

Temperature sensors for high pressure processes



INNOVATIVE TEMPERATURE
MEASUREMENT SOLUTIONS
FROM THE GLOBAL LEADER



HIGH PRESSURE (LDPE) TEMPERATURE SENSORS

Thermo Electric Instrumentation manufactures and supplies High Pressure (LDPE) temperature sensors across a variety of industrial sectors.

The Thermo Electric brand has a reputation of producing quality engineered devices. It is for this reason that we are recognised within the top engineering and construction design houses across the globe. We have been awarded a number of high profile projects based on our depth of knowledge and experience in the supply of such critical assemblies. Our sensors have been used in High Pressure industrial process applications for over 30 years.

VACUUM BRAZING

All of our high pressure temperature assemblies are custom built to your exact specifications. In order to maintain a consistent level of quality we only employ vacuum brazing on all pressurised joints. Our vacuum brazing is a completely automated control technique which eliminates human error during the soldering process. We make selections regarding the types of brazing alloys used, based on the process conditions. The most suitable brazing alloy is then selected with a strong emphasis on gold based alloys. These exhibit characteristics of outstanding strength and adherence. Our engineering and design staff are always available to help you with your designs.





CONSTRUCTION

The integral part to our high pressure thermocouples is the heavy wall mineral insulated thermocouple cable. Our thermocouples can be supplied in standard or premium grade materials, as well as a variety of sheath diameters.

In addition to a design and manufacturing service we can also provide calibration certificates for each sensor. Our in house calibration laboratory can issue certificates which are fully traceable to international standards.

LONG TERM PROTECTION AND RELIABILITY

The conductors are isolated from the outer sheath by high purity magnesium oxide (MgO) which assures long term stability for the mV output. The hot junction can be grounded or ungrounded from the outer sheath - a grounded thermocouple junction is recommended if fast response times are required.

We offer a large number of designs: screwed, clamped or ring (waver, lens and cone) types are available to meet customer specifications. Extra precaution is taken to ensure the surface finish of the sealing area is protected during manufacturing and transit - a damaged seal area can result in unacceptable leaks. The device can be then connected to your instrumentation by using flexible (braided) wires, quick coupling connectors or industrial junction boxes.



PRESSURE PARTS MATERIALS

When designing high pressure sensors a number of conditions have to be considered:

- Corrosion
- Fatigue
- Brittleness
- Thermal and mechanical stress

CORROSION

When designing high pressure thermocouples, consideration must be given to the corrosive nature and conditions of the application. Corrosion proof materials can be selected for most conditions, these materials must be suitable at temperatures across the entire operating range. Our experienced engineers advise you in selecting the optimum materials based on your process conditions.

FATIGUE

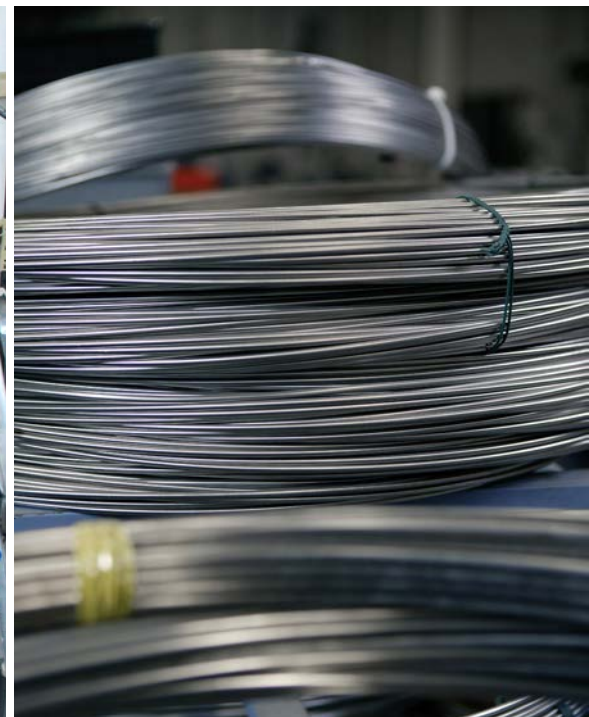
Twisting, flexing and vibration are also critical factors to consider. Choosing the wrong material can result in premature failure of the sensor and costly process down time. Our industry experience can help guide you through this selection process.

BRITTLENESS

When a metal exceeds its maximum design operating temperature, the material can become brittle. This can cause process failure or even induce a chemical reaction within the process. We can reduce the risk of specifying incorrect materials, through our knowledge of the material selection process and the operating temperatures curves associated with each alloy. We can liaise with your engineers at the design phase, to ensure the correct materials are specified on your projects.

THERMAL AND MECHANICAL STRESS

Our Thermo Electric specialists provide a high degree of expertise in the field of metallurgy. This knowledge is used to eliminate the chance of different coefficients of expansion, in materials at high process temperatures or high pressure points.



TESTING

Our manufacturing excellence procedures and our complete control over the entire assembly process ensures that our high pressure temperature sensors are of the highest quality. All of our sensors are supplied with hot junction and brazing joint X-rays. Each sensor is supplied with all required certificates.

We can also supply further additional testing if required:

NON DESTRUCTIVE

- Temperature calibration
- Ultrasonic inspection
- Magnetic particle
- Liquid penetration
- Helium leak
- Liquid nitrogen
- Positive Material Identification (PMI)
- Pressure testing (up to 7,000 Bar)

DESTRUCTIVE

- Strength
- Stress rupture
- Hardness test
- Fracture toughness
- Dynamic tear
- Impact: sharp V



CERTIFICATION

In addition to standard test certifications, Thermo Electric Instrumentation can issue material certificates, stating chemical composition and mechanical properties for all pressurised parts such as sheath and soldering materials.

QUALITY CONTROL

Our experienced staff are always available to assist you with your sensing requirements. We only select the highest grades of materials based on your applications. Our production procedures and quality control system are fully certified by Lloyds Quality Register and our reputation for consistent excellence in high pressure (LDPE) temperature sensor manufacturing speaks for itself.



MANUFACTURING FACILITIES

We have dedicated manufacturing and testing facilities located in the Netherlands. Our Thermo Electric temperature sensing products are supplied directly from our headquarters to our customers, through sales and service centres across the globe.

HIGH STANDARDS AND EFFICIENT SUPPLY

Our dedicated central production and engineering facilities allow us to maintain our high standards and best practice in engineering and design. This expertise is reflected in the efficient supply of Thermo Electric temperature sensors and in our consistent achievement of quality in the field.

SERVICES

- Wake frequency calculations according ASME PTC 19.3 (2010)
- X-rays
- Welding robot
- Manufacturing record book
- Quality inspection plan
- Explosion safe certificate Exi, Exe, Exd, Exn
- Cleaning for oxygen service
- Visual inspection
- Dimensional check
- According EN 10204 3.1 and NACE MR0175
- WPS and PQR for welded Thermowells
- Batch certificate
- Certificate of origin
- Certificate of conformance
- CSA/US
- IEC-Ex
- ATEX
- KTL
- CCOE
- GOST R

TEST FACILITIES

- Functional performance test
- Loop resistant test
- Insulation resistance test
- Dye penetration test
- Pressure test
- Calibration test
- From $-200\text{ }^{\circ}\text{C}$ up to $1.500\text{ }^{\circ}\text{C}$ (RvA/ILAC)
- Calibration test for each instrument, mV, mA, Ohms and V (RvA/ILAC)
- Vacuum test
- Helium leak test
- PMI test

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