

Plastics Industries



Noncontact Temperature Measurement for Plastics Industries



Major Applications

- Blown Film Extrusion
- Cast Film Extrusion
- Biaxially-oriented Film Extrusion
- Sheet Extrusion
- Extrusion Coating
- Laminating and Embossing
- Thermoforming

Raytek® noncontact infrared thermometers are designed for use in plastics industries where monitoring and controlling temperature is critical to productivity and product quality.

Infrared thermometers measure temperatures of fast moving processes quickly and efficiently. They measure the temperature of the product directly, instead of the oven or the dryer.

Raytek infrared sensors are easily integrated into existing process control systems and are:

- Non-destructive – the product is never touched or contaminated
- Fast and reliable – moving objects are measured accurately and quickly
- Flexible – temperature measurements can be made of a large area or a small spot

Raytek infrared sensors take temperature measurement one step further. Simultaneous analog and digital output as well as modern field buses allows temperature data to be integrated into a closed loop control system for remote temperature monitoring and analysis. Raytek smart sensors, with digital electronics and 2-way communications, can be configured remotely.

The results are:

- Higher quality products
- Increased productivity
- Reduced energy costs
- Enhanced worker safety
- Reduced downtime
- Easy data recording
- Greater control

Accurate ongoing temperature measurement is crucial to any plastic industry process where temperature is a factor. The following are examples of different types of process lines and how Raytek noncontact infrared sensors can increase productivity and product quality.

Blown Film Extrusion

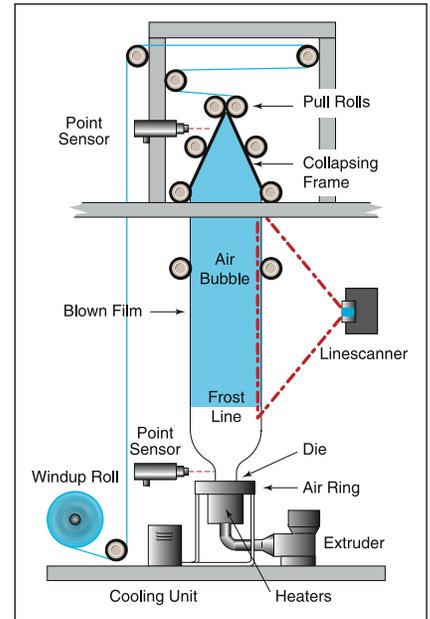
In a blown film extrusion process, film is extruded as a continuous tube, then air cooled, collapsed and wound onto rolls as bags, or slit into single layer widths.

Accurate temperature monitoring coupled with the ability to adjust heating and cooling helps maintain the plastic's tensile integrity and thickness.

Raytek point sensors can take spot measurements at the die and the collapsing frame, and MP150 linescanners can take temperature profiles between the frost line and collapsing frame.

Benefits:

- Early detection of die bolt problems
- Elimination of gauge bands
- Real-time monitoring of air ring efficiency
- More consistent lay-flat width
- Better run ability and less breaks
- Reduced scrap rate



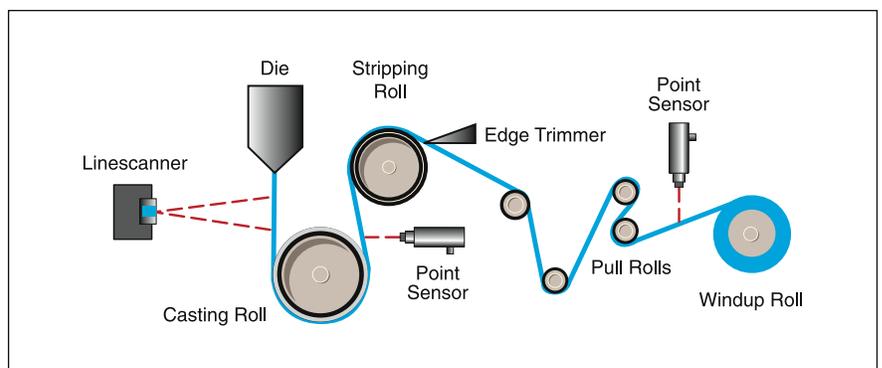
Cast Film Extrusion

In the cast film extrusion process, the melt is extruded through a wide die as a thin web and is cooled on a polished metal casting roll. Raytek point sensors help control temperatures so that proper thickness and finish uniformity are maintained.

An MP150 linescanner mounted after the die can give early detection of die bolt heater problems or plugged dies.

Benefits:

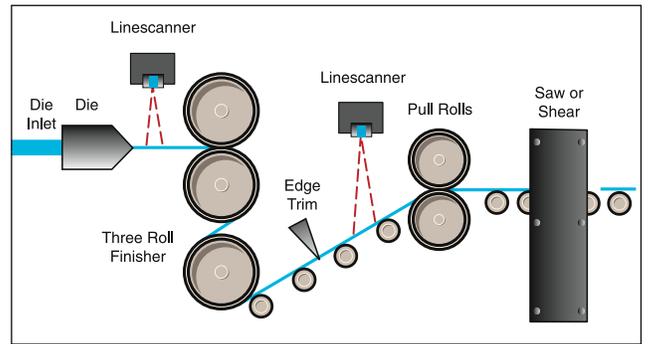
- Early detection of die bolt heater problems and/or plugged die
- Enhanced surface finish uniformity
- Less breaks and machine downtime
- Greater film thickness uniformity
- Improved final film shape stability
- Increased productivity



Sheet Extrusion

The illustration is an example of a typical sheet extrusion process. Note that material thickness determine the type of sensor and the type of optical resolution needed for optimum noncontact temperature measurement.

Installing an MP150 linescanner before the three roll finisher allows the operator to monitor the sheet temperature and adjust the die heater and/or the roll cooling, so product quality is consistent. A linescanner mounted before the pull rolls helps safeguard against tears and irregularities.



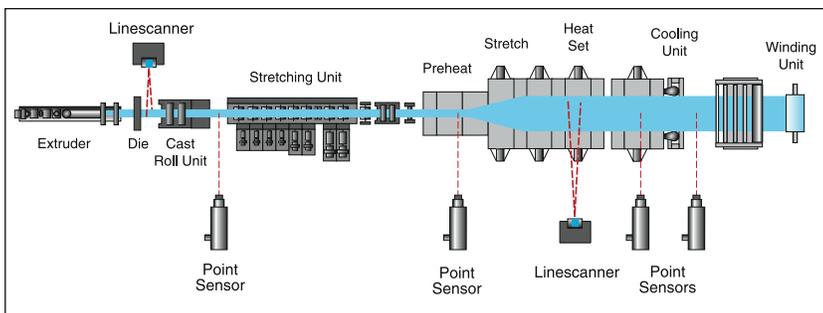
Benefits:

- Sheet temperature profile feedback for more effective chill roll control
- Increased sheet thickness uniformity
- Faster grade changes and reduced scrap
- Melt temperature profile for die bolt heater control
- Uniform cooling prevents curl and twist
- Increased productivity

Biaxially-oriented Film Extrusion

In a biaxially-oriented film extrusion process, MP150 linescanners can be mounted at the die to monitor the die bolt heater and take a melt temperature profile, and at the heat set.

Thermalert® sensors can be mounted at the cast roll unit for chill roll control and at the pre heater and cooling units, for heating and cooling control. A sensor mounted after the cooling unit helps determine if the product is cool enough for finishing.



Benefits:

- Real-time feedback for rapid zone temperature adjustments
- Greater thickness and tensile strength uniformity
- Early detection of die problems
- Less breaks and downtime
- Reduced scrap rate

Extrusion Coating

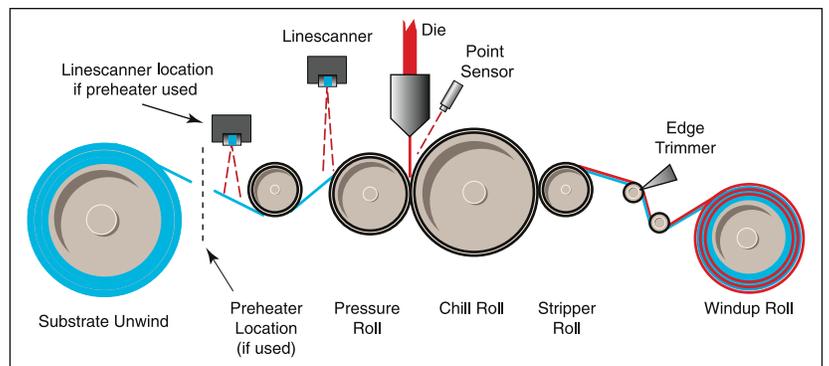
A molten web from a die is applied to paper, film, or foil in an extrusion coating process. The distance between the die and the pressure and chill rolls is usually 75 to 125 mm (3 to 5 inches). The resin temperature at this location must be very hot for the melt to adhere to the substrate. The narrow and often difficult to access measurement area is not a problem when using Raytek sensors. The operator can monitor and adjust the die heater and the chill roll temperatures either manually or automatically.

For adhesion to smooth surfaces, such as aluminum foil, other processes include heating the substrate, increasing melt temperatures and adding chemical primers.

Point sensors mounted after a pre heater can monitor exit temperature and automatically adjust heating elements. Another MP150 linescanner mounted after the chill roll or after the edge trimmer can help detect tears or irregularities before the product is cut or rolled.

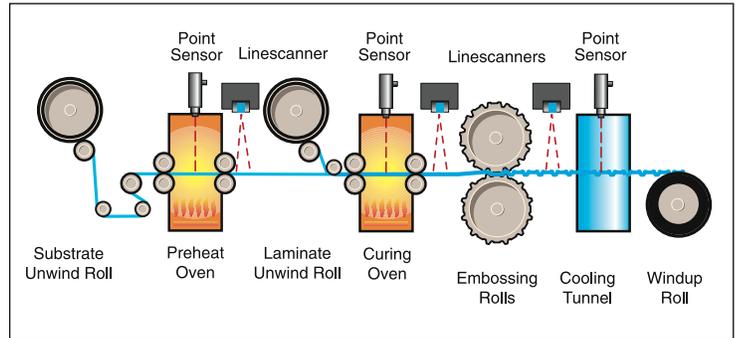
Benefits:

- Early detection of die bolt heater or cooler problems
- Enhanced surface finish uniformity
- Better run ability and roll building
- Less breaks and machine downtime
- Reduced scrap rate
- Increased productivity



Laminating and Embossing

The illustration shows where sensors can be located so the laminating and embossing process runs smoothly and efficiently, producing a quality product. MP150 linescanners can be mounted at the preheat and curing ovens. At these points, the linescanner can monitor cross-web temperatures and help in the control of adjustments to heating elements. At the cooling tunnel, the linescanner can monitor cooling efficiency. At the windup roll, the linescanner checks for tears or breaks in the material.

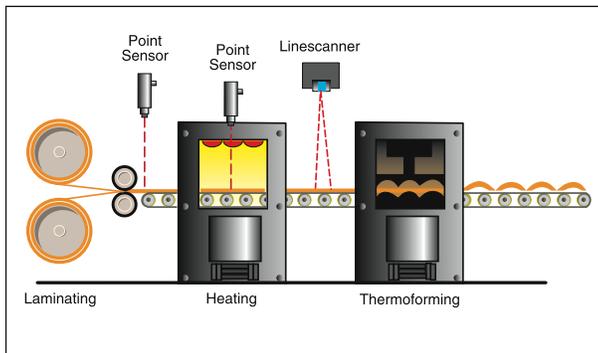


Benefits:

- Early detection of die bolt heater or cooler problems
- Help in heating and cooling control
- Less breaks and machine downtime
- Reduced scrap rate
- Increased productivity

Thermoforming

The illustration shows an example of sensor locations for a thermoforming process. If laminating is part of the process, a Raytek infrared sensor can ensure proper temperatures for laminating a multi-layer product for subsequent forming.



An MP150 linescanner or Raytek point sensors positioned between the heater and the forming machine, or mounted as an integral part of the heater, can help monitor the material's temperature distribution at its proper level prior to entering the thermoformer.

Benefits:

- Improved quality and part uniformity
- Early detection of heater and cooler problems
- Better run ability of thermoformer
- Energy savings
- Reduced scrap rate
- Increased productivity

Fluke Process Instruments

Americas

Everett, WA USA
 Tel: +1 800 227 8074 (USA and Canada, only)
 +1 425 446 6300
solutions@flukeprocessinstruments.com

EMEA

Berlin, Germany
 Tel: +49 30 4 78 00 80
info@flukeprocessinstruments.de

China

Beijing, China
 Tel: +8610 6438 4691
info@flukeprocessinstruments.cn

Japan

Tokyo, Japan
 Tel: +81 03 6714 3114
info@flukeprocessinstruments.jp

Asia East and South

India Tel: ++91 22 2920 7691
 Singapore Tel: +65 6799 5578
sales.asia@flukeprocessinstruments.com

Worldwide Service

Fluke Process Instruments offers services, including repair and calibration. For more information, contact your local office.

www.flukeprocessinstruments.com

© 2018 Fluke Process Instruments
 Specifications subject to change without notice.
 12/2018 3159041D2

