

# adphos Enhancer

## Enhanced Temperature Measurement

### Your Advantages:

- Precise temperature measurement at high reflective surfaces till to low temperatures ( $T < 30\text{ °C}$ ).
- Integrated adjustment of the sensors considering the process- und environmental conditions.
- Consulting, installation, maintenance and service from one hand



### The Challenge :

In harsh industrial environments, low temperature measurement on materials with high reflectivity, e.g. untreated or very thinly coated (1 mm up to 5 mm) metal surfaces, is a significant challenge. This is particularly the case for measuring low temperature range ( $30\text{ °C} - 60\text{ °C}$ ). Due to the low emissivity of these materials the signal-to-noise ratio is very low. Consequently standard sensors reach their limits very quickly.

Instruments and techniques currently available in the market, especially for low temperature measurement for high reflective materials were only not suitable for the use in industrial environments because of the following reasons:

- the need for very high accuracy adjustment to the surface (max. deviation  $\pm 1^\circ$ )
- highly sensitivity against variations in temperature and contaminations in the surroundings
- the requirement for precise distance between the sensor and surface to be measured (max. deviation  $< \pm 1\text{ mm}$ )

### The Solution:

As a result of successful installations in a wide range of applications where the requirement was to accurately measure low temperatures on highly reflective surfaces, adphos Thermal Processing GmbH have acquired specialist technical knowledge in this area.

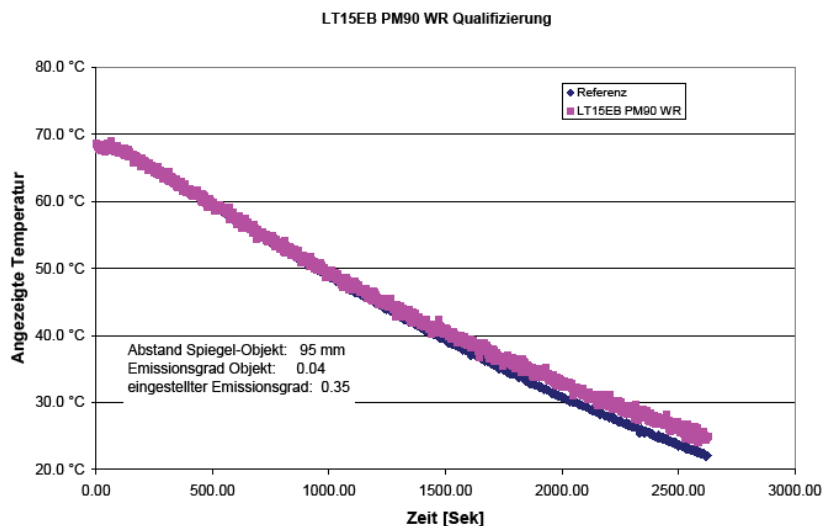
This "Enhanced Temperature Measurement"-system was developed in collaboration with a leading pyrometer manufacturer.

The system consists of two components:

- Engineering of the sensor
- Customizing the sensor to the surface, temperature, reflectivity of the material whilst considering the environment.

## Technical Data:

Installation length	220 mm – 285 mm <sup>1)</sup>
Installation depth	62 mm – 120 mm <sup>1)</sup>
Working distance	80 mm – 110 mm variable <sup>2)</sup>
Spectral range	8 mm – 14 mm
Measurement range	ca. 30 °C to 900 °C <sup>3)</sup>
Accuracy	± 5 °C at 40 °C <1 °C at 100 °C <sup>3)</sup>
<sup>1)</sup> depending from sensor type <sup>2)</sup> for sensor type E-2 <sup>3)</sup> depending from application	



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### Sensor elements:

To cater for various different applications (e.g. temperature range, temperature resolution) a wide range of different sensor types are available.

Generally the sensors consists of an electronic unit with an integrated measuring system as well as a special metallic gold plated parabolic reflector. This mirror unit ensures that the measurement signal will be enforced by multiple reflection and the signal-noise ratio will be considerably enhanced. By doing so, the measurement accuracy on a highly reflective surface, accuracy of  $\pm 5$  °C is achieved at a measurement temperature of 40 °C.

The sensitivity against deviations from the perpendicular adjustment and the abundance of measurement distances will be improved articulately.

Angles of up to  $\pm 5^\circ$  are allowed without significantly reducing the measurement accuracy.

The distance between the sensor and the surface depends on the type of sensor that is chosen. Distances from 80 mm up to 110 mm from the surface can be used without sacrificing measurement accuracy.

The sensor can be customized by the addition of readily available serial interface Sensor (Interface protocol RS485) and therefore aligned for the present measurement task. Many parameters like emissivity, response time, analog outputs or alarm configurations can be changed online.

### Alignment to the Measurement Tasks and Conditions:

For industrial applications sophisticated process measurement like temperature measurements on highly reflective surfaces has proven to be very difficult regarding long term stability and signal accuracy. High and transient environmental temperatures, extreme dust exposure and mechanical vibrations causes measurement errors. Maintenance frequency (e.g. cleaning mirrors and lenses) must increase to allow for a failure-free operation. Other process-related restrictions, such as different types of substrates, strip joins, etc must be taken into account for sensor application.

Over the years adphos Thermal Processing GmbH has been successful in techniques for reliably and accurately measuring many processing parameter including temperature measurement under difficult processing and environmental conditions. These experiences have been used in the introduction of the "Enhanced Temperature Measurement"-system.

Our application experts will give you all the advice and practical support to solve your measurement tasks from the beginning till to the end.

adphos Thermal Processing GmbH provides the following services to their customers to ensure reliable and accurate temperature measurement:

- ⇒ Analysis
  - measurement task
  - required measurement accuracy
  - process- and environmental conditions
- ⇒ Selection of correct sensors
- ⇒ Selection and engineering of additional systems like cooling units, automatic mirror cleaning systems, traversing units etc.
- ⇒ On site installation
  - mechanical installation of the sensors
  - optimisation of the sensor
  - linking the sensor's signal into the established system control
- ⇒ Repairing and maintenance
- ⇒ Calibration

## Order Code of the Available Models:

Enhancer-Type	Distance Sensor ↔ Substrate	Order Code
E-1	4,0 mm	556001
E-2	80 mm – 110 mm	556002
E-2-C	E-2 with cooling jacket	556003
E-2-CP	E-2 with cooling jacket and purge head	556004



All here mentioned data are subject to changes due to product optimisation  
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