

sensor *report*

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Sensors

Measurement
Technique

Industrial Vision

Factory Automation

Heraeus

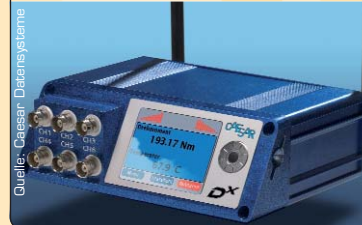
The world's market leader for platinum temperature sensors sets the pace for the future.



SENSORS

- Digitally compensated pressure transmitters
- Acoustic Wave based sensing
- Ceramic pressure sensors
- Printed position sensors

MEASURING AND TESTING



- Integrity testing of shock accelerometers
- Mini-Telemetry for rotating components
- Load monitoring on wind turbines

APPLICATIONS & PRODUCTS

- Miniature sensors

PANORAMA

- SENSOR+TEST 2008
- AUTOMATICA 2008
- Perfect Pictures from the Stratosphere

Fascinating Platinum

The technological leader, Heraeus Sensor Technology, is investing in the growth market of platinum-based sensors

In the mid-nineteenth century the pharmacist, Wilhelm Carl Heraeus, was successful in producing temperatures of over 1772°C using an oxyhydrogen gas mixture. It was at this point that the noble metal, platinum, began its success story.

This was because it was only with the availability of the high-temperature melting metal in sufficient quantities that its extraordinary properties could be discovered and utilised for chemical process technology and industrial measurements. Barely 15 years later, Carl Wilhelm Siemens (William) exploited the change of resistance in platinum wire for temperature measurement.

THIN WIRES. However, it took more than 35 years before a certain Richard Küch was granted his patent specification on 1st July 1906. Employed in development at W.C. Heraeus in Hanau, he was the first to realise an «Electrical resistance thermometer» for use in processes. Küch was successful in winding long thin platinum wires onto a quartz spindle, covering both of them with a thin-walled quartz cylinder which gave hermetically sealing against ambient conditions. And with that, the company, Heraeus, had set a milestone in the development of temperature measurement techniques.

The platinum temperature sensor could now start its decisive advance. And it was only now that specialists in laboratories could appreciate the almost linear, easily standardised characteristic, the wide temperature measurement span and the unbeatable long-term stability. In the end it was these core pro-

erties which brought Pt sensors under massive costs pressure. Everyone wanted to exploit the advantages – but even then it had to cost as little as possible.

THIN FILMS. When in the 1970s, thin-film technology moved out of the research labs into the production plants, technologists at Heraeus rediscovered the platinum temperature sensor.

The quartz spindle became the ceramic substrate and the platinum wire the platinum meander. And again a success story started based on platinum as well as on thorough knowledge about material properties and process management – all under the name of Heraeus Sensor Technology.

The list of tasks that had to be solved is a long one: Reproducible deposition of different materials as thin films, reliable bonding to the substrate, matching of the thermal expansion of all component materials both statically and dynamically, contacting, fitting wires, passivation, etc. and finally developing the process for large-scale production.

TECHNOLOGICAL LEADERSHIP. Heraeus Sensor Technology has continually extended its international technological leadership since the beginning of Pt temperature sensors. Without making any compromises in product quality the compa-



Fig. 1: The patent specification from 1906 for the first «electrical platinum resistance thermometer»



Fig. 2: Platinum Temperature Measurement in highest quality



ny produces for the suppliers of large-scale markets from cars through to electrical cooking hobs – from heating, ventilation and air conditioning to life sciences, from electronics to process measurement engineering. Taking just the highly specialised temperature measurement probe for the control of the regeneration of the catalytic converter in cars, a total volume of many millions of units have been supplied since the beginning of production.

In order to avoid confusion: Heraeus Sensor Technology only supplies sensor elements which form the core of the respective temperature sensor. The application-specific package is realised by the OEMs, even if it is often developed jointly down to the detail.

Market proximity and communication with the users is part of the company's core strategy – and it is experienced by all employees. These days, without the «design-in phase», in which the manufacturer and user apply their specific knowledge together, no effective optimisation of product costs is possible. And it is only those confronting the arduous requirements of real applications who can grow with the market and with the demand.

The product development process, right from the concept phase which finishes with the feasibility study, through to the prototype phase in which large-scale production is tested, is ac-

companied by a project team of specialists provided by the customer and Heraeus. Later, during the production phase, continuous process optimisation takes place.

Today, marketability allows Heraeus Sensor Technology to supply a comprehensive assortment of Pt sensors for temperature measurements from -196°C to 1,000°C with nominal resistances from 100 ohms up to 10,000 ohms and in the most varied forms, either with leads or as SMD models.

MARKET LEADERSHIP THROUGH AN INTERNATIONAL PRESENCE. The company has an international sales structure with distributors in all industrial countries who not only supply their respective markets and market segments, but carefully monitor them too.

In 2008 Heraeus Sensor Technology is responding to the continuously growing demand for temperature sensors through a further investment amounting to millions in the expansion of production capacity. This will establish the basic requirements for further expansion of the current market share of over 50%. [LO83107](#)

www.heraeus-sensor-technology.com



Fig. 3: Clean room production

ABSTRACT
 In der Mitte des 19. Jahrhunderts hat mit den Verfahren von W.C. Heraeus das Platinzeitalter begonnen. Anfang des 20. Jahrhunderts übernahm das Unternehmen die Technologieführerschaft bei Pt-Temperatursensoren mit der Patenterteilung für das erste Platin-Widerstandsthermometer. Heute liefert die Heraeus Sensor Technology in Millionenstückzahlen in alle Welt. Mit dem spezifischen Know-how in der Prozessführung kann das Unternehmen ohne Kompromisse bei der Qualität auch kostensensible Massenapplikationen wie z.B. im Fahrzeugbau bedienen. Durch Investition von mehreren Millionen Euro hat Heraeus Sensor Technology jetzt die Voraussetzungen geschaffen, seinen Marktanteil von mehr als 50 % weiter auszubauen. [gaw]