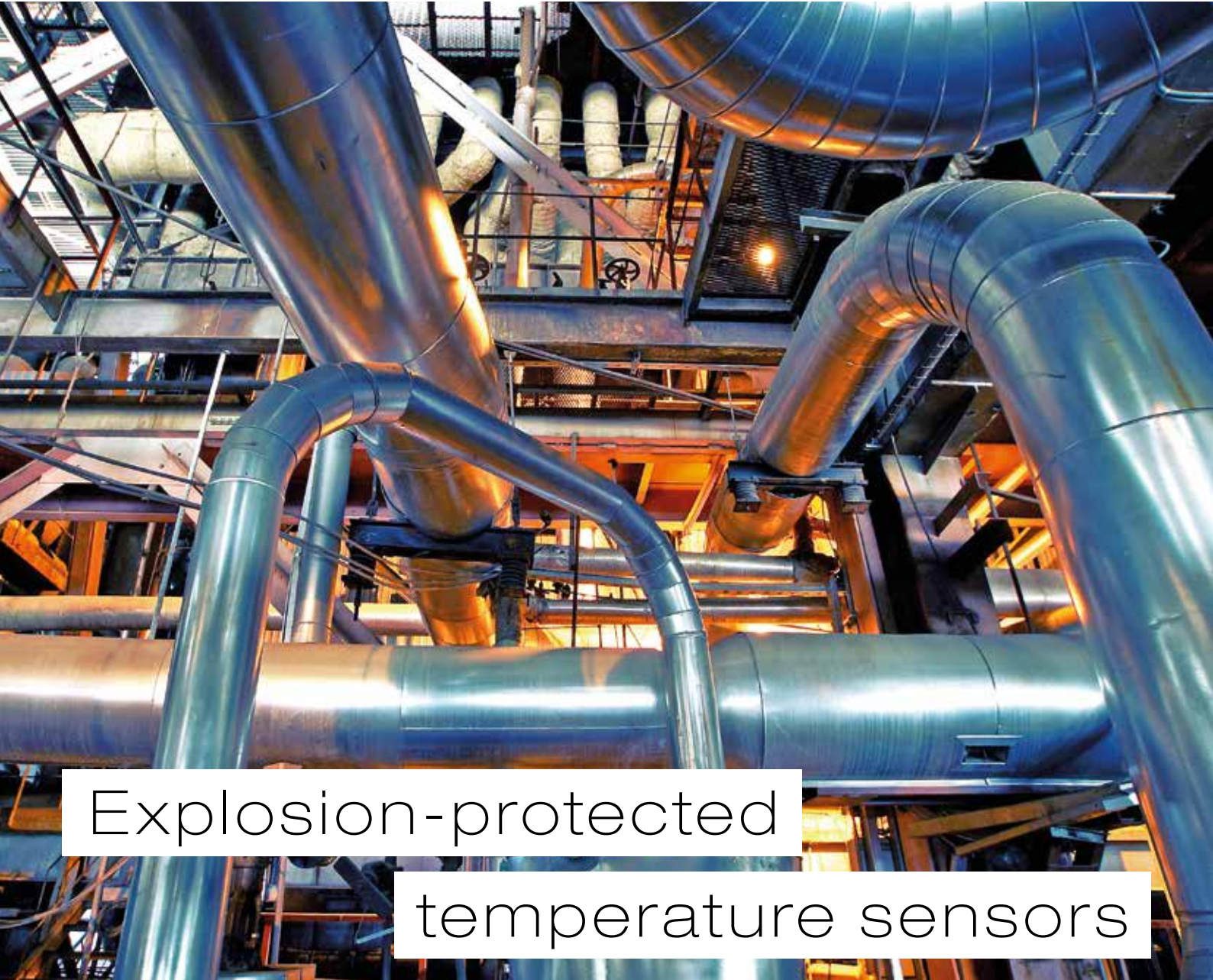




# GÜNTHER



Explosion-protected

temperature sensors

according to ATEX directive 2014/34/EU



**Temperature Measurement Technology**  
Reliable . Precise . Certified

# Explosion-protected temperature sensors

## Safety, even in explosive areas

Since 2012, GÜNTHER GmbH temperature measurement technology has also produced explosion-protected resistance thermometers and thermocouples. These are **certified according to the ATEX (ATmosphères EXplosibles) directive 2014/34/EU** for safe temperature measurements in liquid and gaseous states, as well as dust particles.

Our explosion-protected temperature sensors are designed as resistance thermometers or as thermocouples. They convert the temperature at the measurement site into an electrical quantity (voltage, resistance) and, in connection with the corresponding downstream devices, enable the measurement, registration and regulation of temperatures between  $-196\text{ °C}$  and approx.  $+1800\text{ °C}$ .

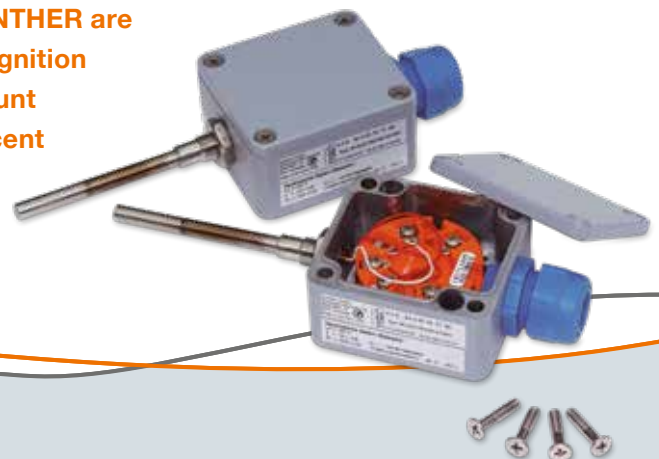


Our explosion-protected temperature sensors are used in the industry branches predestined for this, **chemistry and the petrochemical sector**, as well as in the **extraction of crude oil and gas**.

GÜNTHER temperature sensors are even used in explosive areas in **mechanical and systems engineering**, and in the **food industry**.



**All explosion-protected temperature sensors from GÜNTHER are designed in such a way that they cannot represent an ignition source thanks to their structure, even taking into account possible faults, and thus correspond one hundred percent to the strict requirements of the ATEX directive.**



## Product series and ignition protection types

The temperature sensors of **ignition protection type Ex i** (product series **R0/T0 to R8/T8**) are certified for connection to intrinsically safe circuits of category “ia”. Here, the following electrical limit values apply:  $U_i = 30 \text{ VDC}$ ,  $I_i = 101 \text{ mA}$ ,  $P_i = 750 \text{ mW}$ .

We also offer temperature sensors of **ignition protection type Ex d** with pressure-resistant encapsulation in different builds (series **R9/T9**). Here, the electrical limit values are determined as follows:  $U_{\text{max}} = 5 \text{ V}$ ,  $I_{\text{max}} = 2 \text{ mA}$ .

In addition to this, we produce temperature sensors of **ignition protection type Ex e** with increased safety (series **RE4/TE4, RE5/TE5, RE6, RE7, RE8/TE8**).

Here, the following electrical limit values apply:  $U_{\text{max}} = 30 \text{ V}$ ,  $I_N = 2 \text{ mA}$ ,  $P_{\text{max}} = 102 \text{ mW}$ .

A current limit is planned here as overload protection.

$I_{\text{max}} = 1.7 \times I_N$  ( $I_N$  = safety rated current according to IEC 60127).

Special sensors of **ignition protection type Ex ec / Ex tc** (series **RX/TX, RN/TN**) are also part of our broadly varied range of explosion-protected temperature sensors.

## Structure and equipment

Common resistances made from platinum or nickel are built into the resistance thermometers. These temperature sensors are produced in accordance with DIN EN 60751 and are available in all common tolerance classes with two, three or four wire technology. Versions with two measurement circuits in two or three wire technology are also possible.

Optionally, all explosion-protected thermocouples can be fitted with the thermocouples T, J, K, E, S, R, B and N according to DIN EN 60584 in the tolerance class 1 as a simple or double measurement circuit. For ignition protection type Ex i, the thermocouples A, C and D are also used.

The temperature sensor design is always coordinated with the respective environment and the measurement task being carried out. For this, we use the most suitable combination out of a vast number of

- Protective tubes
- Process connections
- Connection heads
- Wires



All explosion-protected temperature sensors from GÜNTHER are supplied with **temperature transmitters which were produced and labelled specifically for us.**

Of course, suitable temperature transmitters with Ex approval from other manufacturers can also be used.



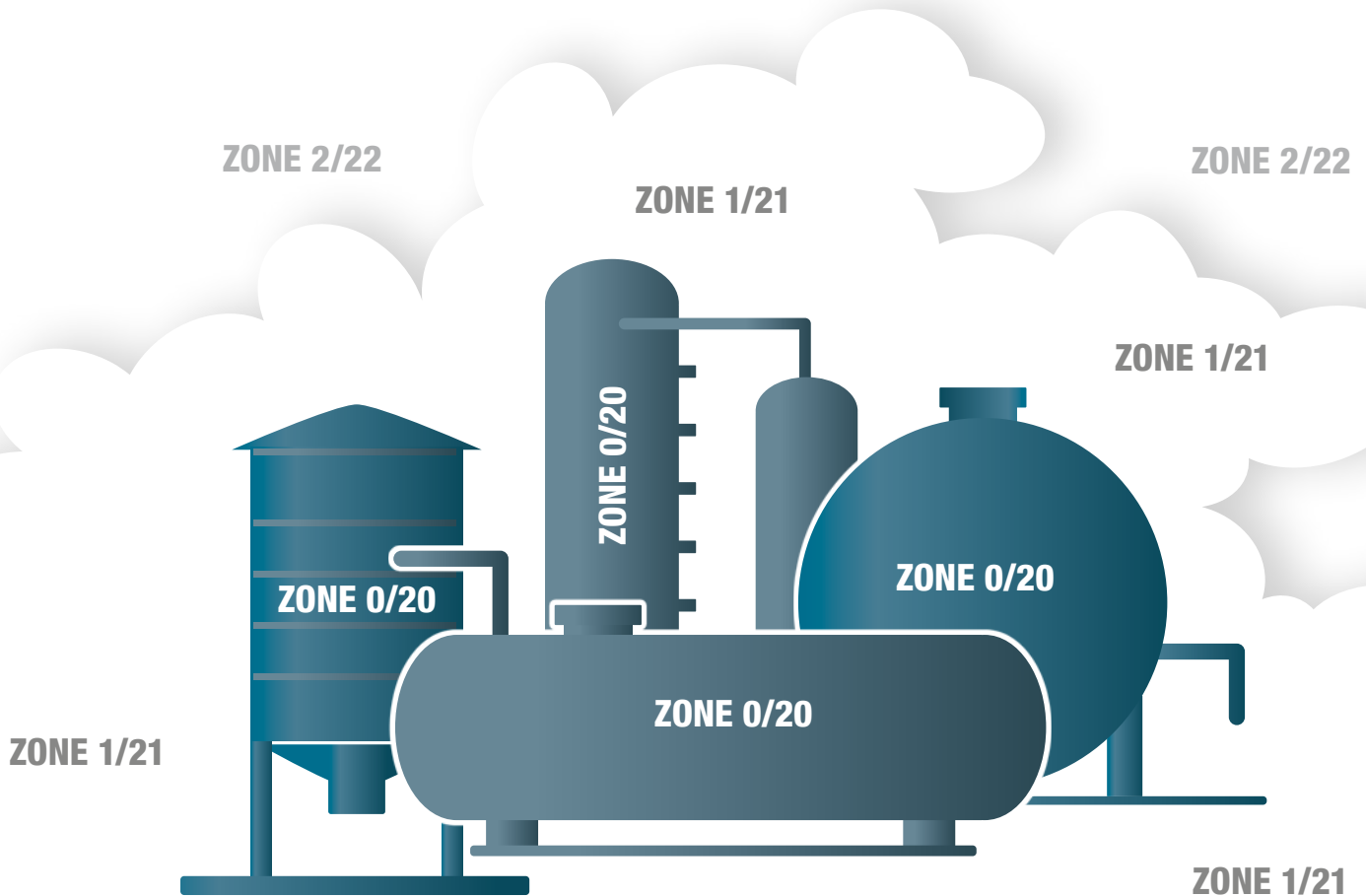
# Explosion-protected temperature sensors

## Areas of application of our explosion-protected temperature sensors

Ignition protection type				Ex i
for zone(s)				(0/1), 1, 2 (20/21), 21, 22
Series R0/T0	Series R1/T1	Series R2/T2	Series R3/T3	

Ignition protection type		Ex i
for zone(s)		1, 2 21, 22
Series R4/T4		

Ignition protection type		Ex i
for zone(s)		1, 2 -----
Series R5/T5	Series R6/T6	



Ignition protection type	Ex i
for zone(s)	0, (0/1), 1, 2 20, (20/21), 21, 22

Series R7/T7



Series R8/T8



Ignition protection type	Ex d
for zone(s)	1, 2 21, 22

Series R9/T9



Ignition protection type	Ex i, Ex ec, Ex tc
for zone(s)	2 22

Series RX/TX



Series RN/TN



Ignition protection type	Ex e
for zone(s)	1, 2 21, 22

Series RE4/TE4



Ignition protection type	Ex e
for zone(s)	1, 2 21, 22

Series RE5/TE5




Series RE6



Ignition protection type	Ex e
for zone(s)	1, 2 21, 22

Series RE7



Series RE8/TE8



#### Explosive gas atmospheres

- Zone 0** An area in which an explosive atmosphere made up of a mixture of air and flammable gases or vapours is permanent or present for most of the time.
- Zone 1** An area in which it is possible or very probable that there is an explosive atmosphere made up of a mixture of air and flammable gases or vapours.
- Zone 2** An area in which an explosive atmosphere made up of a mixture of air and flammable gases or vapours is unlikely to occur, and if it does, then only rarely and for a short period of time.

#### Areas with flammable dust

- Zone 20** An area in which an explosive atmosphere in the form of a cloud of flammable dust in the air is permanent or present for most of the time.
- Zone 21** An area in which it is possible or very probable that there is an explosive atmosphere in the form of a cloud of flammable dust in the air.
- Zone 22** An area in which an explosive atmosphere in the form of a cloud of flammable dust in the air is unlikely to occur, and if it does, then only rarely and for a short period of time.

# Explosion-protected temperature sensors

## Product series R0/T0 (Ex i)

Intrinsically safe sheath measurement inserts  $\varnothing$  3 mm, 4.5 mm and 6 mm with connection socket or single strands ("flying leads") for product groups R1/T1 to R5/T5. These measurement inserts may only be used in explosive areas in protective fittings or connection housings (min. IP 54) intended for this purpose.



**Ex** II 2G Ex ia IIC T6...T1 Gb

## Product series R1/T1 to R3/T3 (Ex i)

For the temperature sensors in series R1-R3 or T1-T3, the protective tubes touching the media (zone 0 or 20) are supplied with walls  $\geq$  1 mm to guarantee the safe separation of zones. The protective tubes protect the sheath measurement inserts against chemical and physical influences. In addition, selecting suitable protective tubes increases the required mechanical stability. For a faster response time at the measurement site, tapered protective tube ends are also possible, if required. The process connections installed in these series are screwed sockets with various connecting threads or blind flanges with dimensions which correspond to an international or national standard.

For welded sleeves, the zone separation must be implemented by the customer with professional welding.



**Ex** II 1/2G Ex ia IIC T6...T1 Ga/Gb

**Ex** II 1/2D Ex ia IIC T135°C Da/Db

## Product series R4/T4 (Ex i) / RE4/TE4 (Ex e)

Temperature sensors in the series R4/T4 and RE4/TE4 are fitted with protective tubes of various wall thickness. The individual adjustment of the protective tubes to the measurement insert means that short response times can be achieved. These are always closed protective tubes where either no process connections, mobile process connections or fixed welded process connections are installed. The process connections do not represent zone separation for the series R4/T4 and RE4/TE4. These temperature sensors can be used in zone 1 (gas Ex) and zone 21 (dust Ex).



**Ex** II 2G Ex ia IIC T6...T1 Gb

**Ex** II 2G Ex eb IIC T6...T1 Gb

**Ex** II 2D Ex ia IIC T135°C Db

**Ex** II 2D Ex tb IIC T80°C...T440°C Db

### Product series R5/T5 (Ex i) / RE5/TE5 (Ex e)

The temperature sensors in series R5 / RE5 (resistance thermometer) and T5 / TE5 (thermocouple) essentially consist of a measurement insert which protrudes out of the connection head without additional protective tubing. From the factory, we supply dimensions with diameters of 3 mm, 4.5 mm and 6 mm. As process connections, we use movable clamp or wedge ring connections or fixed thread sockets, with or without a neck tube. The process connections are not for zone separation. These series can be used in zone 1 (gas Ex) in Ex i design, or zone 1 (gas Ex) and zone 21 (dust Ex) in Ex e design.



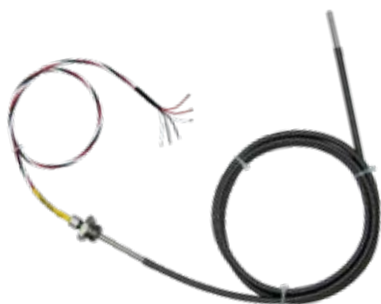
 II 2G Ex ia IIC T6...T1 Gb

 II 2G Ex eb IIC T6...T1 Gb

 II 2D Ex tb IIIC T80°C...T440°C Db

### Product series R6/T6 (Ex i) / RE6 (Ex e)

Temperature sensors in the series R6/T6 / RE6 were developed as cable sensors with different diameters for zone 1 (gas Ex) in Ex i design, or zone 1 (gas Ex) and zone 21 (dust Ex) in Ex e design and are available as tube structures or in the mineral-insulated design. Their small dimensions, a wide range of possible process connections and their high degree of flexibility allow temperature measurements in hard to reach places.



 II 2G Ex ia IIC T6...T1 Gb



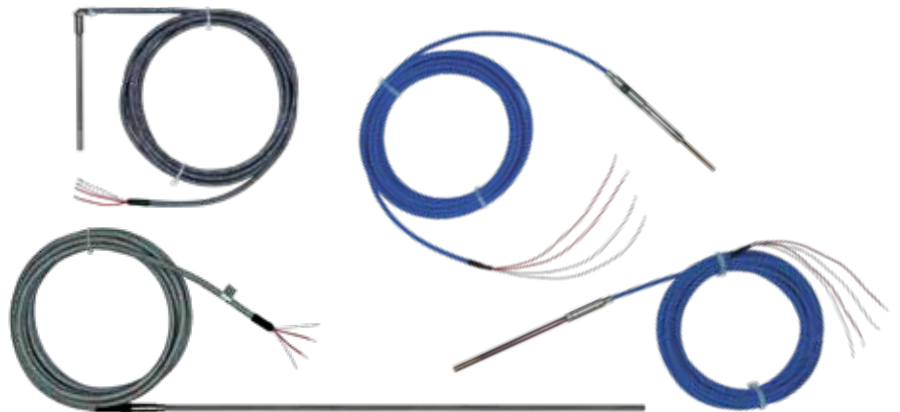
 II 2G Ex eb IIC T6...T1 Gb

 II 2D Ex tb IIIC T80°C...T440°C Db

# Explosion-protected temperature sensors

## Product series R7/T7 and R8/T8 (Ex i)

Similar in structure to the sensors of product groups R6/T6, these temperature sensors are also approved for zone 0, 0/1 (gas Ex) or 20, 20/21 (dust Ex). They have a continuous or detached protective tube in a straight or angled design, as well as a mineral-insulated design with connected wiring. For zone separation, approved clamp connections IP67 can be used, for example, with metric or imperial connection threads.



 II 1G Ex ia IIC T6-T1 Ga

 II 1D Ex ia IIIC T135°C Da

 II 1/2G Ex ia IIC T6-T1 Ga/Gb

 II 1/2G Ex ia IIIC T135°C Da/Db

## GÜNTHER temperature measurement technology – over 50 years of experience and quality



For over half a century, the name GÜNTHER has stood for the most advanced temperature measurement technology in almost all areas of the industry.

A database-supported material warehouse and employees continually undergoing training allow us to produce specially adapted temperature sensors for unusual application scenarios as well.

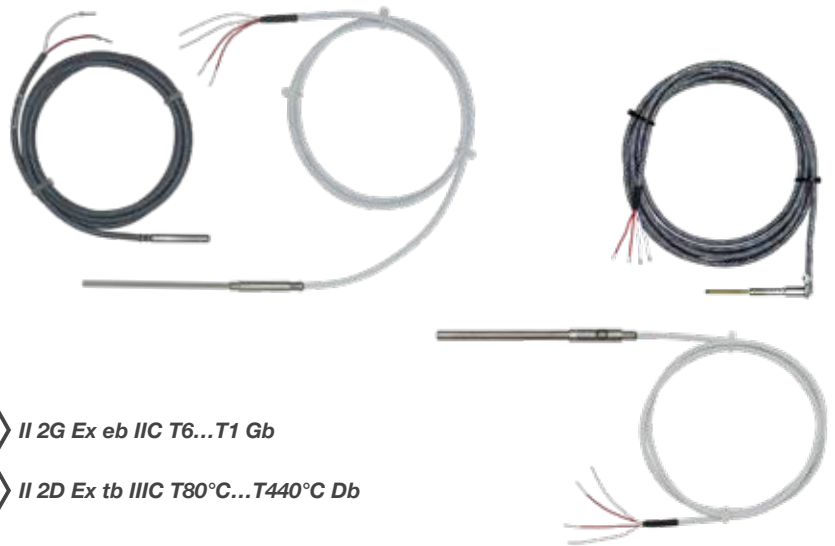
Here, the highest quality standards are assured at all times by a QM system (certification according to DIN EN ISO 9001:2015) and our own calibration lab which is accredited by the German Accreditation Body DAkkS.

**GÜNTHER temperature sensors guarantee exact measurements, even under the most extreme conditions of use.**



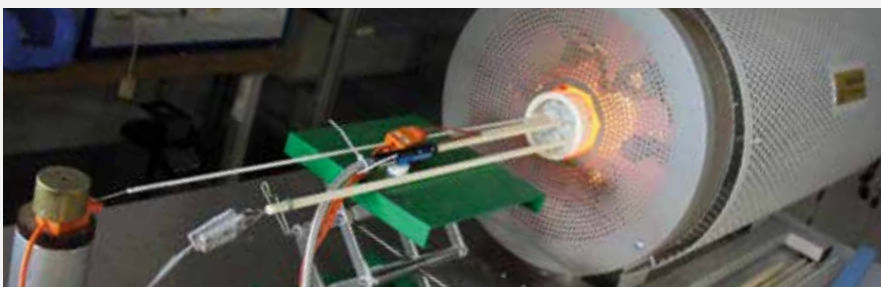
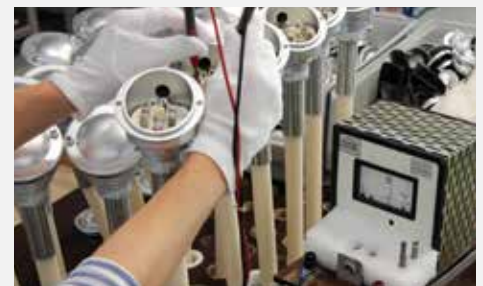
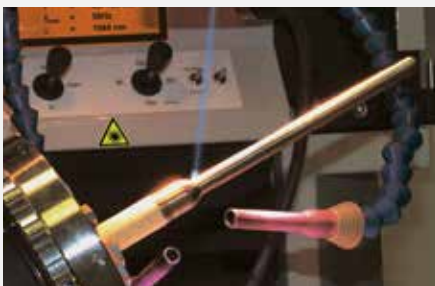
## Product series RE7 and RE8/TE8 (Ex e)

The temperature sensors in series RE7/RE8 (resistance thermometer) and TE8 (thermocouple) are approved for use in zone 1 (gas Ex) and zone 21 (dust Ex). They have a continuous or detached protective tube in a straight or angled design, as well as a mineral-insulated design with connected wiring.



 II 2G Ex eb IIC T6...T1 Gb

 II 2D Ex tb IIIC T80°C...T440°C Db



From the planning stage, to production with subsequent quality check, right up to delivery – clearly defined processes ensure that orders are processed without a hitch.

**This guarantees short delivery time for our customers, but with consistent quality standards.**

# Explosion-protected temperature sensors

## Product series R9/T9 (Ex d)

The temperature sensors of series R9 and T9 are characterised by pressure-resistant encapsulation and deliver accurate measurement results for temperatures of up to 1800 °C. The measurement insert protrudes out of the pressure-resistant head. Its protection fitting can be produced from ceramic or metal, for example, depending on the requirements. However, this is not part of the type examination certificate and can therefore be produced by the customer as well. The sensors R9/T9 are approved for use in explosive atmospheres of zone 1 (gas Ex) and 21 (dust Ex).

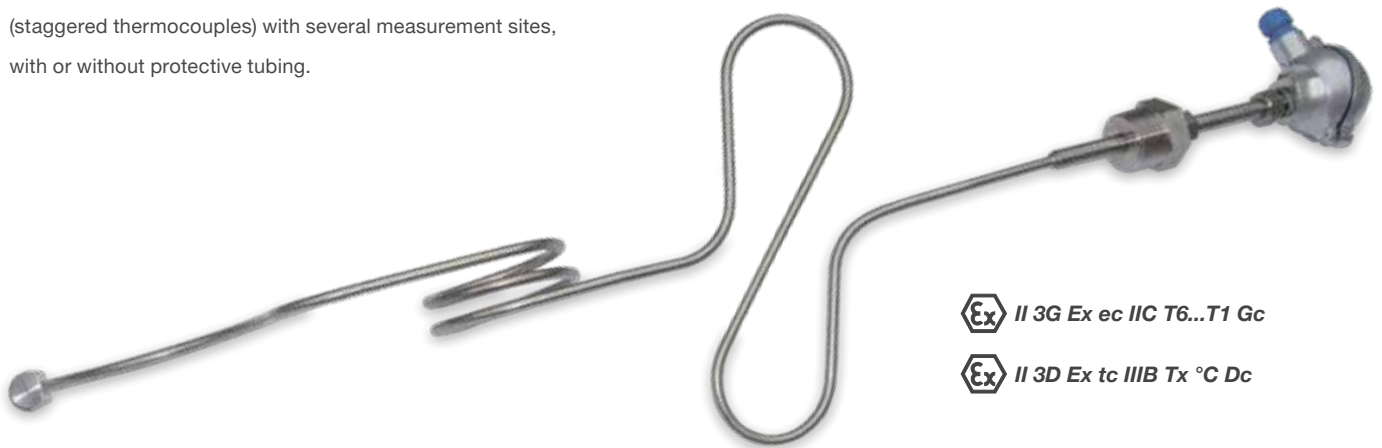


 II 2G Ex db IIC T6...T3 Gb

 II 2D Ex tb IIIC T80°C... T195°C Db

## Product series RN/TN (Ex ec), RT/TT (Ex tc) and RX/TX (Ex i)

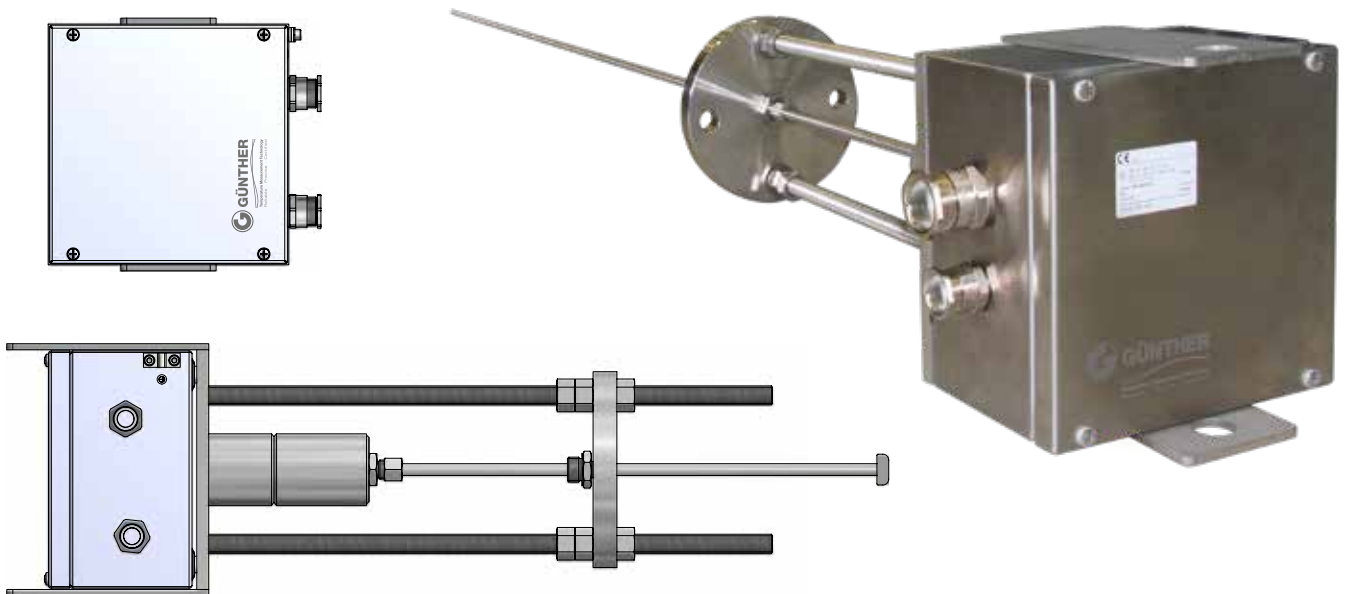
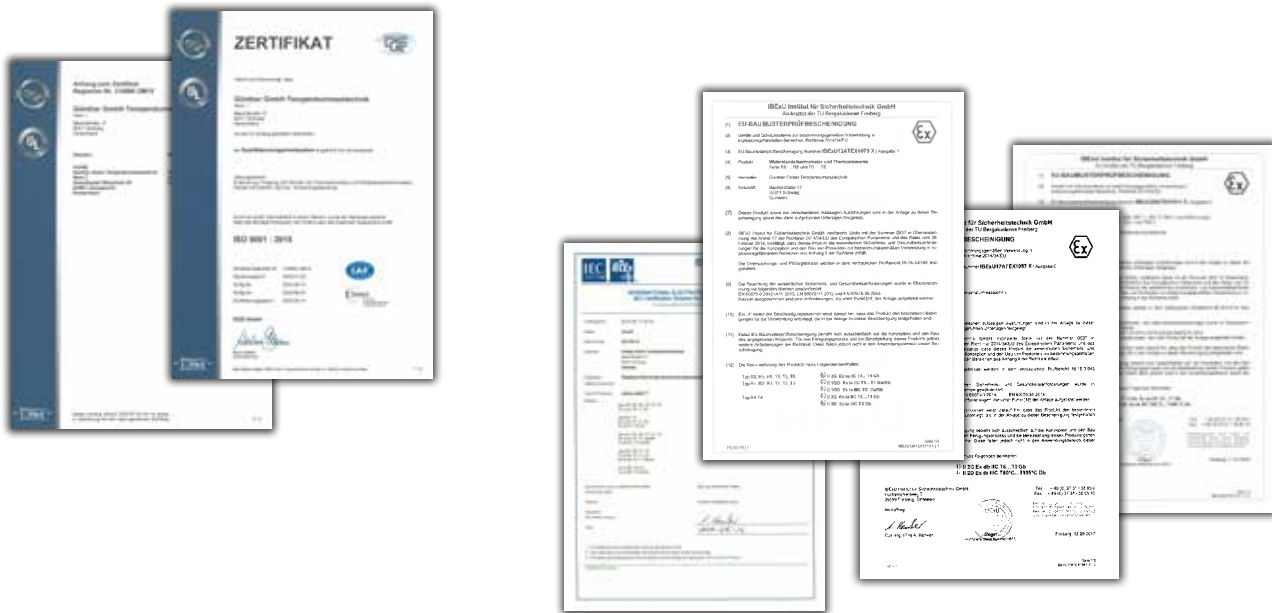
Similar in structure to the product series R1/T1 to R9/T9, the sensors of series RN/TN do not generate sparks, electric arcs or hot surfaces in normal operation. They fulfil the requirements of ignition protection type “ec” according to DIN EN 60079-7 and are suitable for use in zone 2 (gas Ex). The series RT/TT fulfils the requirements of ignition protection type “tc” according to DIN EN 60079-31 and is suitable for use in zone 22 (dust Ex). GÜNTHER also delivers tailored solutions and custom builds of the series RX/TX according to the requirements of ignition protection type “i” according to DIN EN 60079-11. This is simple, passive equipment for use in zone 1 (gas Ex) without a type examination certificate. However, a manufacturer’s declaration with information about the relevant parameters is produced for this. They can be supplied as tube-skin temperature sensors (sensors with expansion loop) or multipoint thermocouples (staggered thermocouples) with several measurement sites, with or without protective tubing.



 II 3G Ex ec IIC T6...T1 Gc

 II 3D Ex tc IIIB Tx °C Dc

# Explosion protection precision – safe and certified.





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