confident that sheets were dry enough to cut and fold without damage.

Infrared sensors are able to continuously monitor temperature within a very narrow range and, unlike previous thermometers used in materials manufacturing and printing processes, they do not have to touch the material they are monitoring to provide an accurate reading. The devices can also be tied to data gathering electronics to capture a continuing history on equipment performance. In addition, the sensors, either machine-mounted or used as a hand-held tool, allow printers and materials manufacturers to take regular readings on the performance of mechanical equipment, noting hot-spots which could signal imminent machine failure.

One company has replaced strip thermocouples with Calex sensors in the aluminium webs used in the creation of its lithography plates. The result has been an improved product consistency that has heightened customer confidence.

On the original installation, strip thermocouples were mounted on the back of the coil and had to be in constant contact with the moving aluminium web to provide ongoing temperature readings. The constant friction that resulted

would bend the thermocouple mountings so that the temperature sensing element was no longer in contact with the web, or would cause the device to press too hard and scratch the metal. Temperature is one of the most critical measurements in plate making, as the polymer loses photo-sensitivity if it becomes too hot. Before infrared sensors, it was virtually impossible to record continuous temperature because of the mechanical failures of thermocouples. Infrared sensors mounted at the exit to six ovens on the production line now provide a constant visual reading to operators and assurance that oven temperatures remain within the tight tolerances needed for optimum product quality.

Although the upfront cost of the sensors is slightly greater than that of traditional thermocouple devices the overall cost is less, because of the durability of the Calex sensors and their maintenance free performance.

Another company applies infrared sensors in its line of dryers, which are used widely in web offset printing throughout the graphic arts industry. The machine-mounted thermometers serve as sentries on the dryers which heat the printed material to 140°C to remove solvents from the ink to ensure that the image is set properly.

Prior to the delivery of reliable and relatively low-cost infrared sensors, there was virtually no way to gain accurate temperature measurements in the drying process. Contact thermometers were impractical because they damaged the paper passing through the dryer. Basically, before infrared sensors, the dryer and paper

temperature was judged by the operator, a chancy process that often resulted in an unacceptable product. Today the operator has a visual display of the precise surface temperature of the printed sheet for assurance that the ink is properly set before the paper enters the chill stand. A bonus payoff from infrared sensors is a greatly reduced energy demand by the dryers, which can now operate at precisely the temperature for a top quality product. When drying temperature was less predictable, the heaters were usually operated at temperatures higher than needed to compensate for error.

Another recent infrared sensor application was for a chemical company that is a major supplier of ink to printers. They had been plagued by the hardening of the liquid while it was stored in drums. Printers reported a solid brick when they opened a drum for use. The remedy was to ensure that key steps in the ink processing occurred within precisely defined temperature bands. The use of Calex infrared sensors provided this assurance and set the ink flowing again.