GÜNTHER

Thermocouples

for the glass industry

according to DIN EN 60584

Temperature Measurement Technology

Reliable . Precise . Certified

Thermocouples for the glass industry

Reliability under extreme conditions

GÜNTHER GmbH Temperaturmesstechnik has been manufacturing thermocouples and resistance thermometers for applications in almost all industrial sectors at five European locations since 1968. The core business is the development and production of small series tailored to the requirements of the customers.
Extensive material stocks, as well as different, independent suppliers for raw materials or components used usually allow for short production times. This also guarantees that spare parts can be supplied at short notice. **A long-established QM system and our own calibration laboratories ensure the highest quality standards.**

Shortly after the company was founded **over 50 years ago, the first sensors were supplied to the glass industry.** These temperature sensors, which are usually exposed to high temperatures and adverse environmental conditions, have been continuously developed and improved since then.

GÜNTHER supplies all industrial sectors in the glass industry and delivers temperature sensors and accessories, for example, for the production of

- Container glass
- Tableware glass
- Quartz glass
- Glass wool
- Flat glass
- Special glass
- Medical glass

Economy and ecology

Quality that pays off

It has always been part of the GÜNTHER company philosophy to manufacture and deliver the best quality. By processing carefully selected raw materials, we are able to manufacture products which, on the one hand, have a significantly extended service life and, on the other hand, provide permanently accurate measuring results.
We have developed our **patented STABITEC-system** especially for the requirements of the glass industry, which provides our sensors with additional advantages over standard designs. The resulting longer maintenance and repair intervals enable more economical operation of the systems in which they are used.
Constantly accurate measurement results also enable more precise temperature control and thus optimise the energy required for heating.
This conserves resources and the environment and reduces operating costs.

Take-back and recycling

GÜNTHER takes back used or damaged thermocouples containing precious metals and reimburses the value according to the current world market price.
Furthermore, it is possible to **set up a precious metal account** to which returned platinum (minus processing/recycling costs) is credited. Material required for later orders is then debited to this account without being affected by price fluctuations on the world market.

Thermocouples with precious metal protection sleeve for direct glass contact

Direct temperature measurement in molten glass is of vital importance in production processes. In the distributor, forehearth and feeder, the monitoring system serves to control and regulate a continuously constant glass temperature. Usually a number of different thermocouples with precious metal protection sleeves are used here, whose measuring tips are in constant contact with the liquid glass.

Distributor and forehearth thermocouples are designed as single or double elements as required. For the so-called sieve or matrix measurement, three **triple elements** are usually used. The elements are arranged in the glass flow so that the nine measuring points form a matrix.

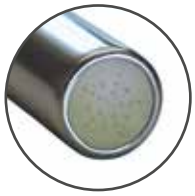
Feeder sensors are used for final monitoring of the glass temperature and thus provide useful information on the viscosity of the glass. GÜNTHER adapts the design of the feeder sensors exactly to the technical conditions. For example, **variants with replaceable protective sleeves or angled designs** are available. These thermocouples are also used for direct temperature measurement in the side walls and in the tank bottom.

For the production of the platinum protection sleeves, different platinum alloys are available at GÜNTHER. Dispersion-hardened sleeves of all dimensions as well as platinum coatings in various thicknesses and grades can be manufactured.

Thanks to extensive stock-keeping, all primary materials and components are available at short notice for the production and delivery of our high-quality temperature sensors.

Additional equipment and special probes

1 Bubbler tubes



Bubbler systems are often used to support the refining and homogenisation process within the melt.

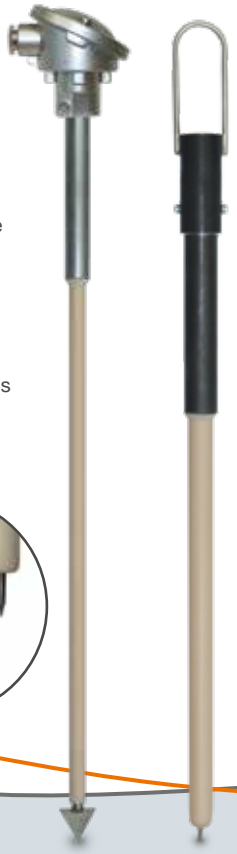
Bubblers increase the convection flow in the tank. In addition, a physical barrier is created to prevent unmelted material from moving too far towards the refining area.

Bubbler tubes can be supplied by GÜNTHER in various designs according to customer specifications.

2 Glass level probes

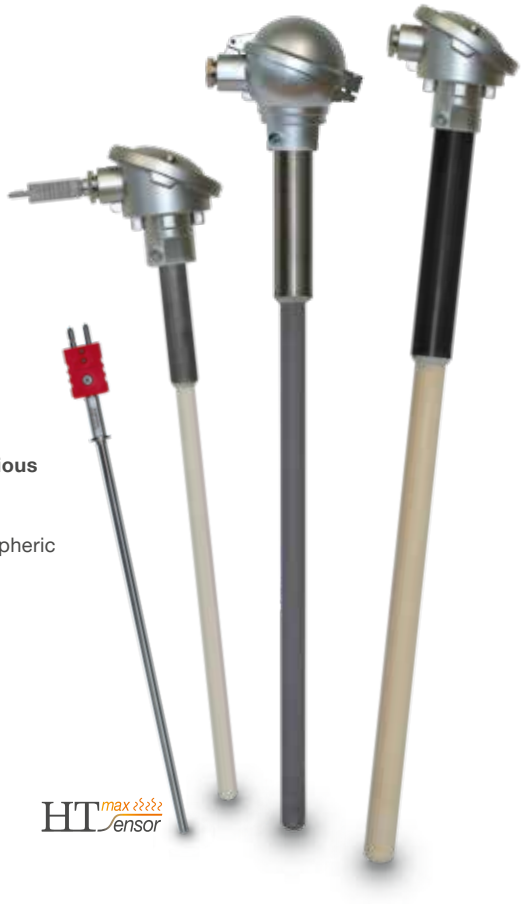
Glass level probes are used to monitor and control the level of the molten glass. They usually consist of an aluminium oxide protective tube from which a precious metal pin or sheet protrudes at the lower end as a contactor.

GÜNTHER manufactures glass level probes whose designs are precisely adapted to the respective operating conditions such as flow rate or the temperature of the glass melt.



Thermocouples for the glass industry

High temperature thermocouples without glass contact



Thermocouples with ceramic protection tubes play an important role in the glass manufacturing process.
Tub vault or crown thermocouples are exposed to extreme conditions (up to 1800°C). They can be used for both direct and indirect measurements. As in the vault, the temperature in the side wall and in the bottom of the tub is also of high interest. Here, both direct temperature measurement in the molten glass and indirect measurement in the lining are used.
For temperature measurements in the regenerators, GÜNTHER manufactures thermocouples for both the flue gas duct and the vault. For vault temperature measurement, **sensors with precious metal thermocouples are used in conjunction with protective tubes made of high-quality ceramics.** Thermocouples with ceramic protection tubes are also used for measuring the atmospheric temperature above the melt.
In quartz glass production, **type B thermocouples with ceramic protection tube or type C thermocouples with molybdenum protection tube** are often used for taking measurements without direct contact with the molten glass. All protective fittings manufactured by GÜNTHER offer maximum protection against premature poisoning of the thermocouples, which is of crucial importance in the glass industry in particular with regard to the longevity of the elements.

Thermocouples with non-precious thermocouple wires

Temperature sensors with non-precious metal thermocouples are used at many points in glass production, for example in the control of the furnace heating process.
For temperature measurements in the regenerators, GÜNTHER manufactures thermocouples for both the flue gas duct and the vault. For areas where less high temperatures prevail, such as the regenerator back wall or the flue gas stub ducts, **thermocouples with heat-resistant metallic protection tubes** can also be fitted.
Type K thermocouples (NiCr-Ni) are usually used for this purpose.
”Mould thermocouples“ are usually designed as type K, type J or type N.
They are usually designed as **sheathed thermocouples in various designs** with different diameters and are used for continuous temperature measurement in or around the glass moulds.
In flat glass production, these thermocouples are used for measuring the bottom temperature in the tin bath and for temperature measurement in the cooling tunnel.

Materials

Thermocouples

Due to the predominantly very high process temperatures in glass production, generally precious metal thermocouples (type R, S, B) are used. Thermocouples of the types N, K or J are sometimes also utilised in the work steps following the melting process. For extreme applications, it is also possible to employ **"stabilised" thermowire, so-called "SPTwire",** in which the crystal lattice structure has been optimised – in this way, a significantly increased durability can be achieved. With our **HTmax series,** we offer another possibility to measure temperatures in the upper limit range. These are **precious metal or tungsten/rhenium thermocouples in combination with molybdenum or sapphire protection tubes.** Of course, all these thermocouple types comply with the highest possible accuracy class of DIN EN 60584-2 and can also be delivered with calibration.

Technical ceramics

When using thermocouples in the glass industry, particularly high demands are placed on the protective fittings used – due to the adverse ambient conditions. By using the **highest quality ceramics with a high proportion of aluminium oxide,** GÜNTHER temperature sensors achieve an above-average service life.

Protective sleeves made of precious metals

For temperature sensors that are in direct contact with the molten glass, the areas of the protective armature that come into contact with the glass are made of platinum or platinum alloys. GÜNTHER has a wide range of materials with the usual standard diameters and the appropriate wall thicknesses in stock for this purpose, which enables rapid order processing. Depending on the type of glass and economic conditions, the following materials are used, for example: **PtRh80/20, PtRh90/10, PtRh90/10 DPH (oxide dispersion hardened), Pt DPH (oxide dispersion hardened).**

Thermoelectric and compensation cables

GÜNTHER stocks a wide range of high-quality thermoelectric and compensation cables. Depending on the area of application, these can be **single or multi-pair cables,** which – especially for high temperature ranges – can be sheathed with **silicone, Teflon or glass fibre insulation.**

Temperature transmitters

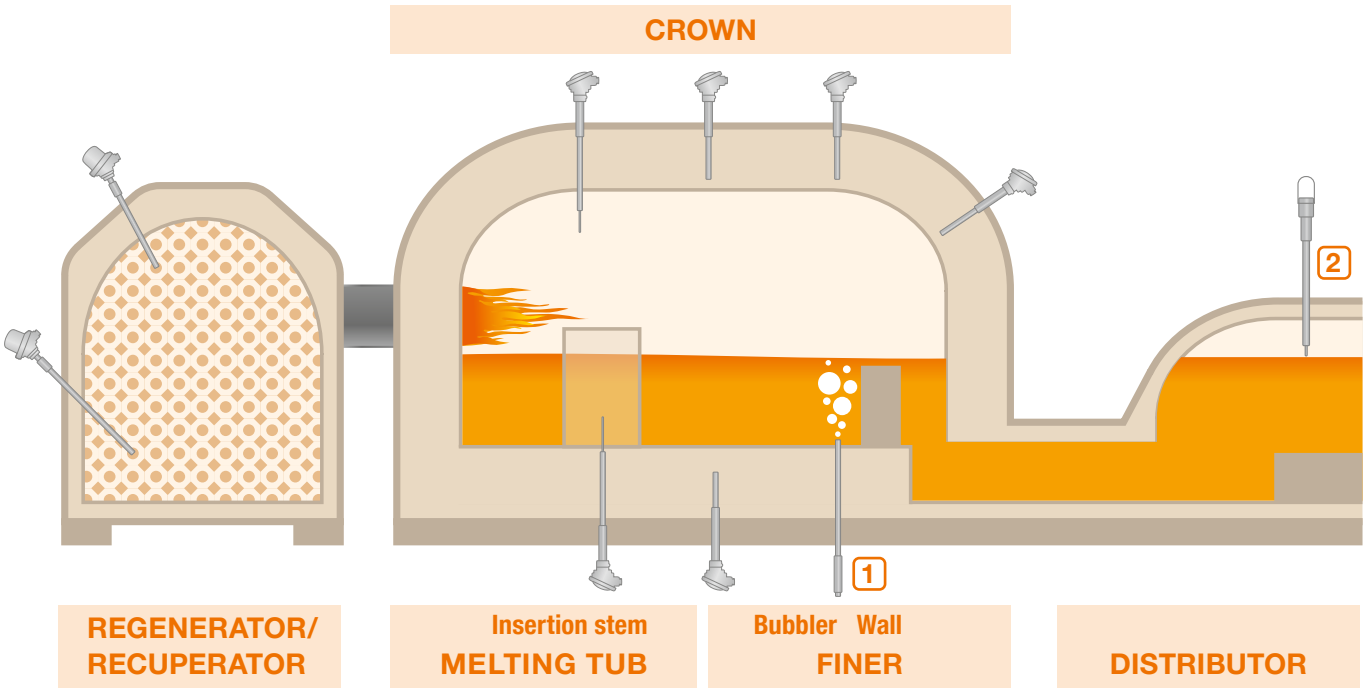
Depending on the type of control, temperature transmitters are often used whose task it is to convert the thermo-voltage signal into a 4 ... 20 mA signal. Temperature transmitters are often required to meet the corresponding safety integrity level (SIL).

Areas of application for GÜNTHER temperature sensors

The end products in the glass industry are diverse – hollow and container glass, flat glass, quartz glass, glass wool and many other product groups require **different types of processing of the raw material.**

GÜNTHER has specialised in developing and manufacturing temperature sensors that are precisely optimised to the conditions and requirements of the respective production lines. The decisive factor here is not only the selection of the right materials for the construction of the protective fittings and the choice of the right thermocouple for the temperature range, but also the planning and realisation of an optimum design for the ambient conditions.

In this way, correct measurement results can be achieved in the long term, and production processes can be reliably controlled.

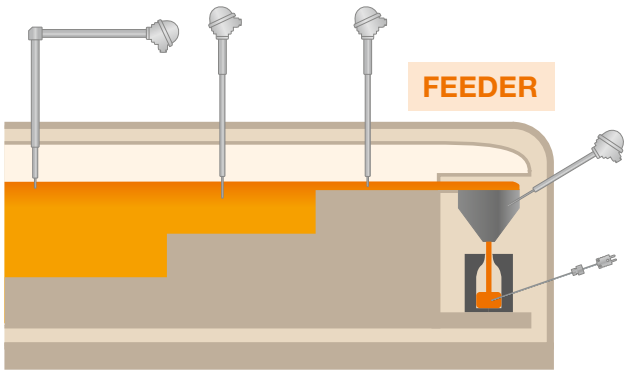


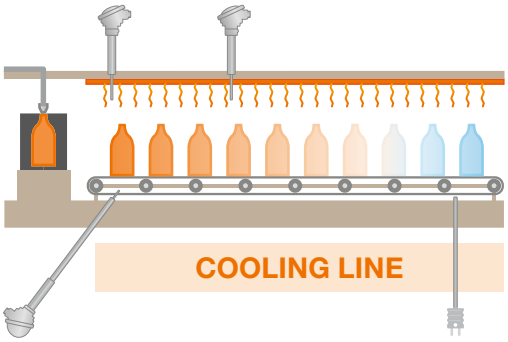
Thermocouples and auxiliary devices in a typical glass manufacturing process can be classified according to their place of use and design.

The basic classification allows a distinction to be made between the following four main groups:

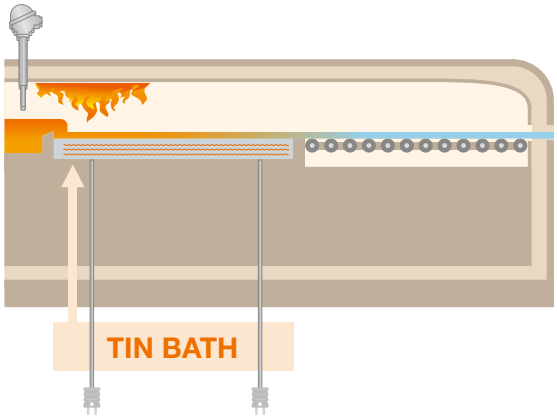
- High temperature thermocouples without direct contact with liquid glass.
- Thermocouples in direct contact with liquid glass, with protective sleeves made of precious metals.
- Auxiliary thermocouples made of base metals, used in processes with a temperature range not exceeding 1100°C.
- Auxiliary equipment such as glass stand probes and bubbler tubes.

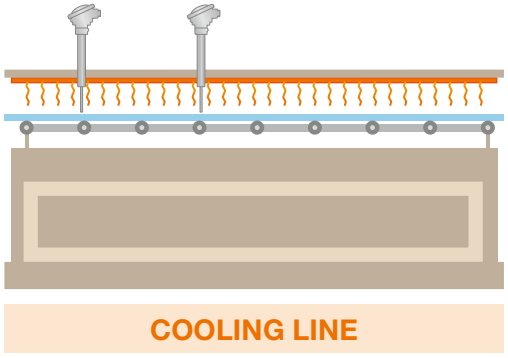
Production of container glass



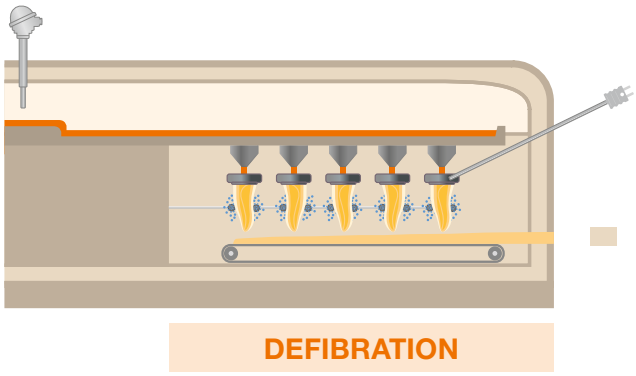


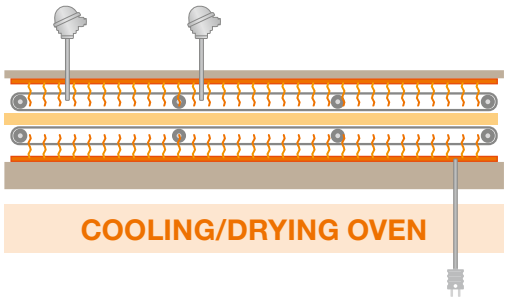
Production of flat glass





Production of glass wool





GÜNTHER GmbH Temperaturmesstechnik
Bauhofstraße 12 · 90571 Schwaig · Germany
Tel. +49 (0)911 / 50 69 95-0 · Fax +49 (0)911 / 50 69 95-55
info@guenther.eu · www.guenther.eu

LANGKAMP Technology B.V.
Molenvliet 22 · 3961 MV Wijk bij Duurstede · Nederland
Tel. +31 (0)343 / 59 54 10
info@ltbv.nl · www.ltbv.nl

GUENTHER Polska Sp. z o.o.
ul. Wrocławska 27C · 55-095 Długołęka · Polska
Tel. +48 (0)71 / 352 70 70 · Fax +48 (0)71 / 352 70 71
biuro@guenther.com.pl · www.guenther.com.pl

S.C. GUENTHER Tehnica Măsurării S.R.L.
Calea Aurel Vlaicu 28-32 · 310159 Arad · Romania
Tel. +40 (0) 257 / 33 90 15 · Fax +40 (0) 257 / 34 88 45
romania@guenther.eu · www.guenther.eu

Head office in Schwaig · Germany