Heraeus

ELECTRO-NITE

Continuous Temperature Measurement Solutions For Foundries

In today's high-performance foundry environments, precision, reliability, and real-time data are critical to ensuring product quality and optimizing operational efficiency. Electro-Nite delivers a comprehensive range of advanced continuous temperature measurement solutions, specifically engineered to address the unique challenges of molten metal processing. Our technologies enable foundries to monitor, control, and enhance their processes with confidence.

Quality and operational benefits through continuous temperature measurement.

The Heraeus Electro-Nite continuous temperature measurement system offers several improvements for casting operation and control:

- **Correct Pouring Temperature:**
  Continuous measurement allows for the correct time to open the ladle to ensure correct pouring temperatures are achieved.

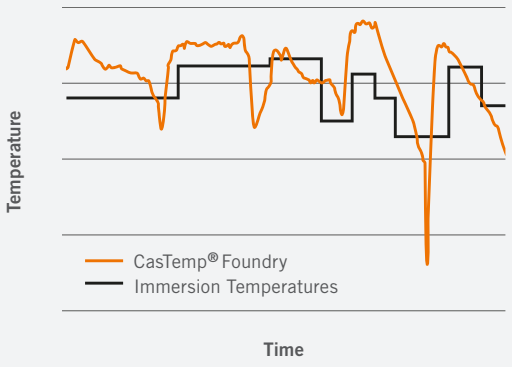
- **Optimize Pouring:**
  Continuous measurement can allow pouring to be finished at the correct time to avoid defects in the cast product by freezing too early.

- **Safety:**
  Operator is not required to take a dip temperature every 10 minutes due to the continuous temperature, meaning a significant drop in the operators exposure to the melt.

- **Traceability:**
  All our systems are traceable using type B Pt30%Rh/Pt6%Rh thermocouple wire, adhering to international standards (IEC584, DIN43710, NBS125, JIS1981, AFNOR, BS4937) based on the IPTS 1968 temperature scale. The wire is selected for an accuracy of +0 to +3°C at the melting point of palladium (1554°C).

Depending on the application, **CasTemp Foundry**, **Contitherm**, and **Contilance** each offer distinct advantages, delivering continuous temperature measurement that supports superior metallurgical control, greater process efficiency, and consistent product quality.

- The **CasTemp** probe is inserted through the sidewall of the ladle, measuring temperature throughout the casting sequence.
- **Contitherm** is a top immersion system designed to continuously monitor molten metal temperature during pouring, enabling real-time process adjustments.
- **Contilance** is a top immersion system engineered for reusability across multiple pours, offering a cost-effective and durable solution for foundry operations.



The graph shows the difference between spot measurements and continuous measurements given by the CasTemp® Foundry sensor.

The CasTemp® Foundry system

The CasTemp® Foundry system is used to safely, reliably, and continuously measure the temperature of liquid metal in the foundry ladle or auto pouring systems. It has been designed to withstand the environment within a foundry and is the global standard for continuously measuring temperature.

The benefits of CasTemp® Foundry are:

- improved safety by removing the possibility of the operator being exposed to liquid metal
- continuous temperature readings throughout
- a fast response because the probe is fully submerged in liquid metal
- reduced temperature-related issues
- avoids contact with slag
- accurate measurements during ladle activity

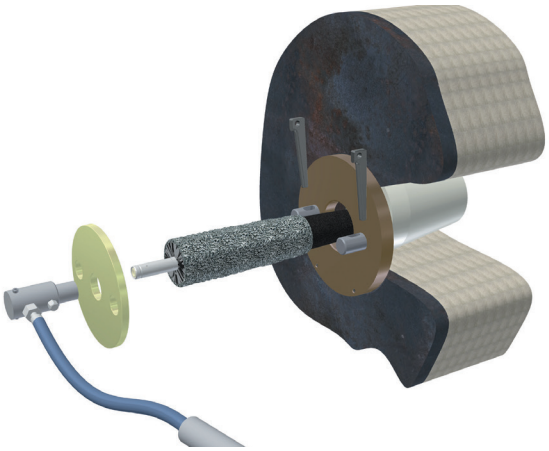
The sensor can be used in most types of ladle. The CasTemp® Foundry system is quick and easy to install.

Preparing the system

The CasTemp Foundry sensor is inserted through the sidewall of the ladle using a system specifically designed mounting system.

Using the CasTemp® Foundry Sensor

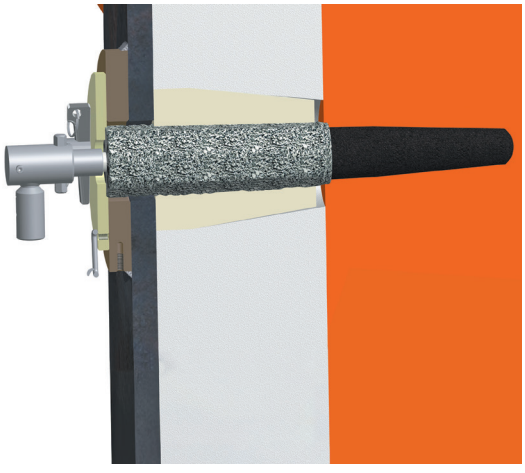
The sensor contains a type-B thermocouple housed in a robust refractory sheath, which can withstand thermal shock and gives a fast temperature response.



Operation of the CasTemp® Foundry sensor

Measuring

CasTemp® Foundry continuously measures the casting temperature throughout a casting.



The CasTemp® Foundry retaining system

The following shows the essential parts of the CasTemp® Foundry measurement system

1 Well block
Securely holds the probe in the lining of the ladle

2 Embedding tool
Correctly lines the well block up in the ladle

3 Mortar
Secures the sensor in the block

4 Continuity checker
For verifying the integrity of the sensor thermocouple at the point of installation

6

FIT AND FORGET

The CasTemp® Foundry system gives an accurate measurement throughout the casting sequence and is positioned close to the liquid iron outlet. It is a ‘fit and forget’ system that does not need any handling.

8

5

7

5 Application system
Locks the ladle equipment in place

6 CasTemp® instrument
Processes and displays the measurements

7 CasTemp® Foundry sensor
Continuous immersion temperature sensor for molten metal

8 QUBE CTW
Battery-powered unit transmits measurement data via high-integrity connection

The CasTemp® instrument is a robust instrument that can be placed close to the measurement point.

The large display makes sure that it can be read at a distance of up to 30 metres (~100 feet). It sends temperature data from the sensor to the control room and has a number of communications options, which are programmable. It eliminates the need for fixed cabling and results in improved safety and reliability and is designed with a simple connection protocol to ensure robust synchronization.

The benefits are:

- the CasTemp Wireless system is simple to install, set up, and operate
- it improves safety: no maintenance on cabling in restricted and dangerous locations
- operational and cost benefits:
  - Easy operator setup
  - No cabling/connectors from the sensor to instrumentation
  - Long-Life battery technology

QUBE CTW

The Qube CasTemp Wireless (CTW) is connected to the sensor and transmits measurement data to the CasTemp Wireless Instrument. QUBE CTW is battery-powered and is identified with a unique serial number, which ensures 1:1 pairing of the CasTemp sensor with the instrument.

When in search mode, the measurement steps are typically:

- Connect the QUBE CTW to the continuous temperature sensor from CasTemp
- Note the unique serial number of the QUBE CTW
- Pair the QUBE CTW to the sensor

Pairing is confirmed both by the instrument display and the QUBE CTW LED sequence. The measurement continues automatically. Resetting or disconnecting the QUBE CTW results in “unpairing”.

The following shows a typical display of temperature measurement date on the CasTemp Wireless instrument:

CasTemp® Wireless instrument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The Contitherm system

Contitherm is immersed from the top and continually measures temperature throughout a casting sequence.

The Contitherm immersion thermocouple system provides continuous and accurate temperature control of liquid metal.

The Contitherm sensor features a robust construction with a platinum-rhodium thermocouple for precise temperature measurement and a graphite-alumina refractory outer sheath for extended protection against liquid metal and slag.

The Contitherm system is complemented by a range of handling devices to hold the Contitherm sensor in various application throughout the foundry process. Signal and extension cables are included to bring the signal to the control room. Instrumentation for signal monitoring with alarms and various outputs are also available. The system is completed with calibration and check devices to enable easy service and maintenance.

Preparing the system

The Contitherm system is suitable for use top mounted applications, like melting and holding furnaces in top mounted applications along with auto pouring line applications.

Contitherm 760 & 1015

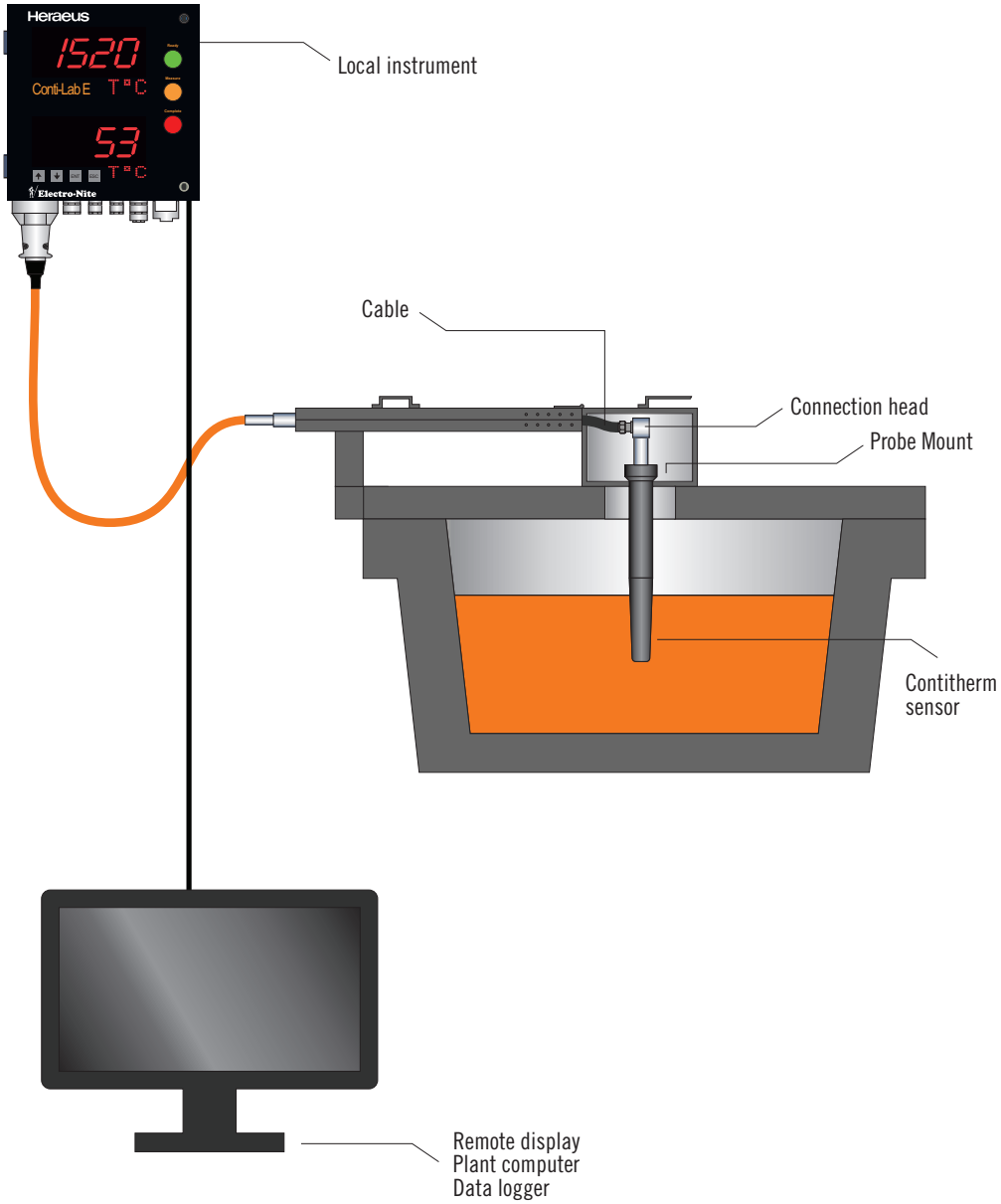
Plant Hardware

Each application is unique, so Contitherm handling hardware is tailored to each plant. Our engineers can advise plant engineers on the best positioning and handling strategies for optimal performance.

Instrumentation

Both systems are compatible with Electro-Nite's proven wireless technology, as featured in the CasTemp Wireless (CTW) QUBE, ensuring reliable, real-time data transmission.

A typical installation of a wired Contitherm system at a casting line



The parts of the system

The following shows the essential parts of the Contitherm wired measurement system.
These can be wireless or wired, below shown is the wired option, above is the wireless option.

1

2

3

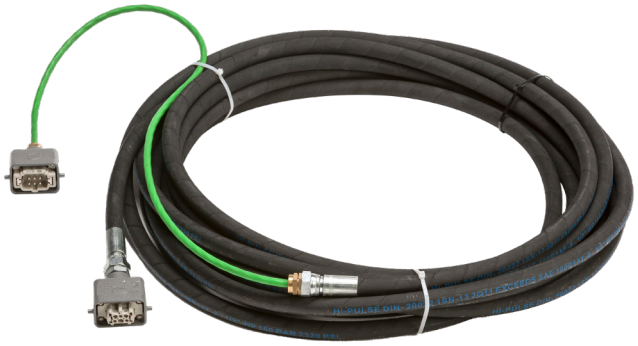
4

1 Conti-Lab E instrument
Processes and displays the measurements

2 Instrument adapter cable
Connects the instrument to the lance

3 Air pressure regulator
Controls the flow of air for cooling

4 15-metre air cooling hose
Connects the air pressure regulator to the lance



5 15-metre signal cable
Connects the instrument adapter cable with the lance

6 Contitherm 760
Measurement sensor

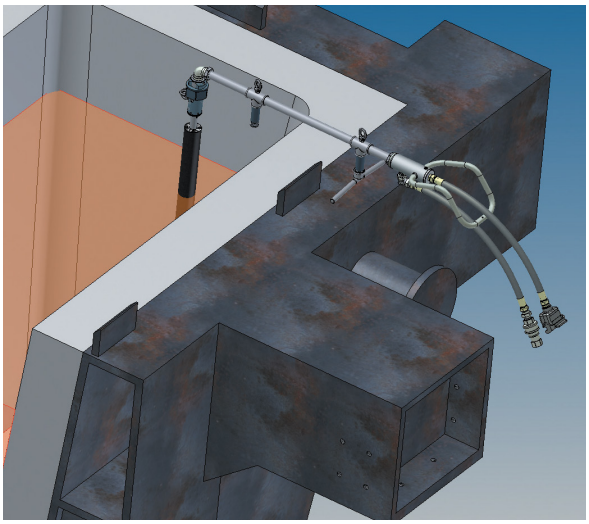
7 Contitherm 1015
Measurement sensor

8 Hot zone Cable
Connects the probe to the instrument

The Contilance system

The Contilance system is optimized for auto pouring lines and holding furnaces.

With this system the sensor is immersed from above the molten metal and is designed to be removed by hand and reused on subsequent casts.



Contilance application

The Contilance system can be easily positioned using a simple bracket, and the sensor can then be immersed into an automatic pouring line. The bracket enables the lance to pivot, allowing the sensor to move with the liquid metal level.

Below is a wireless lance that is air cooled and held above a common autopour application with the assistance of a cradle like holder. The QUBE CTW is attached to the pole connecting the sensor to the system. This assemble is easily moved for routine maintenance in this application.

The benefits of Contilance are:

- improved safety by reducing the operator's exposure to the molten steel
- monitorable continuous temperature measurement
- fast thermal response
- improved output is achieved by optimizing the casting speed
- easily monitored temperature trends for process control are easily monitored
- the system is reusable and is easy to install and set up.

Preparing the system

The Contilance system is quick and easy to install.

The main steps are:

- connecting the air supply to the air-cooled lance
- connecting the lance to the measurement instrument
- connecting the Contilance sensor to the lance

CONTILANCE LANCE

CHOOSING THE RIGHT LANCE BASED ON THE APPLICATION.

Angled Contilance lance:

- is best suited to open, powder-coated applications.

90° Contilance lance:

- is best suited to lid-covered and close proximity applications.

A regular air supply keeps the lance and sensor head cool to ensure:

- accurate temperature measurement
- safe handling
- extended inner cable longevity

Using the system

The Contilance sensor is usually inserted after the molten metal level is established in the application and can be removed either before, during or after all metal has been drained.

The Conti-Lab E is a robust instrument designed to be placed close to the measuring point. This is the wired application instrument for the Electro-Nite continuous temperature system. Its large display ensures readability from a distance of up to 30 meters. It instrument can link to the plant PLC via a number of programmable communication options.

The system is also compatible with Electro-Nite's proven wireless technology, as featured in the CasTemp Wireless (CTW) QUBE, ensuring reliable, real-time data transmission.

Connecting the system

The Contilance system features its own signal and extension cables, which deliver temperature readings to the instrumentation on the shop floor and in the control room. Alarms, various outputs, and calibration and check devices are also available, facilitating easy service and maintenance of the system. These too can be adapted to accommodating the CastTemp Wireless (CTW) QUBE platform.

Angled Contilance lance

90° Contilance lance

The parts of the system

The following shows the essential parts
of the Contilance measurement system.
These can be wireless or wired, an installation specialist
will advise the best recommendation for the application.

1

2

3

4

1 Conti-Lab E instrument
Processes and displays the measurements

2 CasTemp® Wireless instrument

3 Air pressure regulator
Controls the flow of air for cooling

4 15-metre air cooling hose
Connects the air pressure regulator to the lance

5 Contilance lance
Angled and 90° Wired lance assembly

6 Contilance pole
Angled 90° Wireless lance assembly

7 Contilance 900
Measurement sensor

8 Contilance 650
Measurement sensor

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