BASF
We create chemistry

Model Based Control Solutions

For Glass Gob Temperature Control

By combining BASF Exactus® pyrometers with ACSI advanced control methods, customers are able to implement *cost-effective* solutions that tightly control the glass gob temperature.

ACSI

Gob Temperature

A consistent glass gob temperature is a critical part of the forming process. Traditional mass flow temperature (MFT) alone is blind to temperature variations beyond the 9 point grid. By controlling gob temperature with a Model Based Control (MBC) strategy, unprecedented process stability and repeatability can be achieved.

Temperature Measurement

The Exactus pyrometer, with 1ms response, collects about 40 readings per gob and supplies the average or peak gob temperature to the control system. Accurate to ±2°C and drifting <0.1°C/year, Exactus pyrometers enable superior process control that conventional pyrometers cannot match.

Model Based Control

ACSI's technology interprets all the variables that affect gob temperature. By understanding the interrelationships among inputs, it removes the compli-cations that would normally be difficult for operators to resolve. The MBC:

- Thinks of the forehearth as a unit, not individual zones, allowing the zones to work together rather than fight each other
- Prioritizes temperature readings to determine the most important
- Predicts control actions required to drive the glass temperature to setpoint quickly without overshoot
- Models feed forward inputs and update control actions to quickly stabilize temperature variation

Combining Gob Temperature with Model Based Control provides unparalleled process stability and repeatability. This combination can lead to as much as a 2% yield improvement.

Benefits & Results Achieved

- **Rapid Return on Investment**
- **Reduced Defects:** Seal surface and split finish defects reduced by nearly half.
- **Faster Job Changes:** Two thirds reduction in gob stabilization time after job change has been achieved. The recovery time improvement is shown in Figure 2.
- **Reduced Gob Temperature Variation:** More than a 7X reduction in gob temperature variation is shown in Figure 1.

Superior process temperature stability with Model Based Gob Temperature Control leads to reductions in specific defects. Note the dramatic stability improvement in Figure 1 below.

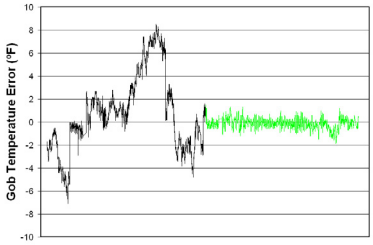

Figure 1 displays the gob temperature error during a 16-day period with:

1. PID control (black)
2. Model Based Control with gob temperature (GT) as process variable (green)

A two thirds reduction in job change recovery time can be achieved with Model Based Gob Temperature Control. The drastic recovery time improvement is shown in Figure 2 below.

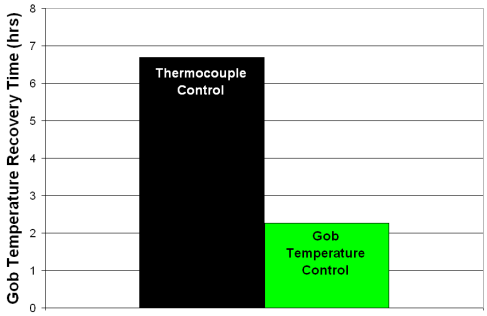

Figure 2 displays an average of the time required for gob temperatures to stabilize after a job change.

1. Thermocouple Control (black)
2. Gob Temperature Control (green)

About Us

BASF's Catalysts division is the world's leading supplier of environmental and process catalysts. The group offers exceptional expertise in the development of technologies that protect the air we breathe, produce the fuels that power our world and ensure efficient production of a wide variety of chemicals, plastics and other products, including advanced battery materials. By leveraging our industry-leading R&D platforms, passion for innovation and deep knowledge of precious and base metals, BASF's Catalysts division develops unique, proprietary solutions that drive customer success.

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