Assembly and application rules for PW and PG sensor elements

TEMPERATURE

HUMIDITY

FLOW

General information

- The superior properties of PW and PG sensors are based on materials which have a thermal coefficient of expansion that matches of platinum. By using this technology the platinum thin film layer behaves much more like the bulk material. Therefore this new technology is an ideal (suitable) solution for platinum thin film sensors especially for the highest accuracy. To assemble these sensors properly it is important to apply suitable materials.
- User has to consider that some materials used for standard thin film sensors assemblies might be less suitable or not compatible.

Mechanical design rules

- Thermal coefficient of expansion of all materials used for assembly should be matched to the sensor element (8-14 x 10^{-6} K^{-1} at RT) in order to avoid any mechanical stress to the sensor element induced by thermal-mismatch.
- The most suitable potting material is MgO, which is in direct electrical and mechanical contact to RTD element
- It is necessary to consider of abrasive effects of potting materials (ceramic powders)
- Avoid unnecessary thermal and mechanical shocks as well as vibration stress.

Material issues

- All materials used for assembly must be completely moisture and contaminant free.
- All materials used for assembly should be pre-annealed in oxidizing atmosphere at higher temperature than the maximum working temperature.
- The build-up of reducing atmosphere inside the sensor housing should be avoided.
- Incompatible materials or vapors which can cause an acidic reaction inside the assembly should be avoided to protect sensor element against poisoning at elevated temperatures.

Electrical circuit topics

- To avoid shunt effects at elevated temperatures due to NTC material conductivity, the electrical resistance of all used materials must be as high as possible especially at high operating temperatures.
- It is strongly recommended to keep the electrical power applied to the element as low as possible – especially for really long term high temperature applications.
- AC measurement methods and/or time domain measurements are generally superior to conventional DC measurements.

Connections

- Soldering
- Brazing
- Crimping
- Resistance welding
- Laser welding

Measuring Current

- 50 Ω: typical 0.3 – 1.0mA (max. 1mA)
- 100 Ω: typical 0.3 – 1.0mA (max. 1mA)

Sensor Handling

- Using gloves is recommended
- Avoid using metal tweezers
- Avoid mechanical stress to lead wires