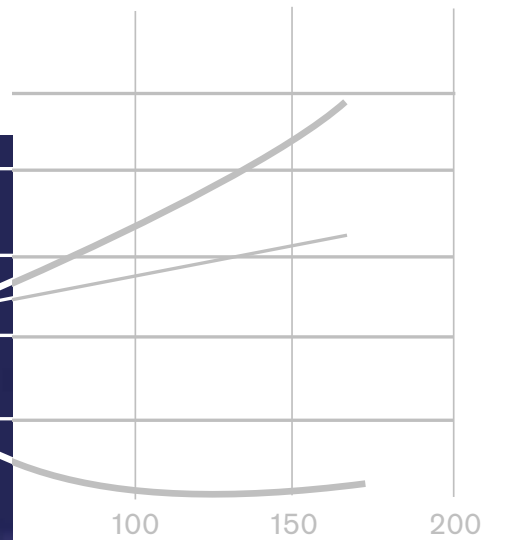
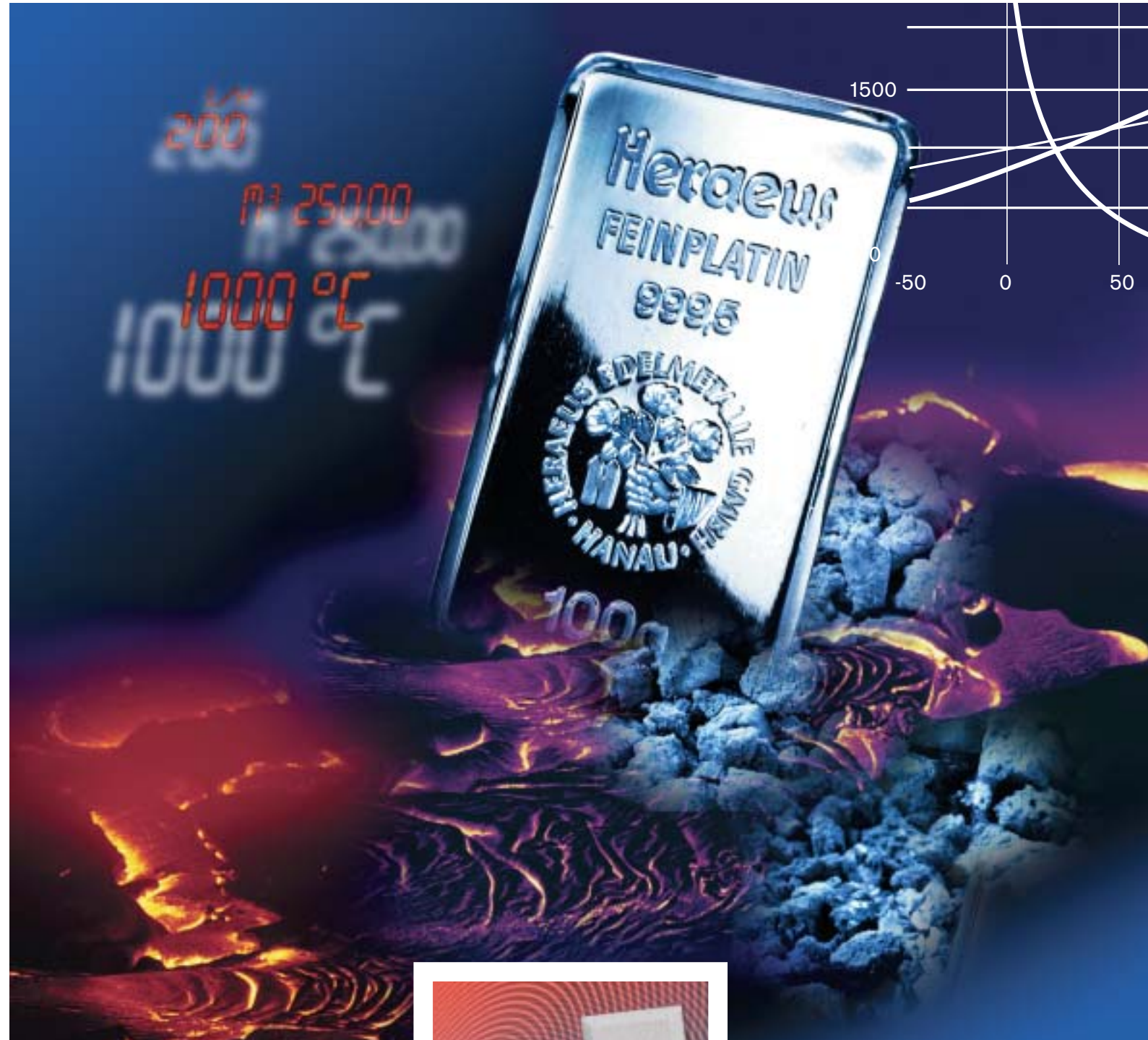
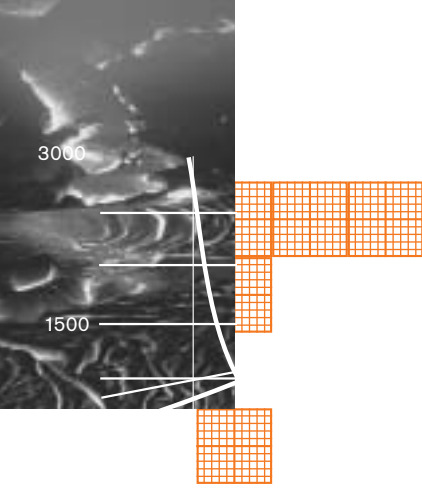


Platinum as Measuring Element



High purity, chemical resistance and a virtually linear resistance response to temperature over a wide temperature range are some of the features which make platinum ideal as base material for temperature measuring resistors. Its most important benefits are:

- High precision
- Low drift
- High signal resolution
- Wide temperature application range (-196°C to +1,000°C)
- Long term stability and product life cycle
- Interchangeability
- Standardised and virtually linear characteristic

The ideal shape: a steep line

The measuring principle for platinum temperature sensors is based on the positive increase in electrical resistance of platinum as temperature increases. As opposed to alternative products such as thermistors or semiconductor sensors, platinum sensors feature a virtually linear signal over wide temperature ranges. This simplifies evaluation and minimizes the measuring error.

The relationship can be described by the following characteristic polynomial:

$$R_t = R_0(1+at+bt^2)$$

The constants are laid down in the international standards for platinum temperature sensors. b is so small that for most applications a linear dependency between R_t and the temperature can be assumed. Platinum temperature sensors with high nominal resistances have a higher sensitivity than those with lower nominal resistances, as the gradient of the characteristic curve is directly proportional to R_0 .

Depending on the materials and processes used for the manufacture of platinum temperature sensors, slight deviations from the ideal constants and the optimum characteristic may occur. These deviations determine the working temperature range and the precision tolerance classes for every sensor type. Within these limits, the platinum sensors are completely interchangeable. Heraeus Sensor Technology's product spectrum is designed to cover a temperature range of -196°C to +1,000°C. The temperature coefficient (TC or α) is positive and defined as:

$$TC = (R_{100} - R_0) / (100 \cdot R_0)$$

It is the increase in the linear exposure of the characteristic polynomial between 0°C and 100°C. The standard DIN EN 60751 for platinum temperature sensors specifies a TC of 0.00385/°C. This TC value applies to all products described in this brochure. In addition, customer-specific sensors with temperature coefficients of 0.00375/°C as well as other intermediate TC values are available, e.g. in accordance with the JIS standard.



Heraeus Sensor Technology USA

1901 Route 130
 North Brunswick, NJ 08902
 Phone 732-940-4400 Fax 732-940-4445
 Email info.hst-us@heraeus.com
 www.hst-us.com