IRT/C’s Used with Heated Metal Rollers to Increase Production

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Introduction

By employing IRt/c sensor technology, a significant increase in high quality output of web processing can be accomplished. Use the IRt/cs with stainless steel, chrome-plated or other uncoated metal rollers as well as with coated rollers. IRt/c systems enable users to:

- Increase throughput speeds up to 20%, or more, on the same machine
- Reduce scrap up to 75% or more
- Reduce set-up times
- Process a greater variety of web materials on the same machine

Applications / Processes that would profit from the use of IRt/c technology:

- Opaque films processing
- Textile processing
- Paper processing
- Any continuous web processes using heated (or cooled) rollers

Use of Exergen’s unique patented, non-contact infrared sensors resolves earlier technical problems related to temperature measurement of shiny, uncoated metal rollers (because of the high infrared reflectivity of the uncoated metal surfaces). Exergen has developed and analyzed a two-stage method to accurately measure and control the heat output of heated (or cooled) metal rollers using the IRt/cs—even at extremely high speeds.

Stage 1: Start-Up and Stand-By Temperature Control

During start-up and stand-by conditions, the temperature of the heated roller will become
fairly uniform across the roller surfaces. Due to this, the temperature can be reliably measured at any suitable location on the surface, or the edge, of the rollers.

Therefore, for Stage 1, merely install an IRt/c so that it can monitor a reliable signal from the roller.

**Uncoated Metal Rollers**

On an unused edge of the roller, install a durable non-metallic target surface finish. This can be done with:

(a) a durable epoxy paint  
(b) the incorporation of a thin metallic hoop, or ring, with a Teflon coating  
(c) or the addition of a thin hoop, or ring, of black, hard-anodized aluminum

Set up an IRt/c sensor so that it monitors this coated surface. Use this sensor to regulate the temperature of the roller during start-up and stand-by modes.

**Coated Metal Rollers** (Teflon, silicon coating, any non-metallic coating, etc.)

Install an IRt/c to aim at the center, or any suitable location, on the surface of the roller.

**Stage 2: Running Temperature Control**

For Stage 2, install an extra IRt/c sensor to directly monitor the web surface after it
contacts the heated roller. As the web starts to move, (or, at a preset rpm) the temperature control system for the roller should be turned over to a control system connected to this IRt/c sensor.

This IRt/c sensor should be mounted so that it monitors the side of the web material that is heated by the roller. For webs heated on two sides, sensors should be mounted on each side to regulate each heated roller.

**For multi-zone rollers:** use at least one IRt/c for each zone across the web.

**For wide webs:** multiple IRt/c sensors can be installed across the web.

**Explanation**

The most typical errors in web processing are as follows:

**Temperature Measurement Errors** - Errors due to incorrect temperature measurement.

- Internal temperature sensor location errors
- Thermocouple “Slip ring” signal errors

**Heat Transfer Errors** - Errors caused by variations of heat transfer to the web.

- Changes in pressure applied to the web as it touches the heated roller
- Web material changes in moisture content, thickness, etc.
- Dirt build-up on the heater roller surface that can hinder heat transfer to the web

As the roller accelerates, heat is removed from the roller surface by the web material. Temperature gradients show up inside the roller, and on the roller surface. Conventional embedded, surface, or edge temperature sensors cannot effectively track and compensate for all these temperature differences, nor can they sufficiently measure the quantity of heat transferred to the web material.

Exergen’s Two Stage IRt/c Sensor & Control System automatically decreases all these sources of web temperature processing errors. Therefore, the actual temperature of the webs can be both closely (to within a few degrees) and dependably controlled through the use of IRt/c sensor technology. The robust IRt/c sensors do not require power supply and periodic calibration, and are designed for years of trouble-free operation.
This information has been sourced, reviewed and adapted from materials provided by Exergen Global.

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Exergen Corporation is the global leader in industrial and medical non-invasive temperature technology. Design and manufacturing takes place in Watertown, the suburbs of Boston. Exergen is very well known for its award winning temporal artery thermometer in the healthcare and consumer market. The company was based by Harvard-research scientist Dr. Francesco Pompei who holds over 75 patents.

**Exergen Corporation and Exergen Global.**

Exergen Global is the industrial, value added supplier of Exergen Corp, the global leader in industrial and medical non-invasive temperature technology which is known for its speed, high accuracy, great reliability, price efficiency and customized solutions.

**Primary Activity**

Value added supplier of infrared non contact temperature sensors with a high focus on the following markets: print, textile, medical, esthetical, food, beverages, agricultural, automotive.