

# Temperature measurement solutions for the glass industry

Thermocouples, Pyrometers & Refining



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### About Us

For over 60 years, BASF has supplied the glass industry with the highest quality temperature sensing products, including thermocouples and pyrometers, to meet our customers' demanding applications. Our technology offers solutions to improve your process and reduce your cost of ownership.

BASF has four different locations across the globe, spanning from Portland, OR; Fremont, CA; Rome, Italy; and, Singapore.

### Glass markets served:

- Container
- Float
- Fiberglass
- Specialty Glass
- Tableware



# Thermocouple products

BASF offers proprietary designs for Crown, Bottom, Forehearth, Flue, Lehr, Tin bath and more.

## Bottom thermocouples

- Wide range of direct immersion and dead-end block designs.
- Special designs available



## Crown thermocouples

- Special protection tube designs to minimize refractory reaction
- Special designs for atmosphere immersion



## Forehearth thermocouples

- Enhanced low precious metal designs.
- Proprietary designs for extended life expectancy



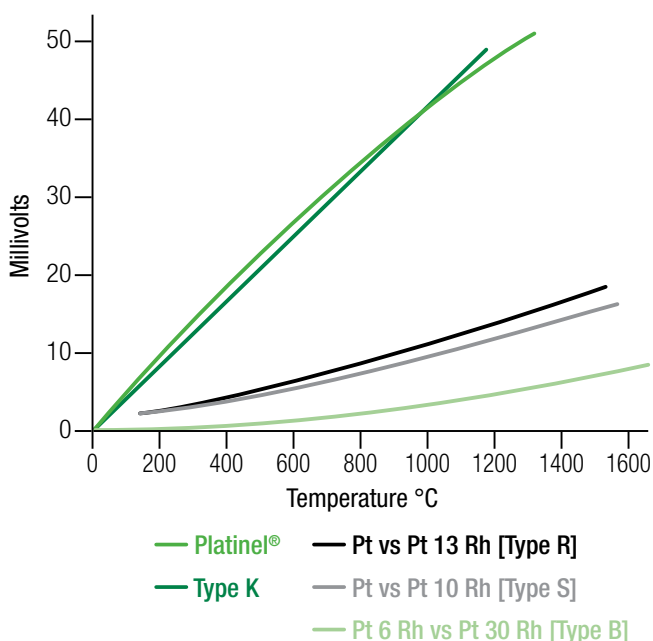
# Thermocouple wire for high temperature applications

BASF offers a wide range of thermocouple wire calibrations. Nobel metals and their alloys have long been recognized as the most reliable sensing elements for high temperature measurement.

## Type P (Platine<sup>®</sup>)

A development by BASF offering:

- High electrical output of the nickel base alloys
- Oxidation resistance
- Stability of the precious metals
- An ideal replacement for type "K" thermocouples where high temperature accuracy is essential



## Type R, S, B

Outstanding properties:

- High Melting Point
- Reproducible EMF
- Resistance to Corrosion
- Stability of Calibration
- Oxidation Resistant

### Fibro<sup>®</sup>

BASF proprietary thermocouple wire for Types S & R

A technical innovation in which fibrous grain structure of the Platinum leg has been changed to offer superior strength over standard wires on the market, which means increased longevity and stability in measurement.

### Benefits of using Fibro wire

- Increase longevity of current design at the same wire diameter
- Reduce precious metal content while maintaining the same life expectancy



## BASF Temperature Sensing – our history

Formerly Engelhard - leader in precious metal thermocouples for over 30 years

**1902**

Charles W. Engelhard Sr. started Engelhard.

**1960**

Engelhard invented Fibro<sup>®</sup> and filed for a trademark.

**1966**

Engelhard went public, with shares listed on the New York Stock Exchange.

1900

# Pyrometers

## Technology and Advantages

### EXACTUS®

#### Specifications:

Accuracy: 1.5°C or 0.15% of reading

Drift: < 0.1°C per year

Repeatability: 0.1°C

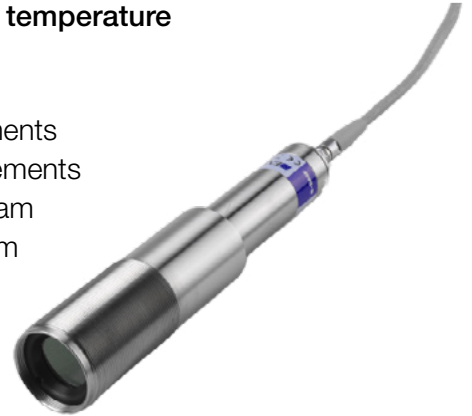
Speed: > 1000 readings per second.

#### Unmatched performance

- Self-compensates for changes in ambient temperature.
- Ability to process data for intelligent data output.
- Calibration standard used by several competitors and the National Institute of Standards (NIST).

#### Applications for temperature measurement:

- Forehearth
- Gob measurements
- Mould measurements
- Fiberglass Stream
- Crown & Bottom



**2000**

EXACTUS® optical pyrometer breakthrough technology introduced.

**2006**

BASF purchased Engelhard.

**2022**

BASF receives ISO-17025 certification for thermocouple production at Fremont, CA.

**2025**

# Our strengths to benefit you

Extensive  
technical support



PM expertise  
and capabilities



Established presence  
and reputation



Full global  
supplier



World class  
manufacturing



Full service precious  
metal supply



High quality standards  
*ISO 9001:2015 Certified*



## Circular economy



### Pool account management

BASF's Precious Metals expertise provides full precious metal management services including the following benefits:

- PM buying and selling
- PM leasing
- Secured vault

### Retentions

Because of our refining capabilities, BASF's retentions can provide the best total return.



## Unique benefits provided Global refining capabilities

BASF has refineries with the ability to provide full global refining services. Other suppliers may not have direct refining capabilities thus requiring them to go to a 3rd party for their refining. This can add cost and time to the refining process. BASF's refining services cover most precious metals including those found in thermocouples, crucibles, blocks, bushings ... etc.



We create chemistry

### 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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## Qualifications & Certifications

