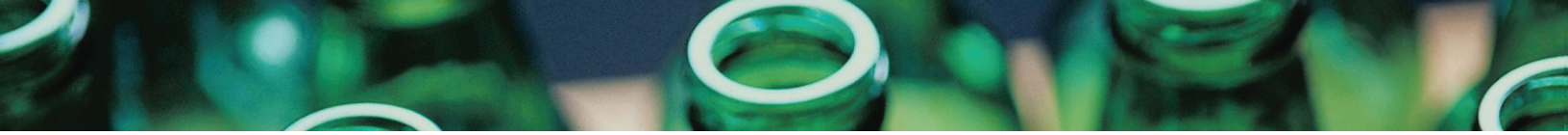
BASF
We create chemistry

Gob Temperature Measurement

EXACTUS® - Higher profit through improved yield and increased plant capacity

EXACTUS®
Optical
Thermometers



Innovative Optical Measurement Improves Profitability & Operational Efficiencies

BASF Exactus® temperature measurement technology teamed with an appropriate control system can increase profit from your production lines. Tightly measuring and controlling the gob temperature leads to improved yield and process uptime. Additonally, a reduced gob temperature variance is essential for the manufacture of light weight containers. Capacity increases of 2% – 5% and annual savings of $200K – 500K have been documented through the use of Exactus technology.

Increase Yields and Profit through Tighter Process Control

- Directly measure and control the gob to eliminate variation due to changes in ambient temperature or air flow around the IS machine
- Improve yields with gob temperatures optimized for specific jobs
- Combine gob and mold measurements for complete control over heat extraction during the forming process – enabling lighter weight glass containers and faster machine speeds

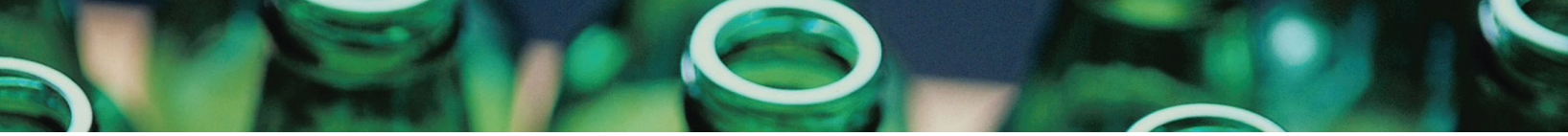
Reduce Production Time Lost During Job Changes

- Return to production faster following a job change by controlling the gob rather than the forehearth
- Minimize yield losses following a job change by reducing gob temperature oscillations

Improve Per Container Energy Consumption & Emissions

- Ship more containers per ton of glass during normal production
- Return to normal production following a job change hours sooner so less glass is cycled back for remelting
- Improved gob control helps facilitate lighter weight containers so more containers can be produced per ton of glass

	**Lighter Bottles**	Tighter process control enables manufacture of lighter weight bottles
	**Better Bottles**	Can improve pack-to-melt yields by > 2% with fewer defects
	**More Bottles**	Can drive increased capacity with significant reductions in job change recovery time
Less energy and raw material per bottle shipped!		



Why Measure the Gob?

Container glass manufacturers spend significant resources conditioning the forehearth glass to provide consistent gob temperature at each orifice. Accurate and repeatable gob temperature measurements give plant personnel the data they need to control and optimize the gob-forming process.

How We Measure the Gob

BASF Exactus® optical thermometers make repeatable, high-resolution temperature measurements of each falling gob. Depending on length and velocity, each gob provides an average of 40 temperature readings. The Exactus pyrometer supplies either the average or maximum gob temperature to the control system, providing unparalleled process stability and repeatability.

Accurate Gob Temperature Measurements

Most optical instruments operate too slowly to capture more than each gob's highest temperature ("peak-picking"). Peak temperature can mislead, as Figure 1 shows. Exactus measures the falling gob's entire length and outputs its average temperature. The average temperature more meaningfully reflects energy that the gob transfers to the blank mold.

The gob temperature profiles, such as shown in Figures 1 and 2, can be stored for later comparison to new gob profiles when troubleshooting the process. Gob temperature profiles give production personnel an entirely new tool to assist them in optimizing the process.

Unparalleled Technology

The ultra-low drift and high accuracy of the BASF Exactus optical thermometers provide a foundation for rock solid glass gob temperature.

Exactus® technology stands out because of its industry leading:

- **Accuracy: Better than +/- 2 ºC**
- **Repeatability: 0.2 ºC**
- **Stability: 0.2º C annual drift**
- **Speed: Up to 1000 readings per second**

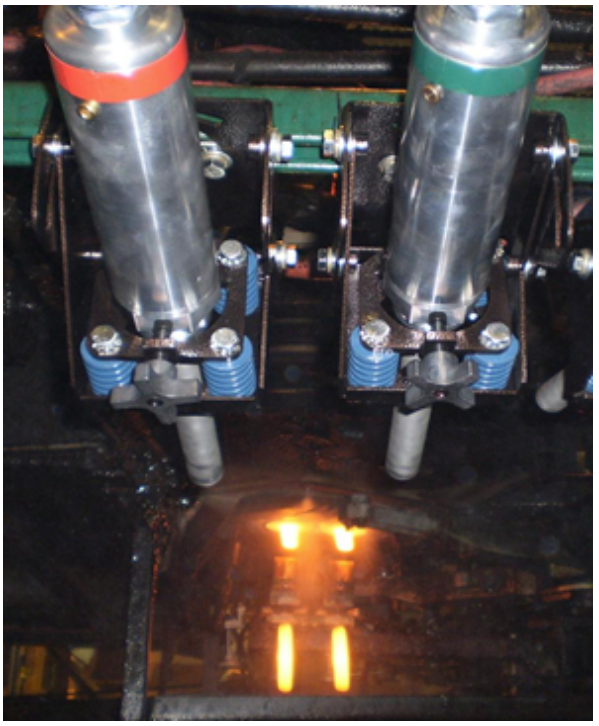
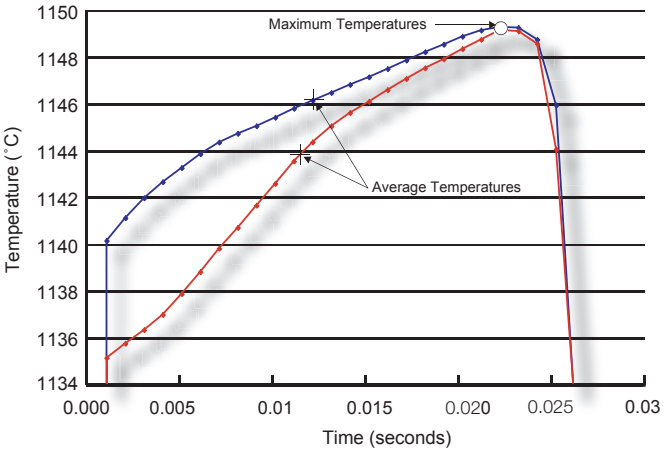
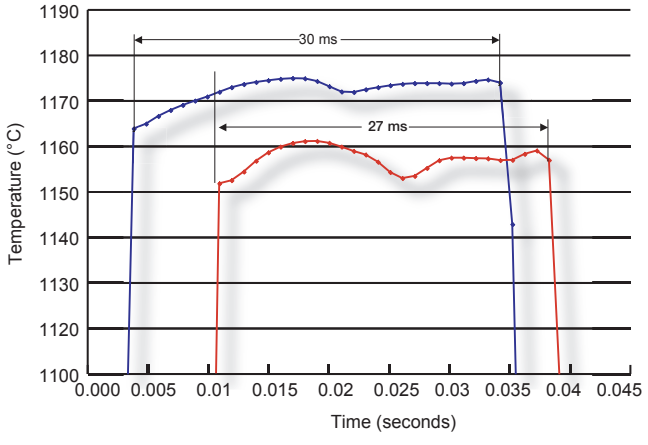


Figure 1. The Average Gob Temperature



Multiple measurements provide more meaningful data

Figure 2. Gob Profiles



Provides critical gob-forming performance information

Superior quality

Exactus optical thermometers are manufactured in a state-of-the-art facility in Fremont, California. Extraordinary care is taken to ensure that every instrument is manufactured with the highest degree of quality. The instruments are then tested and calibrated against exacting standards using ITS-90 traceable freeze points and Statistical Process Control (SPC). This ensures accuracy and maintains repeatability from instrument to instrument. Detailed records are kept on every product before it leaves our ISO 9002 certified facility. BASF also maintains a world-class R&D and calibration lab in Portland, Oregon dedicated exclusively to optical thermometry. Highly experienced staff scientists work to ensure exacting standards are maintained, in addition to supporting customers and developing new breakthrough products. Please contact us to learn more about how BASF innovation can help you meet today's – and tomorrow's – challenges.

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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