

# Датчики температуры

## Брошюра

### По вопросам продаж и поддержки обращайтесь:

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Made in Italy 



# Temperature is our business



A world-leading manufacturer  
of temperature sensor and heaters

EPC contractor business





## A TRUSTED SUPPLIER FOR EPC CONTRACTS

## FACTORY ACCEPTANCE TESTS & DOCUMENTATION



TE.MA. has been an active supplier to EPC Contractors for more than 50 years. Along with its international partners, TE.MA. implements its temperature measurement products and heating systems as part of major oil and gas projects all around the world, including the Middle East, Asia Pacific, US and Europe.

More than simply a manufacturer of products, TE.MA.'s customers regard it as a trusted, reliable supplier of premium quality instrumentation and process heating systems.

Often, TE.MA. is asked to develop customised temperature measurement and/or heating solutions that solve specific issues. These projects may also require close collaboration with a customer's engineering team.

Due to its truly global presence, TE.MA. is a company name found on many renowned approved supplier lists, which are consulted by most leading engineering and EPC contractors. All TE.MA.'s subsidiaries, sales offices and local representatives worldwide, provide teams of experienced engineers who manage and coordinate the implementation of all TE.MA. products and equipment. These local representatives can provide quotations, technical documentation, advice and guidance on all your project requirements relating to temperature and heating. The company's global presence, high quality product portfolio, coupled with the company's reputation for innovative products and technologies, make TE.MA. the ideal supplier for your TE.MA. contracts.



### TE.MA. prides itself on the ability of its in-house test and inspection departments.

The company offers full Fat testing facilities at its factories, with all testing carried out to set, pre-approved functional test procedures. This provides an added guarantee that the equipment arrives at the job site ready for installation and to the correct technical specification.

### TE.MA.'s comprehensive in-house test facilities include:

- Full Radiography Department to ensure bore concentricity and weld integrity
- The latest SPECTROTEST, a high power universal metal analyser for PMI of base and finished materials
- Calibration facilities for sensors and transmitters covering temperatures from -200°C up to +1,800°C
- Pressure testing facilities for internal and external proving of Thermowell integrity.
- Liquid penetration inspection

TE.MA. also ensures that all documentation that is requested within the project VDR (Vendor Documents Review) is supplied in the correct format and project language, digitally and hard copy when required. The documents are submitted through the company's doc control procedure to ensure that they are within the correct time scales outlined within the VDR.

These documents contain as standard: Drawings, Weld procedures and qualifications (ASME IX), IOM Manuals, Stress and Wake frequency calculation, Hazardous Area Certificates, Inspection Certificates, Calibration Certificates & Pressure Test Certificates.



## OIL & GAS/ PETROCHEMICALS

## TEMPERATURE MEASUREMENT

TE.MA. manufactures and supplies temperature measurement assemblies to cover the full range of process applications with a portfolio that covers temperatures from -200°C to +2,200°C. TE.MA.'s products include Thermocouples, Resistance Thermometers, Temperature

Transmitters, Temperature Gauges and Thermowells. Uniquely, TE.MA. sensors are manufactured using mineral insulated cables and RTD elements, which means that quality, accuracy and reliability are assured from start to finish.



Here are some examples of products that TE.MA. has supplied on recent EPC contracts for the Oil & Gas sector:

### TE.MA. provides a comprehensive range of high quality temperature and heater assemblies for the Hydrocarbon sector.

Whether it's an onshore petrochemical/refinery unit or offshore gas platform, TE.MA. products ensure the efficient and safe operation of these production units at all times. TE.MA.'s products are fully certified for use in potentially hazardous and flammable atmospheres and can operate within Zones 0, 1 & 2 certified to global standards, European ATEX, USA NEC, Canadian CSA & Global IECEx requirements. TE.MA. also has country-specific certification such as GOST K, GOST R, NEPSI, KOSHA & JIS.

Over the last 50 years, TE.MA. has developed an unrivalled breadth of temperature measurement & heater assemblies for the oil and gas sector that have been specifically designed to provide temperature measurement and heat generation for some of today's most challenging applications, including the following:

#### Refinery Process

- Tube Skin Thermocouples for Fired Heater Measurement
- High Temperature Thermocouples for Sulphur Recovery (Claus Process)
- Multipoint Temperature Assemblies for 3D catalyst reactor profiling
- Thermowell design for high flow rate applications
- Flare tip thermocouples
- Hard wearing and High temperature assemblies for FCC Units
- Crude Oil Heaters

#### Petrochemical Process

- Multipoint Temperature Assemblies for catalyst process such as Ethylene Oxide
- High Pressure Thermocouples for production of LDPE

#### LNG Storage

- Cool Down Sensors
- Skin Temperature measurement
- Leak Detection Sensors

### Temperature Assemblies for use in Potentially Hazardous Atmospheres

TE.MA.'s comprehensive range of temperature assemblies can be supplied fully certified for use in all Zone 0, 1 & 2 in Europe, complying with the ATEX directive, for USA NEC standards, Canada CSA and globally to IECEx standards. **Specific TE.MA. Temperature Assembly** can be supplied Certified Exia IIC T4 for Zone 0 (1 & 2), Exde IIC T6 for Zone 1 (2) and ExnA II T6 for Zone 2. Sensor configuration can be to any Thermocouple Type or Resistance Thermometer with a variation of sheath material to suit the specific application. Simplex, Duplex or multi-stem combinations can be supplied into a single terminal housing. The housing can be fitted with a castle style terminal block or head mounted transmitters. If a direct mounted style transmitter with integral housing is required, the **Temperature Assembly** can be supplied with machining certification and configurations, but with the benefit of being supplied fully certified for fitment to a third party-supplied transmitter.

### Thermowells

TE.MA. manufactures an extensive range of thermowells to suit all process applications and offers a full design service to ensure that the correct item is supplied to meet the process conditions. Material selection is checked against a database of chemical properties to guarantee compatibility. Stress and Wake Frequency calculations are carried out using a bespoke designed application backed up by analysis to ensure full compliance with ASME PTC19.3 design criteria, can offer a practical solution for when the Thermowell design fails the calculation. Pressure calculations are carried out to ensure material selection meets with the process connection rating at the process temperature.

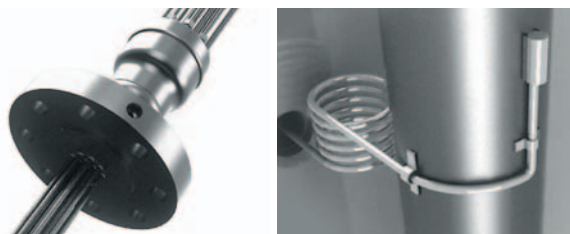




## TEMPERATURE MEASUREMENT

### Multipoint Temperature Assemblies

TE.MA.'s multipoint temperature assemblies are suitable for all types of process applications, including crude oil storage tanks, hydrocarbon cracking units, chemical reactors and desulphurisation catalyst bed reactors. For chemical reactors and desulphurisation catalyst bed reactors, TE.MA.'s range offers full 3D profiling. These free hanging assemblies can be supplied with single point measuring ends or 6 measuring points housed in each sheath to provide a possible 96 measuring points through a single process connection. For LNG storage, multipoint assemblies can be supplied with lengths in excess of 140 metres and fully calibrated and process sealed for temperatures down to -200 °C. When more traditional assemblies are required, TE.MA. can offer various designs, including one with internal cage arrangements which ensures the sensor tips are positioned correctly and are in contact with the larger diameter Thermowell ID for good thermal conductivity.



### High Pressure thermocouples for LDPE production

TE.MA. has developed a range of thermocouple assemblies to suit high-pressure applications, including temperature measurement in LDPE production and for use in plastic injection moulding machines. The thermocouples are manufactured in-house, giving TE.MA. complete control over thermocouple quality. At TE.MA., all pressurised joints on the thermocouple are vacuum brazed in-house using a fully automated brazing process. This ensures that human intervention is minimised, which reduces process errors and defects, thereby improving the quality, repeatability and reliability of the thermocouple. Vacuum brazing ensures a high quality thermocouple, as the process is always carried out under the same controlled conditions. Heat treatment can also be integrated into the brazing cycle, ensuring correct mechanical properties are obtained.

### Tube Skin Thermocouples

TE.MA. designs and manufactures a unique range of tube skin thermocouples for process-fired heaters, which offer higher accuracy and greater reliability against traditional thermocouples currently available on the market. The thermocouple designed ensure maximum accuracy and to help eliminate temperature measurement problems that arise from radiant heat, flame impingement and heat sink effects.

## ELECTRICAL HEATING SYSTEMS

TE.MA.'s extensive range of electric heating systems is constructed using mineral insulated cables. This manufacturing process offers ease of installation, since the sheath can be supplied to a bend radius of 2.5 times the heater OD. This means the heater can be formed into any desired shape and is high pressure sealed for welding when required into process flanges. As with TE.MA.'s temperature assemblies, full product certification for use in hazardous area applications can be provided, Exde IIC T6 for Zone 1&2 terminated into suitable enclosures.

**Here are some examples of product categories that TE.MA. has supplied for recent EPC contracts for the Oil & Gas sector:**

### Mineral Insulated Trace Heaters

TE.MA. supplies heating cables that provide reliable and rugged heat tracing for demanding applications within the oil & gas process sector. The construction enables the heating of equipment to higher temperatures when required. Various sheath and conductor combinations are available to meet application-specific requirements.



### Process Heaters

TE.MA.'s range of process flanged heaters can be supplied with various process flanged connections and combinations of material to meet the specific requirements. Outputs range from several dozen W to many thousands of KW. Process welding is carried out to ASME IX and full material certification is provided. If required, TE.MA. can also provide the process chamber to suit the heater supplied.

### Combustor Heaters

TE.MA. designs and manufactures a range of combustors that comply with all the major international standards. Systems have been supplied to customers that comply with the Construction Code for Pressure Vessels, High Pressure Gas Safety Law, and the Construction Code for Boilers.

## OTHER INDUSTRY SECTORS



**As well as Oil, Gas & Petrochemicals, TE.MA. serves a wide range of other industry sectors around the world.**

### AEROSPACE & DEFENCE:

TE.MA.'s products are mounted in deep space satellites and rocket systems. Cryogenic sensors from TE.MA. are installed to measure extremely low temperatures inside fuel tanks in rockets. Other sensors are used to detect liquid levels. TE.MA.'s temperature sensors can also be found on commercial and military aircraft and helicopters, measuring the temperature of gas turbine engines, as well as in many test stands and R&D projects.

### POWER GENERATION:

TE.MA. supplies its products to companies involved in thermal management, hydroelectric and nuclear power generation, contributing to the efficiency and safety of power plants worldwide.

### FOOD & PHARMACEUTICALS:

As many temperature sensors come into direct contact with food and pharmaceutical products, TE.MA. products are designed with special characteristics in mind, such as cleanliness, anti-corrosion and reliability.

### MARINE:

From the largest tankers for carrying LPG and crude oil, to the smallest ocean going vessels, TE.MA.'s temperature management products and liquid (LPG) volume measurement sensors contribute to the safe and efficient operation of ships throughout their voyage on the seas. These sensors can be supplied certified to various international marine standards, including Lloyd's Register of Shipping (LR) Germanischer Lloyd (GL) and Bureau Veritas (BV).

### AUTOMOTIVE:

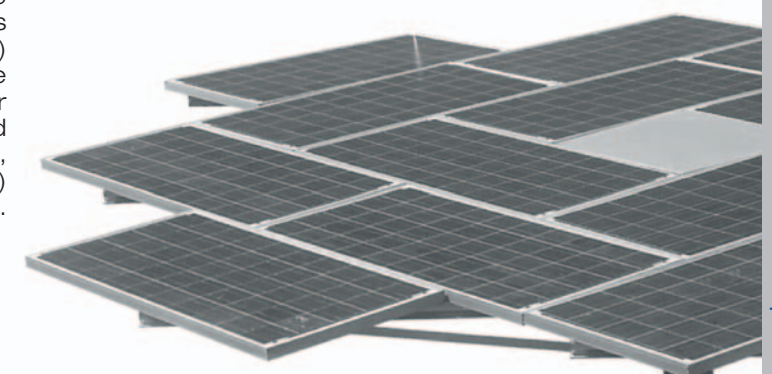
TE.MA. manufactures a range of high quality temperature sensors for the automotive industry. These products are used to measure the temperature of exhaust gases and also for temperature management of catalytic converters.

### IRON, STEEL, CERAMICS & GLASS:

TE.MA. manufactures a variety of temperature sensors and thermowells (including protection tubes and sheath heaters) for the metal processing industry, including iron, steel, aluminium, zinc, ceramics and glass manufacturing. Sensors are supplied for use on blast furnaces, metal melting crucibles, industrial ovens and incinerators.

### PLASTICS & RUBBER:

TE.MA. also provides sensors and electric heating systems to the Plastics, Fibre and Rubber processing sectors. These products include bayonet and band type temperature sensors, as well as sensors for resin. Heaters include Super IR Heaters, high output Cartridge/Band Heaters, and Cast Heaters, for components with complex geometries.



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