PhoenixTM

Phoenix Temperature Measurement

Where experience counts!

Temperature Profiling Systems

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Contents

Welcome to PhoenixTM

Your choice for quality, experience, innovation, value for money and service you can trust.

Over the last ten years PhoenixTM has evolved to bring innovation, quality and simplicity to the process of thru-process temperature profiling and surveying. With an experienced team PhoenixTM is proud to serve a growing international customer base with a professional consultative service. Many industry firsts from PhoenixTM are changing the way that customers are working, applying unique solutions to make temperature profiling safer, easier, quicker and more informative. We aim to provide solutions that are fit for purpose, robust, easy to use but also provide value for money.

Whatever your industry or process application, if it involves a critical heating process step, then a PhoenixTM monitoring system is likely to be a valuable process QA tool. Understand what is truly happening in-process with monitoring information, that gives you the control, to maximize the potential of your operation.

With local support we endeavour to ensure that you get the quick efficient support you deserve including full calibration services to ISO17025.

PhoenixTM Innovations

- 20 channel data logger
- TS12 Oil Quench System
- 2-Way RF Telemetry system
- Finishing Thermocouples with economical replacement sensors
- TS08 Contamination Free CAB Brazing barrier system
- Intrinsically Safe Finishing System (ATEX & cMETus)
- Optical Profiling system

...where experience counts!

Serving the industry for over 35 years:

Ian Budden
General Manager
PhoenixTM Ltd

Michael Taake
General Manager
PhoenixTM GmbH

Why temperature profile or survey?

Process Monitoring

Most furnaces have static control thermocouples measuring ambient temperatures, so often several thermocouples are available measuring the temperatures at a single point in a furnace, however, these are remote from the product.

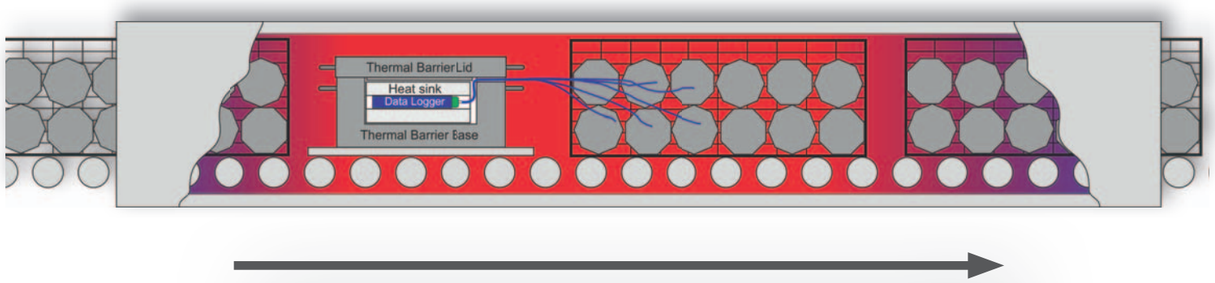
How can you measure the product temperature?

Traditionally product temperatures have been measured by connecting a trailing thermocouple to the product and passing it through the furnace/oven. Trailing thermocouples are expensive and cumbersome to use and process restrictions often preclude their use during normal production conditions, which affects process temperatures and therefore the value of information recorded.
When used, IR sensors also only measure temperatures at fixed points within an oven but more importantly can only measure a product surface temperature so are not able to provide core product temperatures which may be critical to the application.

Temperature Profiling

Get a meaningful temperature profile of your products during the furnace run. A PhoenixTM system runs through the furnace/oven together with your product, measuring the temperature at up to 20 points. Set-up is quick and easy and can be run under normal production conditions minimizing production downtime. The temperature profile graph is unique to the process like a human finger print. The Profile is the thermal DNA which shows you exactly what is happening thermally to the product. Such information enables you to improve quality, reduce energy costs, optimize throughput, minimize maintenance disruption, demonstrate process control and regulatory compliance.

PhoenixTM provide a complete system: a data logger to record temperatures using thermocouples, a thermal barrier to protect the data logger from the heat of the furnace and analysis software to quickly interpret, evaluate and report on your process. The system comes with carry case, user manual and other accessories depending upon on the system configuration.

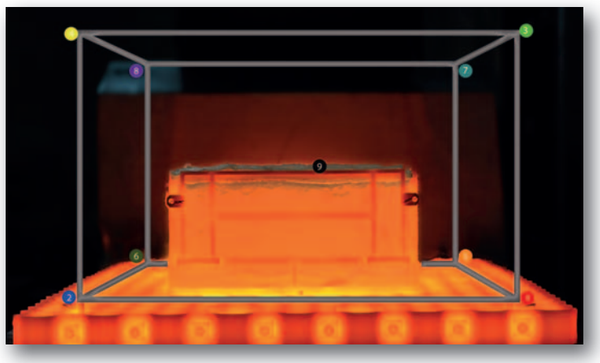


A temperature profile is quick and easy to set up and run. Potential problems can be detected and reports generated to demonstrate process control and compliance.

TUS Systems for AMS2750 + CQI-9

Surveying

Temperature Uniformity Surveys (TUS) are generally carried out to comply with pyrometry standards such as AMS2750 and CQI-9 to ensure that a furnace is performing to a given specification. Using Thermal View Survey software as part of a PhoenixTM system allows a AMS2750, CQI-9 or similar furnace surveys to be carried out quickly under production conditions minimizing production downtime.

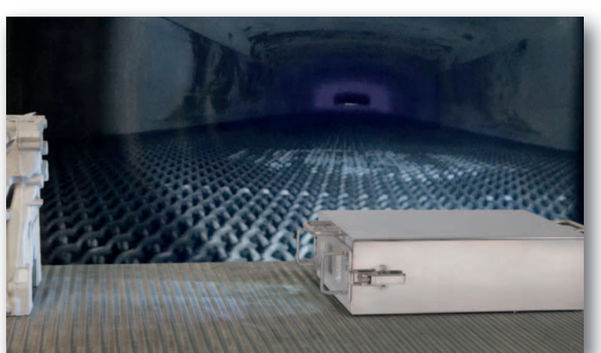


Thermal View Survey Software creates AMS2750 and CQI-9 compliant reports and utilizing our unique 2-way RF telemetry allows control and analysis of the survey in real time.

Optical Profiling

Complementing its existing range of 'Thru-process' temperature profiling systems, PhoenixTM now offer an exciting innovative new "Optic system" for use in continuous ovens and furnaces. The unique system allows process engineers for the first time to view the inner workings of the thermal process under normal production conditions.

Travelling through the continuous oven/furnace, with the products being processed, the Optic system gives a product's eye view of the entire heat treatment journey.



Optical Profiling

PhoenixTM Optic System

...a product's eye view thru your oven or furnace!

What is optical profiling?

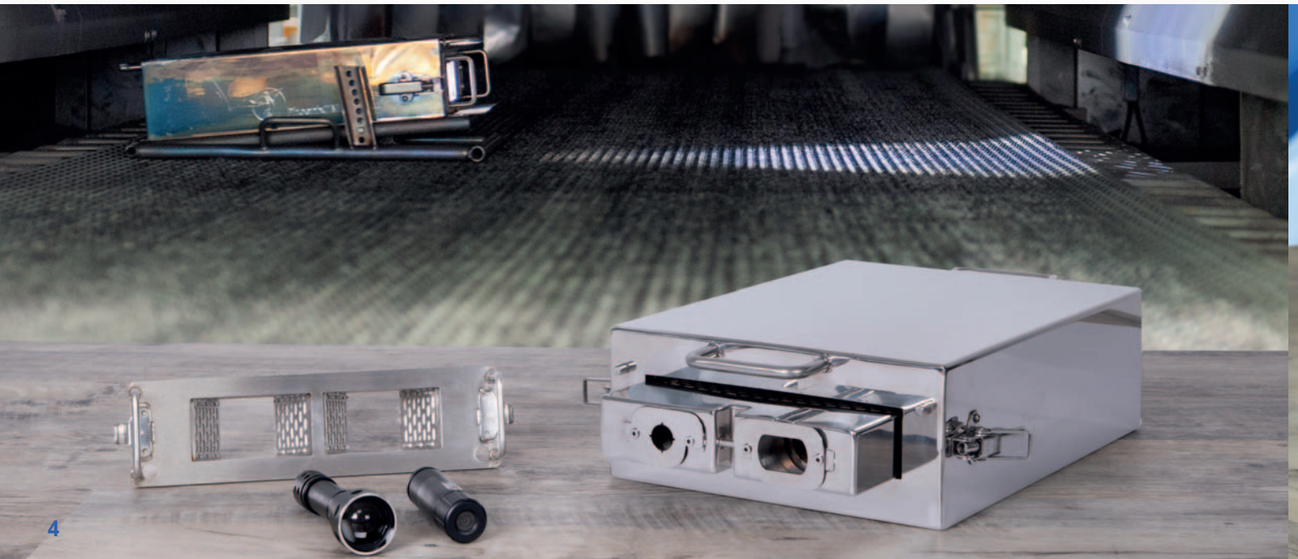
Complementing its existing range of 'Thru-process' temperature profiling systems, PhoenixTM offer an exciting innovative new "Optic system" for use in continuous ovens and furnaces. The unique system allows process engineers for the first time to view the inner workings of the thermal process under normal production conditions. Travelling through the continuous oven/furnace, with the products being processed, the Optic system gives a product's eye view of the entire heat treatment journey.

PhoenixTM can provide a solution:

The innovative unique PhoenixTM Optic system allows optical profiling of continuous thermal processes. With custom designed thermal barrier solutions, the video camera and torch, providing independent illumination can travel safely through the process collecting clear high-resolution video images of the product and interior of the Oven/Furnace. Review of the video record, post run, can highlight problems that may not have been apparent and exactly where they occur in the process.
See exactly what your product sees as it travels through the oven or furnace during normal production conditions.

Find root cause of process problems efficiently!

- Furnace Damage
- Product Transfer Issues
- Condition & Operation of Key Furnace Features
- Schedule furnace clean down



PhoenixTM Optic System

TS64 Thermal Barrier

Specifically designed for finishing applications the TS64 barrier offers easy handling and high performance in a compact design. Ideal for the automotive industry for monitoring painted car bodies travelling though paint cure ovens.
Provides the possibility to perform both simultaneous optical and temperature profiling in a single run.

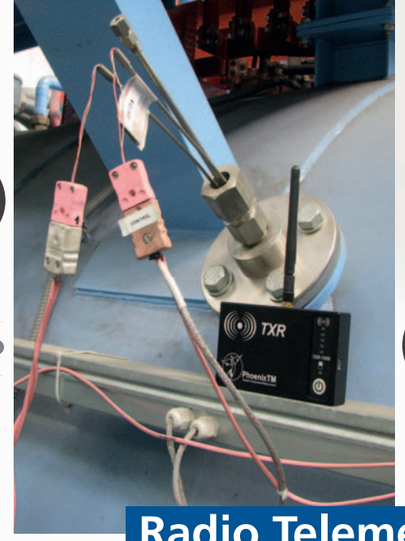
TS68 Thermal Barrier

Specifically designed for high temperature applications either Atmosphere or Vacuum the TS68 barrier offers a robust design providing protection up to 600 °C. With a low height the thermal barrier will fit through conveyorized furnaces with limited clearance with ease. The front face plate design allows easy access to both camera and torch.

Adjustable Stand / Mounting Bracket

Supplied with an optional mounting bracket allowing tilt and rotational adjustment of the barrier and accurate focusing of the camera on the areas of interest.

Data Logger



Radio Telemetry

PTM1200 Data Logger

All PhoenixTM data loggers are designed for use in harsh industrial environments. The electronics are protected by a robust, water resistant, aluminum case. The data logger design incorporates signal noise reduction and cold junction compensation to guarantee accurate and reliable data.
All loggers are shipped with a factory calibration certificate traceable to national standards. Optional certification at an ISO17025 certified laboratory (UKAS for the UK or DKD for Germany) can be supplied if required. A copy of the original, hand signed, calibration certificate and the calibration data is stored within the data logger and can be accessed via Thermal View software if required.

The range of data loggers available allows PhoenixTM to configure temperature profiling and surveying systems to suit indiviual process requirements.

Epsilon-x Data Logger

The robust intrinsically safe 10 or 20 channel data logger has been designed as an option specifically to temperature profile paint processes to optimise the operaton of the process, identify process issues and verify the cure quality. Cold junction compensation with feed back error detection and noise reduction ensures accurate and reliable data. Optional two way RF telemetry is available, allowing real time data analysis and for the data logger to be reset and downloaded remotely. The data logger is supplied with a factory calibration certificate traceable to national standard. Optional certification to UKAS(UK) or DKD(Germany) can be supplied if required.

ATEX (ATmosphere EXplosive)

The logger is certified as Group II Category 3G & 3D for intrinsically safe operation in gaseous environments defined as Zone 2 and dust environments defined as Zone 22 respectively in ATEX 99/92/EC. Classification of equipment use in hazardous zones and identification of Zone classification (at varying solvent concentrations) in the paint application complies with European standards;

EN 16985:2018
"Spray Booths for organic coating material
– Safety requirements"

EN 1539:2015
"Dryers and ovens in which flammable substances are released – Safety requirements"

PhoenixTM data loggers are available in 6, 10 and 20 channel versions in types K, N, R, S, T, J and B with mixed thermocouple combinations available.
Optional configuration are available to support two inputs of 4-20mA or 0-10 volts from alternative sensor types.

Two way Radio Telemetry

The PhoenixTM PTM1200 and PTM1500 data loggers can be offered with an RF Telemetry option to transmit temperature data via an RF signal from within the furnace. Live interrogation and analysis of this data using PhoenixTM Thermal View software allows processing decisions to be made instantaneously saving time, energy and possibly reducing rejects.

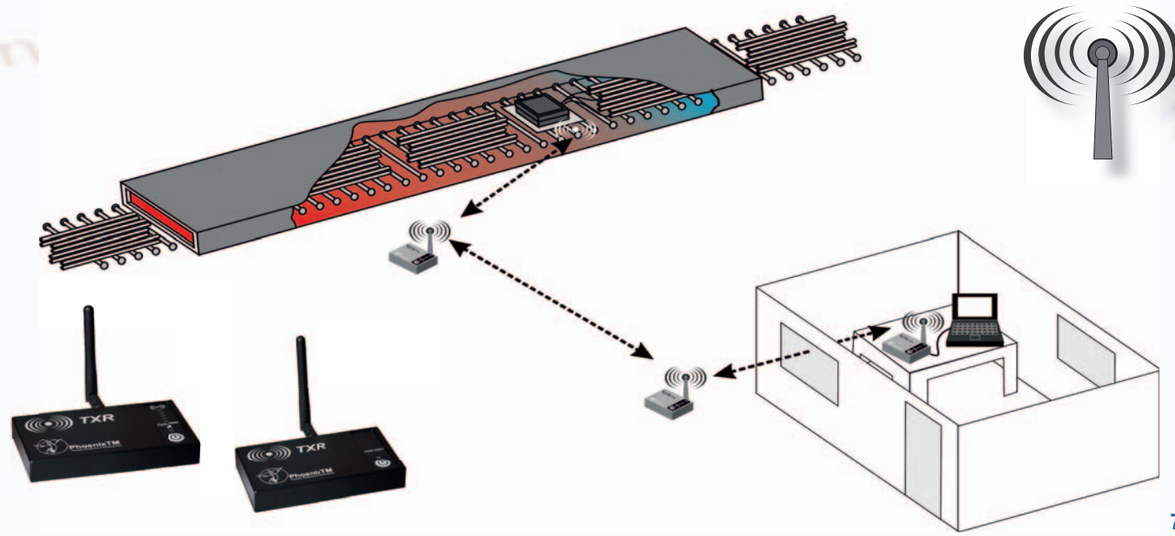
The 'thru-process' system RF Telemetry concept overcomes the technical challenges of monitoring in real time with trailing thermocouples.

Processes where RF Telemetry is the only option

- Furnaces fitted with atmosphere locks
- Vacuum furnaces where product transferred from chamber to chamber
- Furnaces with front and rear doors that automatically open and close
- Processes with integrated quench (Water, Oil, Salt) which cannot be bypassed
- Furnaces requiring automatic loading/retrieval of the product by robots
- Processes in which product transfer involves rotating the product (tubes/logs)

Optimisation of the range via a modular Telemetry System

RF routers are not hard wired and do not need external power so can be located exactly where needed, moved as needs change and transported within or from plant to plant with ease. Data transfer along a router chain allows data to be transmitted over long distances direct from furnace to a remote office where monitoring can be performed efficiently and in comfort. The PhoenixTM RF Telemetry system can be applied to either continuous or batch heat treat processes as shown in the schematic below. A repeater network can be configured to either allow monitoring of a long continuous furnaces, where repeaters are positioned at different zones, alternatively for TUS operations at different isolated independent batch furnaces. Even in situations where RF signal is lost briefly the clever catch up feature means, no process gaps, as data is retransmitted once reception is re-established.



General Heat Treatment

...where experience counts!

Thermal Barrier

PhoenixTM develops thermal barriers to suit specific applications, for example coating processes require thermal barriers to be free of all traces of silicone, whereas in the heat treatment industry, where thermal barriers are subject to high rates of heating and cooling, minimizing thermal barrier distortion is the main consideration. In other processes such as heat treating aluminium wheels, thermal barriers need to withstand full immersion in water from a high temperature. In applications such as sealed gas carburising, PhoenixTM has developed a unique thermal barrier, which permits the system design to safely pass not only through the furnace but also the integrated oil quench allowing monitoring of the entire heat treat process.
The many years experience of senior PhoenixTM personnel working within these industries is translated into the superior design of their Thermal Barriers for all heat treatment and finishing applications.

For general heat treatment processes PhoenixTM offer a range of thermal barrier solutions of different thermal performances but also different constructions to suit different application demands and space limitations. The thermal barriers are designed to keep the PTM1200 data logger at a safe operating temperature using a combination of microporous insulation and heat sink phase change technology. The systems are complemented by the Thermal View Software packages for full review, analysis and reporting of profile data and TUS work. Thermocouple options can be selected from our comprehensive range to meet all application challenges or specification requirements.
In addition to the extensive range of standard thermal barriers offered by PhoenixTM, we also offer a design service allowing unique specification, design and manufacture of bespoke customized barrier solutions.

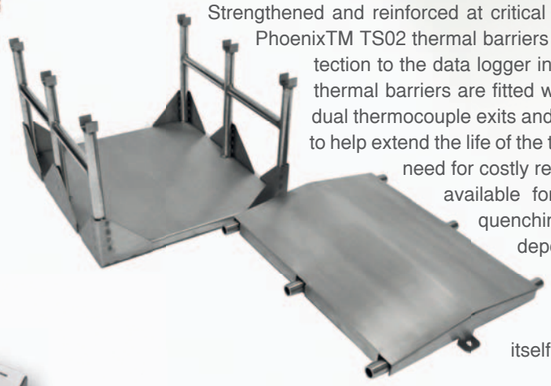
TS01 (up to 800°C)
(General Heat Treatment)

Developed for processes up to **800°C** the PhoenixTM TS01 thermal barrier range is perfect for applications in the aluminum, glass and steel industries. Microporous insulation and a heat sink provide protection against the temperatures inside the furnace.
Made from high grade stainless steel, with an easy to replace thermocouple wear strip, the TS01 thermal barrier range is robust and durable.

Thermal Barriers

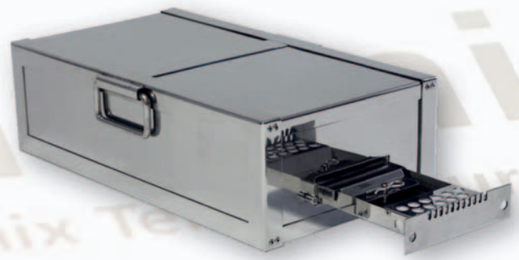
TS02 (up to 1000°C)
(Steel Gas Carburizing)

Processes such as carburizing at temperatures up to **1000°C,** require a thermal barrier which can withstand several changes in temperature, pressure, and aggressive atmospheres.
Strengthened and reinforced at critical points to minimize distortion, PhoenixTM TS02 thermal barriers are designed to offer full protection to the data logger in demanding conditions. TS02 thermal barriers are fitted with extra heavy duty catches, dual thermocouple exits and user replaceable wear strips to help extend the life of the thermal barrier and reduce the need for costly repairs. Additional protection is available for use in high pressure gas quenching with the use of a unique independent quench deflector. High pressure is diverted away from the barrier with no force being applied to the barrier itself.



TS03 (up to 1200°C)
(High Temp Vacuum Heat Treatment)

For processes up to **1200°C** PhoenixTM TS03 thermal barriers are manufactured from high temperature heat resisting alloy, ultra high temperature insulation , strengthened and reinforced at critical points to minimize distortion and fitted with custom heavy duty catches, dual thermocouple exits and user replaceable thermocouple wear strips to help extend the life of the thermal barrier. Unique barrier shapes are offered to allow fitting of barrier into space limited TUS Frames or product baskets.



TS27 (up to 1000°C)
(Space Limited Long Duration Heat Treat)

For processes without a controlled atmosphere a TS27 thermal barrier can provide protection for the data logger in temperatures up to **1200°C** for extended periods. By using evaporative water technology combined with high temperature alloys and microporous insulation the TS27 thermal barrier provides compact design with optimized performance.

TS51 / TS57 (up to 1000°C)
(Steel Tube & Aluminium Log Heat Treat)

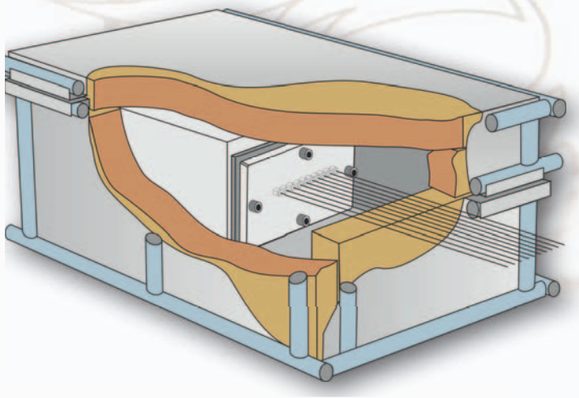
The TS57 thermal barrier range has been designed specifically for heat treat applications where the process requires the thermal barrier to be cylindrical in form to match the product being monitored. The cylindrical shape is essential to either fit inside a tube or allow free rotation of the barrier fitted to the product as it is moved through a walking beam furnace.
TS51 barriers are developed to use heat sink technology to be used also in vacuum and controled furnace atmospheres. TS57 barriers employ an evaporative water technology, the high temperature data logger is kept at a safe 100 °C through the process and a unique design prevents loss of water even in the event of barrier rotation.

Heat Treatment with Oil Quenching

Oil Quenching

TS12 (Sealed Oil Quench Gas Carburizing)

Carburizing in an integrated quench (IQ) furnace is a common heat treatment process for the manufacture of gears, etc. and oil is the most commonly used quench medium. During the oil quench, products within the batch can sometimes experience distortion problems, if the quench is not performing correctly due to wrong composition, contamination, oil decomposition or poor agitation. Monitoring the temperature at various depths within the product and locations around the batch, can provide valuable data on the temperature profile of the part throughout the complete heating and cooling cycle.

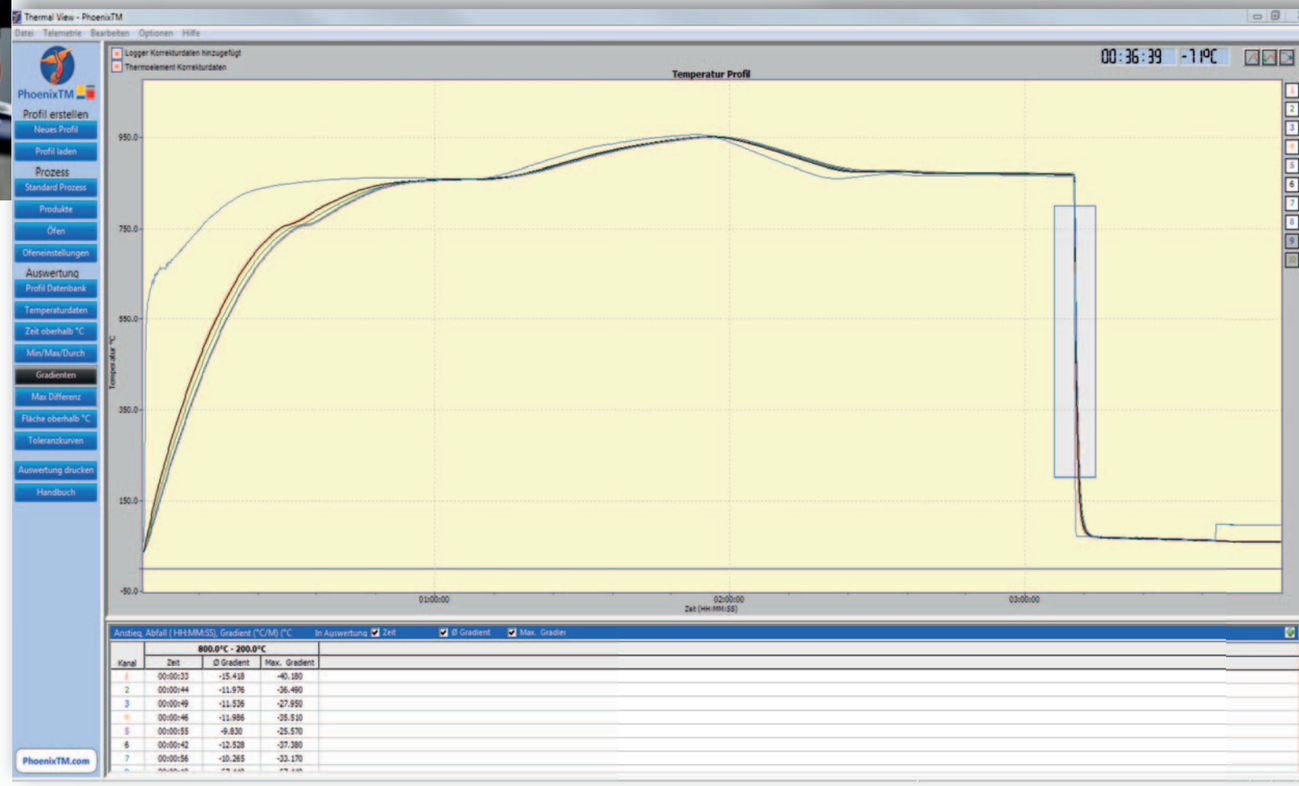


To address the process challenges the unique TS12 thermal barrier design has been developed that both protects the data logger in the furnace (typically 3 hours @ 925 °C) but also protects during transfer through the oil quench (typically 15 mins) and final wash station. The key to the barrier design is the encasement of a sealed inner barrier with its own thermal protection with blocks of high-grade sacrificial insulation contained in a robust outer structural frame.

Systems for Specific Application

Optimisation of the quench behaviour

The possibility of monitoring through the complete process with up to 20 measuring points offers the advantage of measuring the quench behaviour with different loads for process optimisation.



Individual systems for every Furnace

In general, the HTS12 system and all other PhoenixTM systems are developed for the specific customer requirements of the processes and furnaces. Up to 20 thermocouples can be used. The size, shape and heat resistance of the thermal barrier are customised for each application. This means that PhoenixTM systems can also be used in difficult furnace conditions.

Slab and Billet Reheating

...when it really gets hot!

Systems for very high temperatures

TS07 (up to 1300°C)

TS07 thermal barriers are specifically developed for reheat processes in the steel industry where temperature data from deep inside the slab or billet is required. Manufactured using graded insulation layers and an evaporative inner barrier, the TS07 range accepts 10 and 20 channel data loggers and is designed for repeated use at temperatures up to 1350°C.

Developed from many years of experience the TS07 has many features specifically for this harsh environment. The data logger fits into an inner tray providing extra protection for the connections whilst clamping thermocouples to ease handling.

The TS07-100 thermal barrier System is specifically designed for Mini-Mill (CSP) applications. It provides thermal protection for the data logger combined with a support arm for the thermocouples measuring both surface and atmosphere temperature. After preparation the system is lowered onto the moving slab using the foldable suspension arms by an overhead crane. When positioned on the slab the arms are lowered to ensure the low height profile of the system is maintained.

Systems for Specific processes

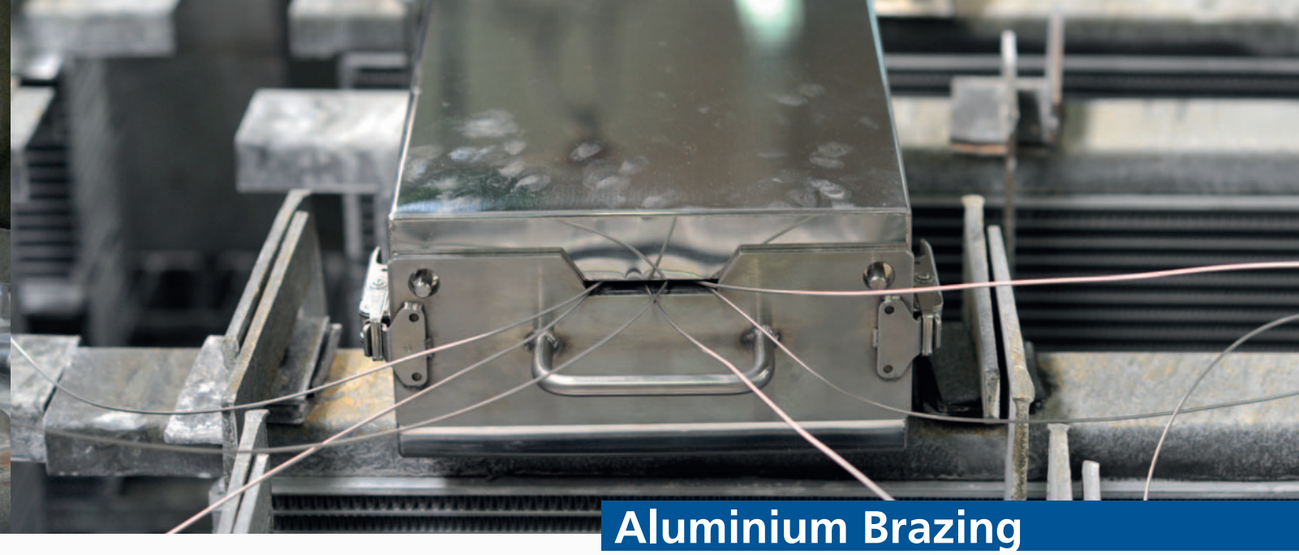
Valuable Information

With the temperature measurement during the process you receive valuable information about the uniformity of the heating. Depending on the positioning of the thermocouples, you can monitor temperature through a cross section in the slab or billet (as in the picture below) or over the length. Applying accurate profile data to mathematical models targeted roughing mill exit temperatures can be set to obtain a desired furnace drop out temperature throughout the product thickness.

Training and Commissioning

Especially with systems for high-temperature applications, the project does not end for us with the delivery of the system.
After the software training and a general introduction to the system, we carry out the first measurement together with you. We place a lot of emphasis on practical topics such as sensor arrangement and protection, additional insulation and carrying out the measurement.

Heat Treatment of Aluminium



Aluminium Brazing

Aluminium Solution Reheat

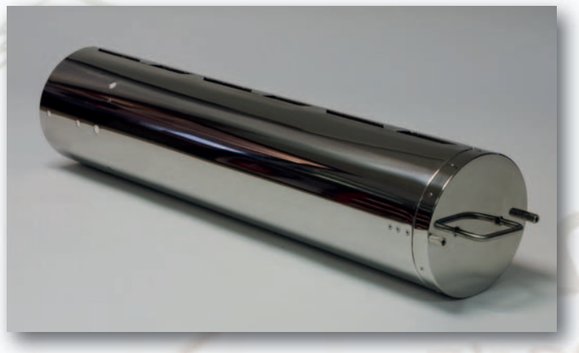
TS06 (up to 1100°C)

Built for solution treatment and age hardening where high temperatures and water quenching are part of the process. These thermal barriers use the principle of evaporating water to keep the data logger cool in the furnace, and can re-fill in the quench to allow it to undergo a further heating period as is normal in these processes. During the quench a water tightseal is maintained by using heavy duty gaskets and stainless steel compression glands around the thermocouples, this affords maximum protection to the data logger.

Steel Tube & Aluminium Log Heat Treat

TS57 (up to 1000°C)

The TS57 thermal barrier range has been designed specifically for heat treat applications where the process requires the thermal barrier to be cylindrical in form to match the product being monitored. The cylindrical shape is essential to either fit inside a tube or allow free rotation of the barrier fitted to the product as it is moved through a walking beam furnace. Employing an evaporative water technology, the high temperature data logger is kept at a safe 100 °C through the process and a unique design prevents loss of water even in the event of barrier rotation.



Aluminium Brazing (CAB & Vacuum)

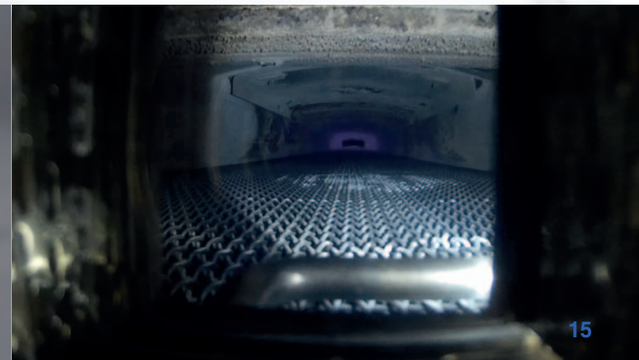
TS08 (up to 700°C)

Built specifically for aluminum brazing applications the TS08 thermal barriers are designed to eliminate exposed insulation, protecting against acid attack and extending the life of the thermal barrier. Oxygen presence within the thermal barrier is reduced by maximizing the amount of nitrogen in the insulation material during manufacture which minimizes possible oxygen contamination, in the furnace. For processes sensitive to oxygen contamination the TS08 can be fitted with an optional facility to allow a nitrogen purge of the thermal barrier prior to each run, significantly reducing oxygen contamination.

Optical Profiling of Aluminium Brazing

TS68 (up to 600°C)

The innovative TS68 thermal barrier has been designed specifically to allow optical profiling of aluminium brazing applications (CAB & Vacuum). The thermal barrier provides thermal protection to both video camera and torch allowing a video to be taken through the furnace under normal production conditions. Ideal for detecting either furnace damage, flux build up or product transfer issues. Without lengthy furnace downtimes problems can be detected as part of normal production, allowing quick corrective action (furnace clean down / repair) preventing product quality issues or line stoppages.



Brick and Ceramic Firing

Ceramics

TS05

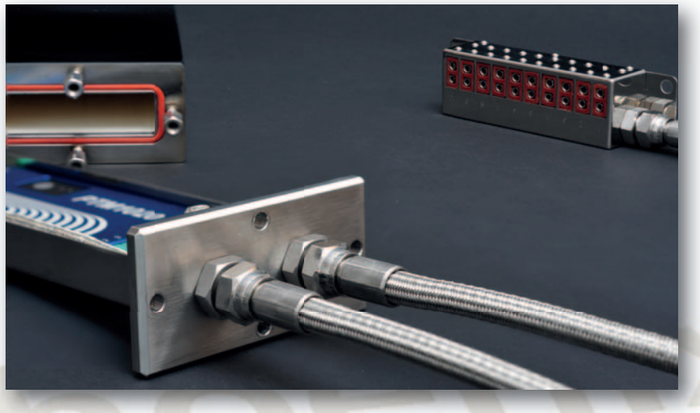
Developed for the ceramic industry, the PhoenixTM TS05 series thermal barriers travel beneath the kiln car for a sustained period at moderate to high under car temperatures. Built from high grade stainless steel these thermal barriers use evaporative water technology to keep the data logger cool and protect against mechanical damage and the dusty environment of a ceramic kiln. These thermal barriers have detachable thermocouple sockets which can be mounted remotely from the thermal barrier for easy thermocouple fitting.
Depending upon the process, thermocouple types K, N, R, S or B are available.

PhoenixTM systems are also available for roller hearth kilns. The system runs through the firing zone with the product and can measure both product and air temperatures.

Systems for Specific processes

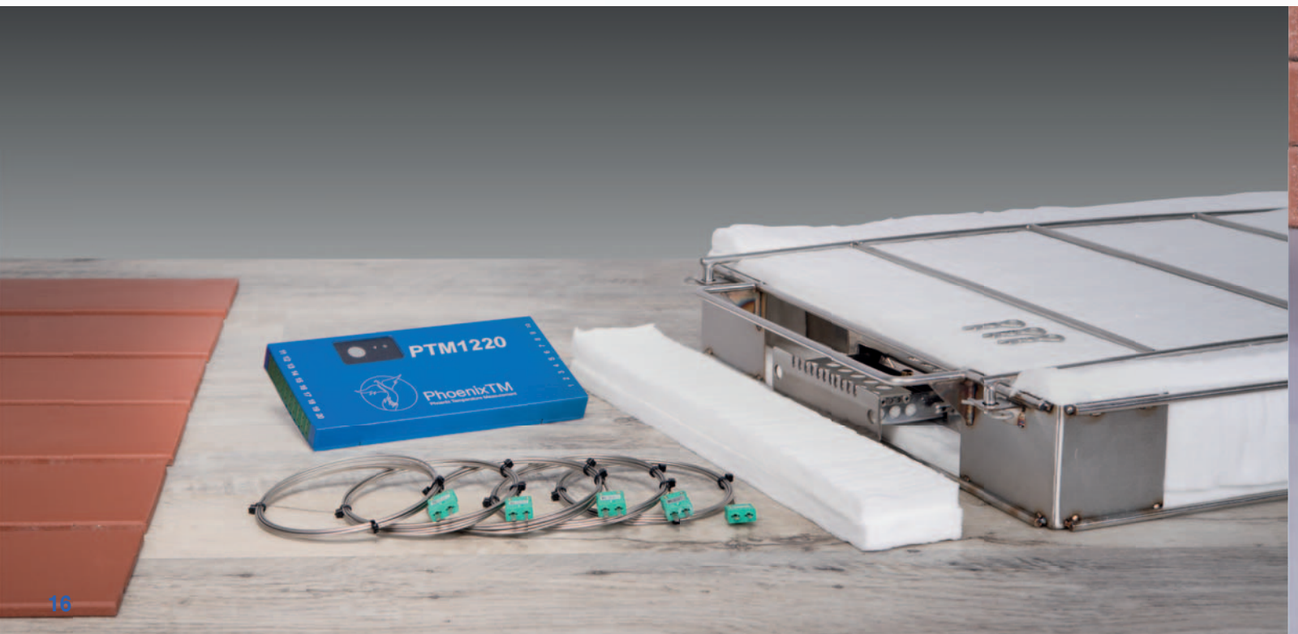
Process temperature up to 500°C

Built from high grade stainless steel these thermal barriers use evaporative water technology to keep the data logger cool and protect against mechanical damage and the dusty environment of a ceramic kiln.
TS05 thermal barriers have detachable thermocouple sockets which can be mounted remotely from the thermal barrier so that thermocouples can be fitted easily and the length of the thermocouples can be reduced.



The optional telemetry sends the temperature data in real time to your PC. Even with very long ovens, radio transmission can be guaranteed by using several repeaters. If, despite this, an interruption in transmission should occur, the data not received is automatically sent again. The evaluation software allows not only the graphical analysis of the firing curve, but also further evaluations such as the time above a certain temperature, average or peak gradients.

The water-cooled thermal barrier has very compact dimensions with a very high heat protection performance. The remotely mountable connection boxes additionally facilitate the handling of system and sensors.



Paint and Powder Coating

Intrinsically Safe System - ATEX

Coating Applications

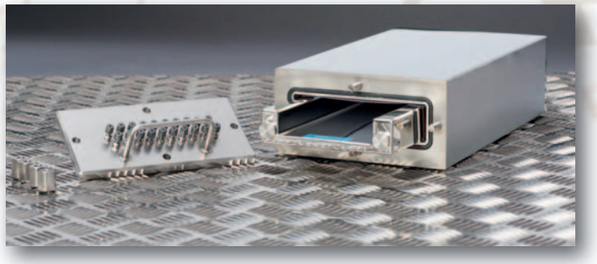
TS04 (-150°C to 300°C)

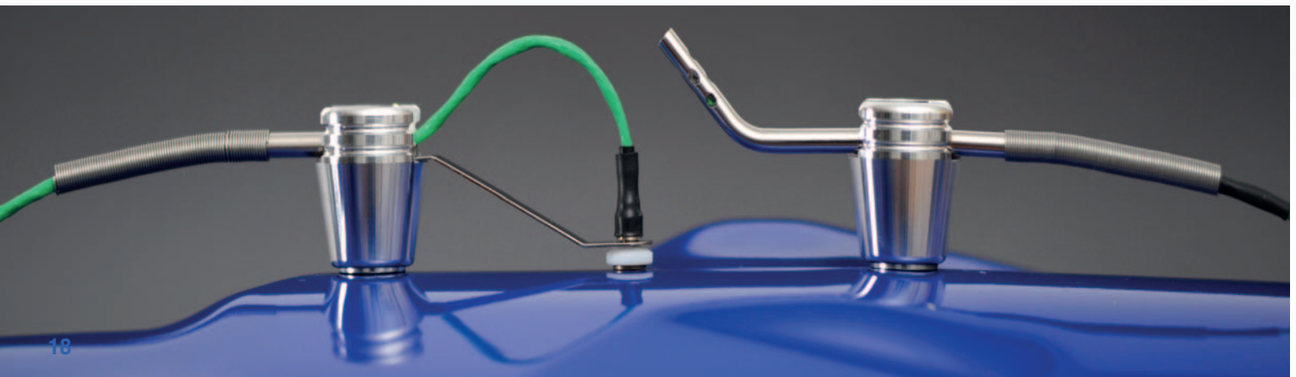
TS04 thermal barriers are designed specifically to meet the demands of the paint and powder coating industry.
Whilst providing a high level of thermal protection the aluminium case and silicone free constuction is both light and easy to use. Several sizes are available to suit 6, 10 or 20 channel data loggers and for longer processes include a heat sink to extend the thermal duration.

The barriers for curing applications are manufactured from aluminum to reduce weight and aid ease of use. An exact calculation of the insulation / heat sink ratio provides a maximum thermal performance as well as a minimizing the size of the thermal barrier.

TS14 (-40°C to 250°C)

In addition to barriers for large wet paint or powder dryers, heat protection thermal barriers are also available for applications with special requirements. E.g. waterproof systems (TS14),
particularly small systems or barriers with individual mounting options.



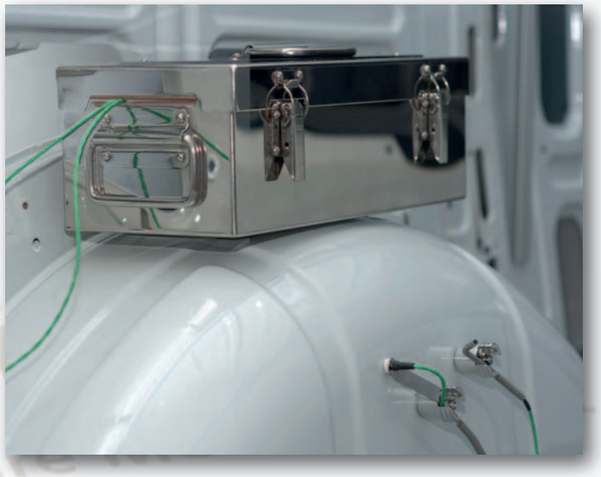


Painting Applications in areas classified with explosive risk

FIS04 Epsilon-x

PhoenixTM has developed a unique ATEX certified, intrinsically safe multi-channel profiling system. It is specifically designed for use in paint and powder coating lines that have been classified as having an explosive risk (Zone 2 Gas and Zone 22 Dust).

These data loggers are available in 10 or 20 channel versions and can be combined with all thermal barriers from the TS04 series.



ATEX (ATmosphere EXplosive)

To perform a temperature profile on a solvent , water-based or powder coating line requires that the profiling system be passed through zones / areas that are classified as potentially hazardous. These areas may include the spray booth, flash off zone and even the curing oven itself. In such areas potentially explosive gases / volatile organic compounds (VOC) may be present from solvents such as Acetone, Toluene and Xylene, used in and released from the coatings or as cleaning agents. When powder coating fine particles can form potentially explosive dust clouds.

PhoenixTM can provide a solution:

The logger is certified as Group II Category 3G & 3D for intrinsically safe operation in gaseous environments defined as Zone 2 and dust environments defined as Zone 22 respectively in ATEX 99/92/EC. Classification of equipment use in hazardous zones and identification of Zone classification (at varying solvent concentrations) in the paint application complies with European standards;

- EN 16985:2018 “Spray Booths for organic coating material – Safety requirements”
- EN 1539:2015 “Dryers and ovens in which flammable substances are released – Safety requirements”

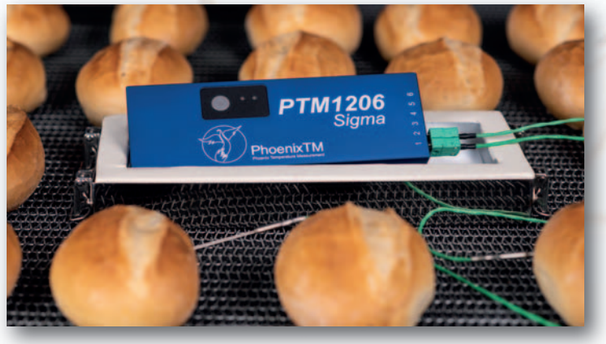
Food Processing

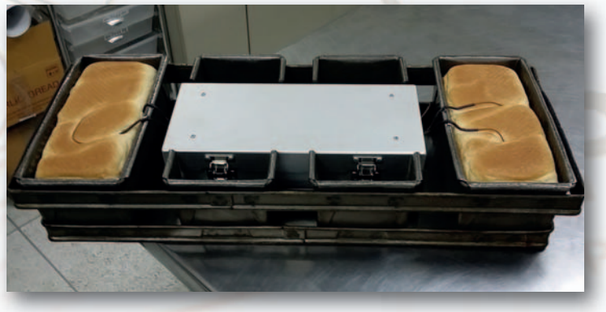
Systems for Food Processes

...traceability according to HACCP!

In the food processing industry food safety is paramount. Companies need to follow strict processing and reporting requirements as defined by the HACCP (Hazard Analysis Critical Control Point) protocol. For Cook / Chill processing as part of the HACCP the key requirement (CCP – Critical Control Point) is proving that the food product has safely achieved a core temperature or time at temperature necessary to destroy any pathogens that could be a food poisoning risk to consumers. As part of this requirement all processes (ovens and product ranges) need to be validated on a regular basis to prove that the cook program and equipment is achieving the required CCP limits.

The PhoenixTM thru-process food temperature profiling system has been designed specifically for HACCP cook validation. The ten-channel data logger is ideal for performing oven temperature uniformity surveys (TUS) to map the cooker and identify oven cold spots. The same system is also capable of providing comprehensive HACCP validation reports showing that in a specific process under production conditions the product achieved the minimum cook to ensure food safety.





PTM1200-NT Data Logger

Systems for the food industry are supplied with PTM1200NT data loggers, with an operating range of -40°C to +80°C. Available with Type T or Type K thermcouples offering a measurement range from -190°C - +400°C.

Typical food cook processes monitored by the PhoenixTM Food System:

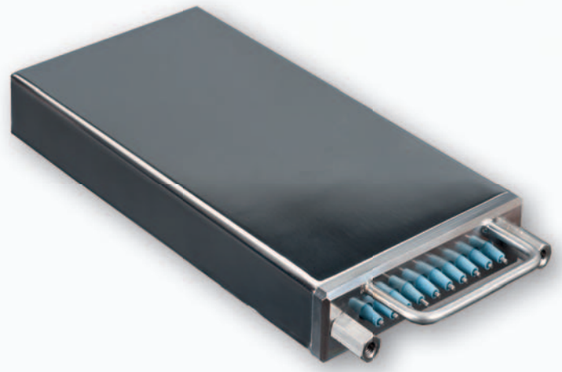
- Batch and Continuous Baking Ovens – Breads, Cakes, Pies, Pizza and Confectionary etc
- Batch Static and Rotating Ovens (Steaming / Roasting) - Poultry, Meat, Vegetables etc
- Continuous linear or Spiral Cookers and Chillers / Freezers – Poultry, Meat, Fish, etc
- Continuous Deep Fat Fryers – Breaded products, sausages, scotch eggs etc

Benefits of food cook thru-process temperature monitoring

- Quick efficient HACCP Validation of Cook Programs (New products and annual certification)
- Process optimization to improve throughput and reduce energy usage
- Process optimization to maximize yield (eliminate wasted over cook) and improve product quality (colour, texture, appearance)
- Rapid fault finding to identify root cause of process issues such as failed manual product temperature checks

Thermal Barriers

Process temperature up to 400°C



TS14 (-40°C to 250°C) (Typical Application: Cook/ Chill/ Fry)

The TS14 system has been specifically designed for the food industry and provides enhanced levels of thermal and mechanical protection for the data logger inside the process. It is waterproof and suitable for use in frying, steam cooking, chillers and blast freezers. The housing is made of a food contact approved stainless steel so that it can travel safely through the process during normal production. The low height submersible design combines high thermal performance with ease of use in challenging food processing environments.

TS04 (Ambient to 250°C) (Typical Application: Dry Bake/ Roast)

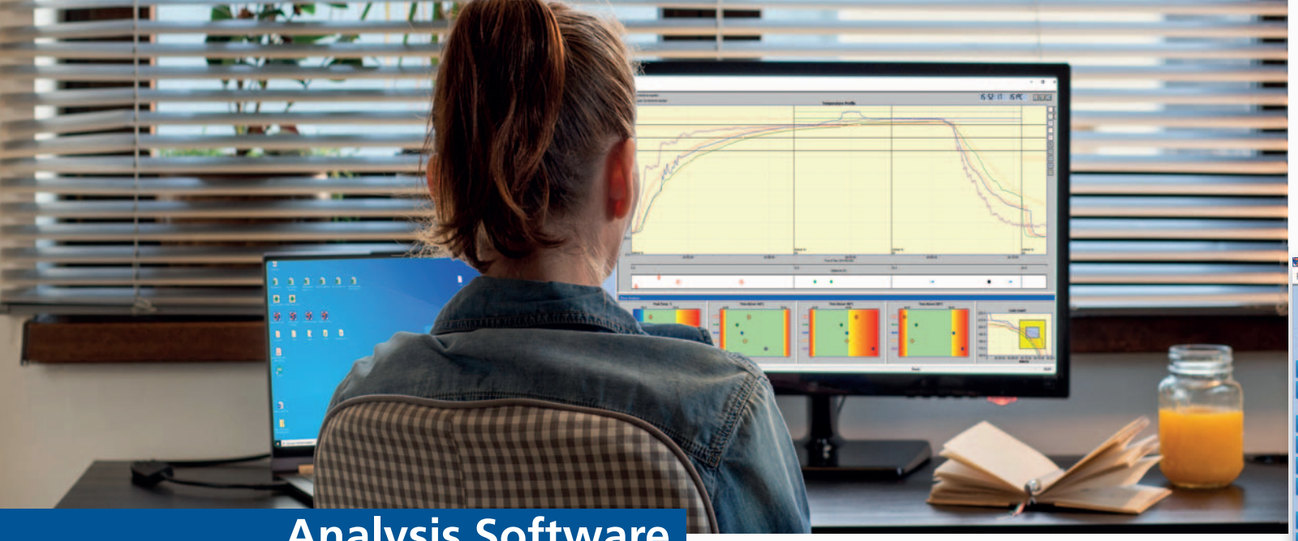
In processes with higher temperatures, such as baking processes, TS04 thermal barrier (in a stainless steel version for easy cleaning) can also be used. These systems are available in a variety of standard versions or with customised dimensions to create the ideal system for your process.

TS24 (-40°C to 250°C) (Typical Application: Cook Chill)

The TS24 thermal barrier has been designed specifically for food processing applications where submersion is not required. Ideal for frequent bake, roast or steam cook monitoring either in batch, rotary or conveyorized cookers. The barrier design provides an IP65 protection with removable lid allowing easy access to the data logger and quick change of thermocouples.

TS44 (-40°C to 250°C) (Typical Application: Long Low Temp Chill)

The TS44 thermal barrier has been designed specifically for food processing applications where typically the product is large (Ham, Meat Joint) requiring a low temperature (<100 °C) long duration cook. The barrier design provides an IP67 protection ideal for protecting in steam/raining water cookers and water/brine chillers.



Analysis Software

The easy way to get a perfect result!

Thermal View Software

PhoenixTM Thermal View is a powerful software package allowing you to quickly and easily analyse data from your process. Screen layout is clear and using the enhanced control bar makes this a very easy package to operate, with all the analysis functions you will need.

Clarity:

Screen layout is clear, concise, and intuitive, making the software user friendly, uncluttered and easy to use without compromise to the analysis detail available.
The software screen has been laid out so users can see what is really important to them – the profile of their oven, furnace, or kiln.

Simplicity:

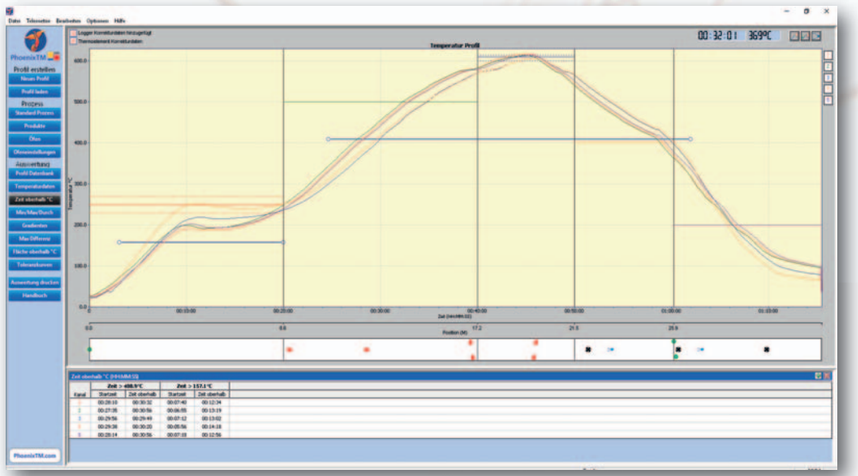
Too many software packages have functions built in that benefit only a few users and complicate the package for the majority. We have avoided this without compromising the available analysis. The important, frequently used elements are arranged on the left side of the screen and can be called up with just one “Click”. By storing them in a database, even older measurements can be found quickly for reference and comparison..

Available for different applications:

The Thermal View software family is industry specific and is offered in a number of different application packages written specifically to provide analysis and reporting tools used in those industries.

Thermal View - SW05

Generic standard software for temperature profiling requirements



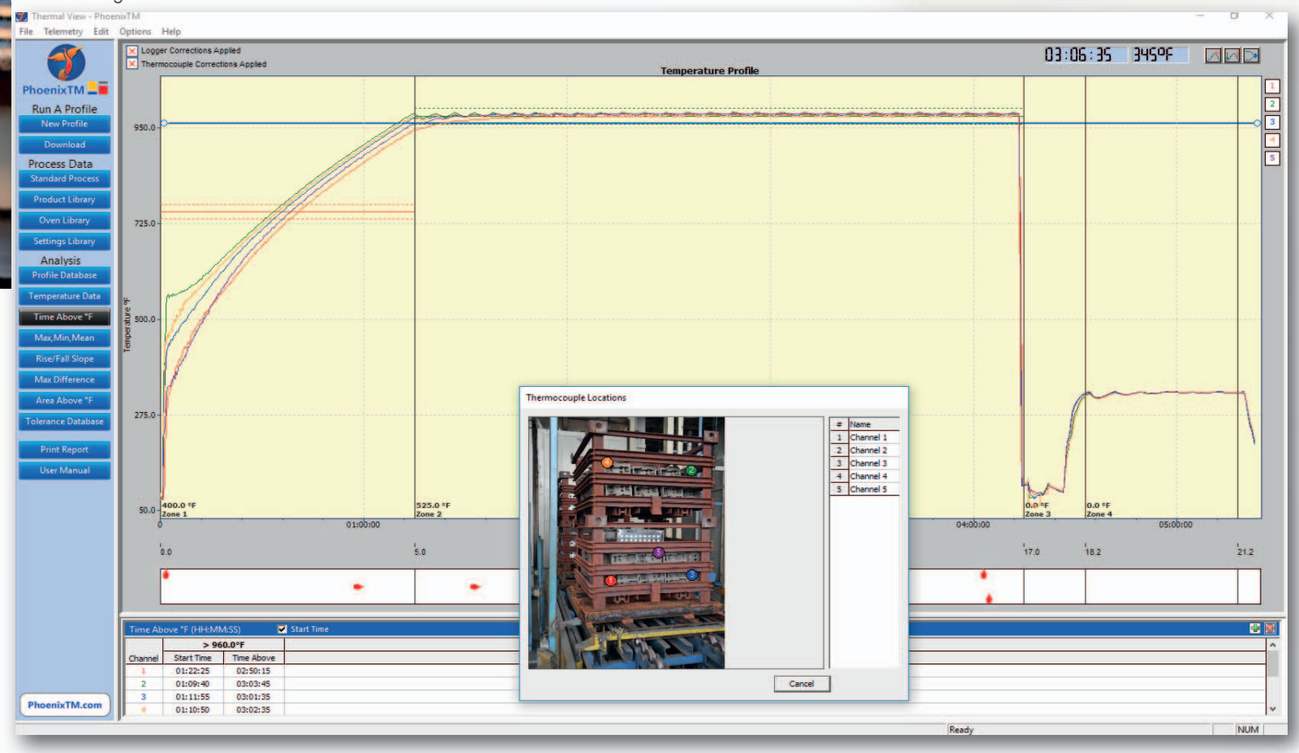
Functions:

- Full Programming Options
- USB Real Time Analysis
- Temperature Data
- Time Above Temperature
- Max, Min, Mean Temperature
- Rise & Fall Slope
- Reference Profile
- On Screen Notes
- Zooming Options
- Database Management Tool
- Product Library Files
- Language Change Option
- On Screen Help
- Graph Display Options
- Thermocouple Alignment Function
- Data Import and Export (CSV)
- Import from PTM Mobile Format
- Print Report Options
- Customer Report - Company Logo
- Trace Identification tools
- Customized Axes
- Phoenix Factor (Basic)

PhoenixTM Analysis Software

Thermal View Plus - SW15

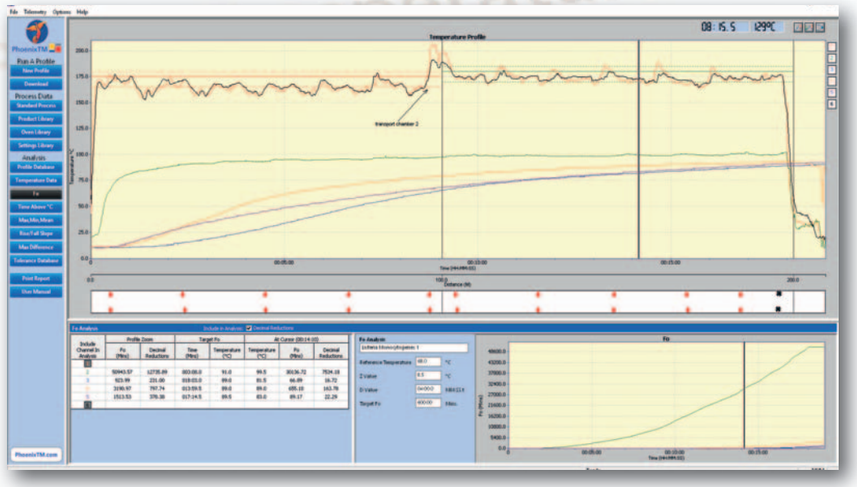
The Standard software for different applications: Thermal View SW Functions + RF & Bluetooth Real Time Analysis, Tolerance Curve, Merge Profile Data, Process Template Files, Product Library Files, Oven/ Furnace Settings Library Files, Profile Splitting, Saved Analysis Settings....



Advanced Thermal View Plus Software package providing all the basics supplied in Thermal view but with more flexibility and power. The software is designed to allow more detailed documentation and interpretation of the raw profile data. Process files allow for each monitoring action all process/test information to be stored in a unique template file eliminating tedious parameter entry each and every run. The process template can be overlaid on the profile showing zone positions and setpoints, allowing matching of the profile features to process location.

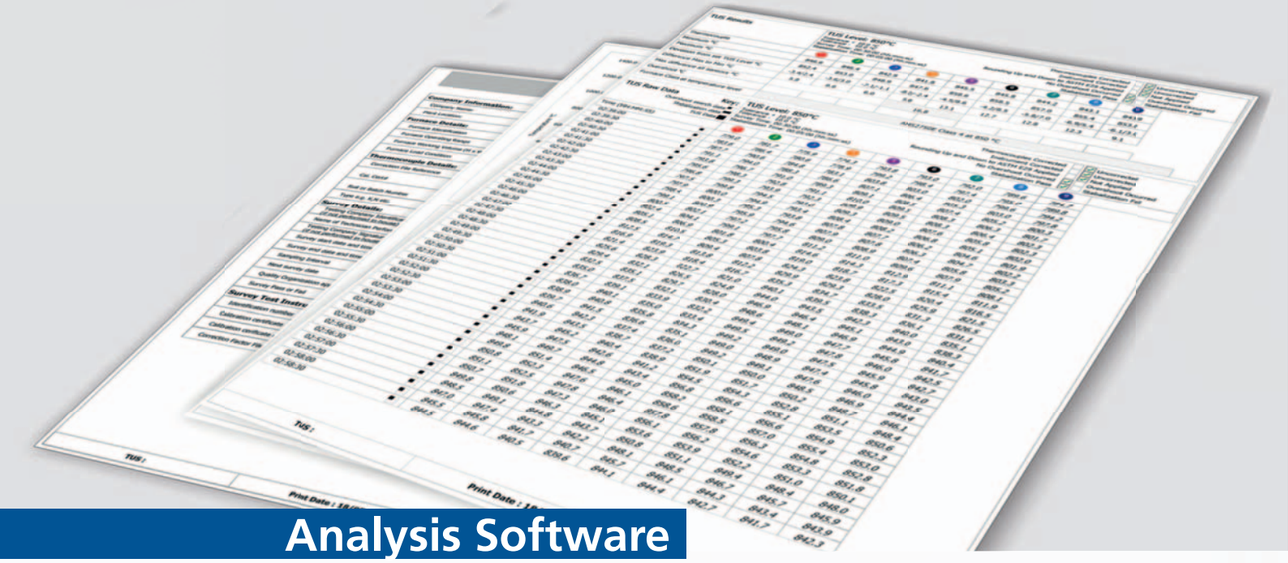
Thermal View Food - SW35

In-depth analysis and visual confirmation of calculations enables efficient process validation and traceability in the food industry.



Functions:

- Fo/Pu process analysis
- View Temperature Data
- Time above Temperature
- Max, Min, Mean Temp.
- Rise and Fall Slope
- Maximum Difference
- Tolerance curve
- Reference Profile
- Notes
- Printed Report
- Profile Splitting
- Export (CSV)
- Real Time Analysis
- Online Help
- Product Library
- Oven Library
- Settings Library
- Data Logger offsets
- Thermocouple offsets
- Merge Files
- Correction factors



Analysis Software

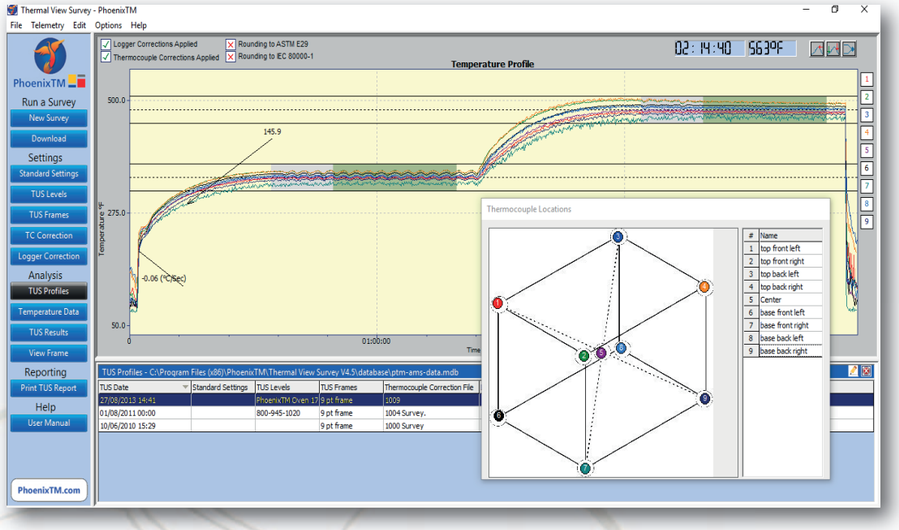
Converting data into information that you can understand and use!

Thermal View Survey - SW25

All the essential functions required to monitor, and analyse TUS surveys and produce AMS2750 and CQI-9 compliant reports.

Functions:

- Thermocouple and Instrument Correction Factors
- Full temperature data at TUS levels
- TUS temperature level library
- TUS frame library & on-screen view
- Temperature overshoot warnings
- Password protection
- Furnace class result at each level
- Rounding Up/Down to ASTM E29 or IEC80000-1
- On screen notes
- Printed report compliant to ASM2750 / CQI-9
- Export to CSV file
- RF & USB real time analysis
- On screen help
- Database storage
- Audit trail
- TUS with up to 60 thermocouples

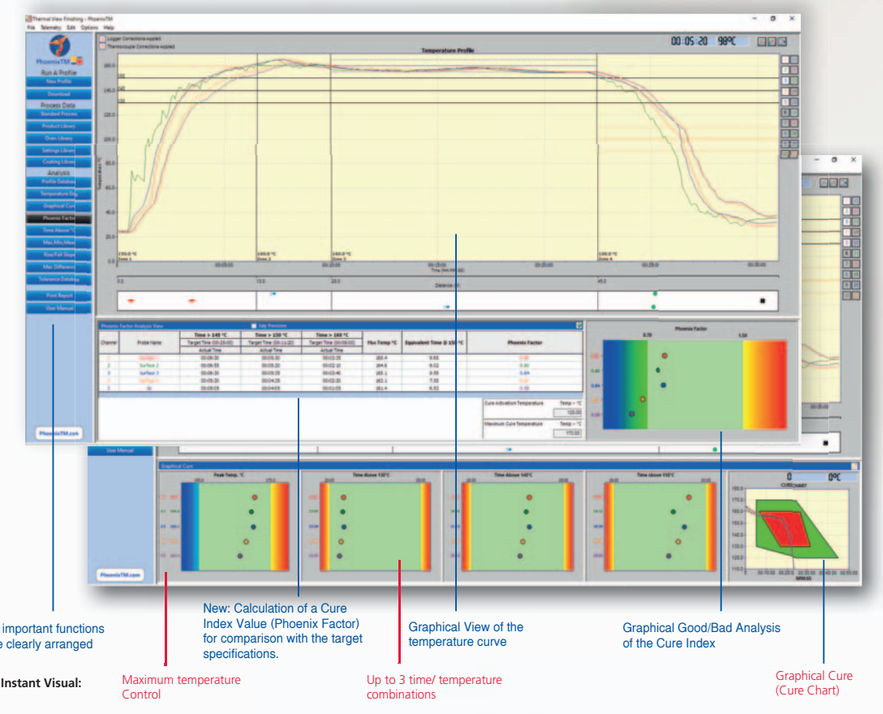


The Thermal View Survey software package is a unique offering to allow temperature uniformity surveys (TUS) to be performed efficiently and easily. The software functionality has been developed to allow all analysis and reporting to comply to AMS2750 and CQI-9. Thermal View Survey software is supplied with Thermal View Plus software to allow thru-process analysis in addition to TUS.

All important basic conditions for the evaluation, such as TUS temperatures, stabilisation and measurement duration, can be entered and saved in the software. Each further measurement in the same system can then be evaluated in just a few minutes and a standard-compliant report printed out. The measurement data is stored unchangeably in a secure database.
A demo version of the software (fully functional, only communication with a data logger is not possible) with some sample files can be obtained from us.

Thermal View Finishing - SW45

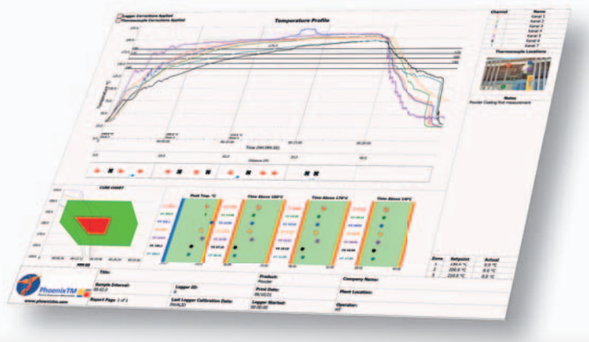
Specifically design for paint and powder finsihing applications.



The finishing software provides instant visual confirmation of compliance to curing specification and provides a one page report summary for easy archiving and process traeability.

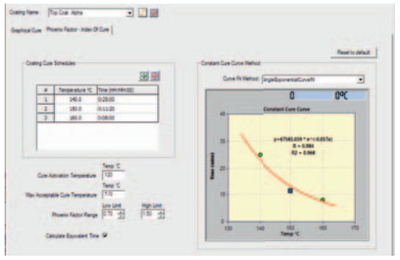
Functions:

- View Temperature Data
- Time above Temperature
- Max, Min, Mean Temperature
- Rise and Fall Slope
- Maximum Difference
- Tolerance Curve
- Reference Profile
- Notes
- Printed Report
- Data Import and Export (CSV)
- Real Time Analysis
- Area above °C
- Product Library File
- Cure Analysis
- Calibration Corrections
- Profile Splitting (Manage multiple oven peaks)
- Graphical Cure (Time @ Temp)
- Graphical Cure (Cure Chart)
- Cure Index Value (PhoenixFactor)
- Coating Library
- Online Help
- Trace Identification Tools
- Customized Axes



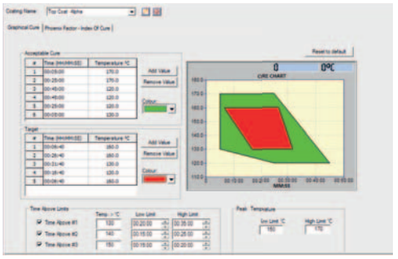
Phoenix Factor - Cure Index Value

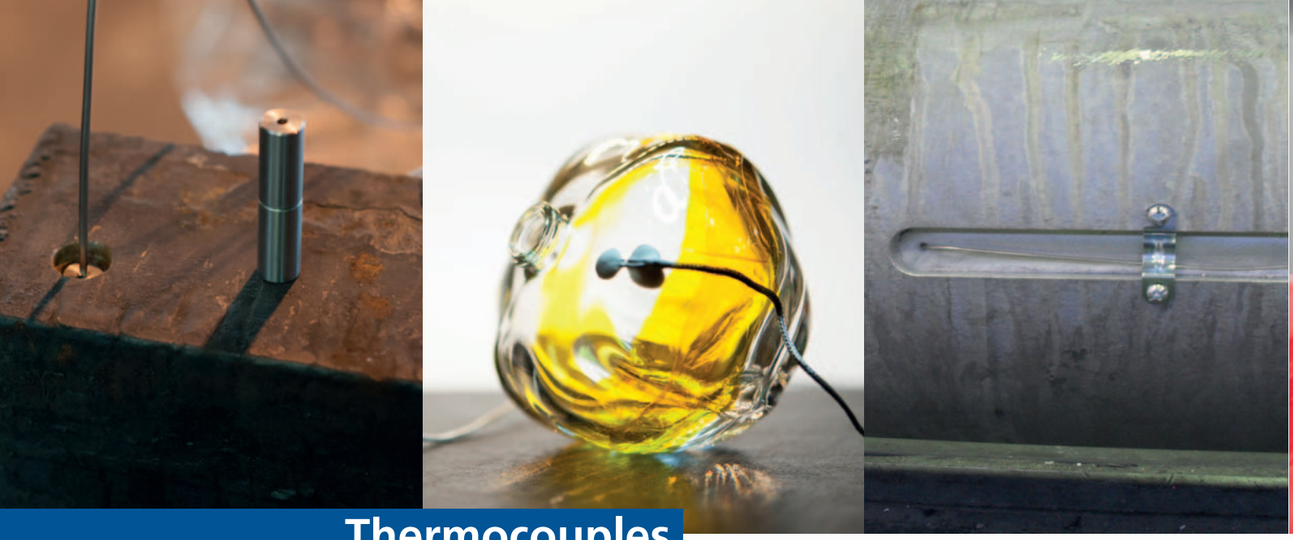
This function calculates a Constant Cure Curve from a maximum of 10 time/ temperature settings; the areas under the curves (integrals) are calculated from the temperature curves of the individual sensors using a special function. These integrals are then compared with a point on the curve. If the integral value lies exactly on the curve, the result is a curing index of 1. The advantage of this function is that the entire process is included in this comparison and gives a very accurate pictue of the cure quality. Furthermore, a numerical value is easy to archive and to process for example in SPC analysis.



Graphical Cure - Cure Chart

Some paint and coating manufactures provide a window from which different time/ temperature combinations can be read. At each of these combinations, the coating will cure correctly. ThermalView Finishing Software calculates the “time at temperature” for each thermocouple and temperature and plots the manufacturer‘s specification and the actual profile on a graph. This allows a quick graphical comparison “in one view”.





Thermocouples

Thermocouple range

In thru-process temperature profiling the quality, and therefore value, of the profile data is greatly influenced on the ability to locate repeatedly the thermocouple tip at exactly where the measurement is required from product to product and run to run. For this reason, as products and applications vary, PhoenixTM offer a comprehensive range of thermocouple designs. The design of the thermocouple and materials used in their construction are matched to the demands of the application. Whether needing a needle thermocouple to insert accurately into the core of a chicken portion or thermocouple that can be attached quickly yet reliably to the surface of a painted car body shell, PhoenixTM can offer a solution.

For very high temperatures:

For high temperature applications (up to 1300°C) PhoenixTM supply a range of mineral insulated thermocouples. These thermocouples have an insulated hot junction to ensure maximum protection against electrical interference from heating elements within the furnace.

Different variations:

All thermocouples are ready-to-use with a mini plug for connection to the data logger. If necessary thermocouples can be supplied with a batch certificate or individually calibrated. Thermocouples are avaliable in many different variations. For temperatures up to 250°C we provide flexible PTFE insulated thermocouples. Glass fibre sheathed thermocouples and ceramic fibre sheathed thermocouples provide a flexible thermocouple option for higher temperature applications.

For special applications:

For special applications we can supply thermocouples with other insulation material as well as individual lengths and fixing methods.

All PhoenixTM type K thermocouples are manufactured to the highest quality standards and conform to the ANSI MC96.1 special limits specification. The insulation material and the plug terminations are colour coded to conform to the IEC 60584 standard.

Heat Treatment

Glass Fibre Insulated Thermocouple (up to 800°C)

This range of thermocouples are perfect for peak temperatures typically ranging from 250 to 800 °C. The glass fibre insulation provides a thermally stable robust thermocouple, but with flexibility allowing the thermocouple to be handled with ease and allow accurate and repeatable positioning of the exposed hot junction (HJ) at the exact measurement point on the product or in the oven/furnace environment.

Mineral Insulated Thermocouple (up to 1300°C)

Diameters of the mineral insulated thermocouples range from 1.6 mm - for general purpose heat treatment applications to 3.0mm for slab and billet re-heat applications. For thicker 3mm MI thermocouples the thermocouple can be terminated with a PTFE tail to allow easy fitting into the data logger installed in the thermal barrier.

Type "K" or type "N"
Probes in 1.6, 2 or 3mm diameter.

Thermocouples

Coatings

Finishing Thermoouples (up to 265°C)

PhoenixTM finishing thermocouples are manufactured using the highest quality materials and conform to ANSI 96.1 special limits specification. The thermocouples are designed to withstand rough handling and uniquely the clamp and magnetic range include user replaceable sensors to minimize long term running costs. Available as magnetic, clamp or exposed junction, triple wrapped with stainless steel braid and have a final overall PTFE insulation.

Exposed junction (TC54)
Taped onto or inserted into position.

Washer (TC56)
Permanently screwed to test piece for routine repeat testing

Clamp Probes (TC52/TC53)
General paint powder applications where product is non ferrous (eg: Aluminium extrusion). Available for surface or air measurement.

Magnetic Probes (TC50/TC51)
Ferrous substrates such as car body shells

MiniMag Magnetic Probes (TC60)

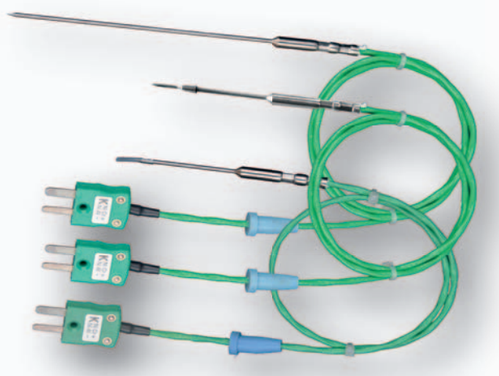
- Compact design to fit
- Strong encapsulated magnet
- Accurate and repeatable measurement
- User replaceable cable

Long Reach Clamp (TC59)
Monitoring Aluminium body panels (Door, Hood, Roof)

Food Processes

Food Thermocouples (up to 265°C)

For HACCP cook validation temperature measurement is required generally at the core of the food product. To perform such measurement a needle thermocouple is the optimal design. Needle thermocouples are designed to allow easy quick insertion into the product, offer rapid temperature response characteristics helping provide accurate temperature measurement, run after run. The needle can be supplied with collar options (straight or tapered) to help maintain the thermocouple measurement point in the product during the process run.
Thermocouple needles come in 40, 60 and 100mm length options to match product type and size to ensure that the sensor is accurately located in the core/cold spot.



Service

Calibration and Repair

Supporting the PhoenixTM range of products dedicated service centres are located in the UK and Germany (PhoenixTM Ltd - Earith Cambridgeshire UK and PhoenixTM GmbH - Bad Oeynhausen Germany). In the USA calibration services are provided by our calibration partner Conrad Kacsik Instrument Systems Inc. From these service centres, efficient, quick technical support, calibration and field repairs are supplied world-wide. Our friendly, responsive team of experienced engineers supported by local partners and representatives are happy to help with all your system support and after care needs. All our data logger are calibrated on equipment that is traceable to national standards (UKAS), and are supplied with full calibration certificates. If required data logger calibration certificates can be supplied which conform to ISO 17025 (DAkkS) from our on-site UKAS accredited calibration laboratories.

The PhoenixTM in-house calibration service provides a compressive package including a heat stability test of data logger and before and after adjustment of readings to ensure that the data logger is working fully to specification. Onboard data logger firmware and Thermal View software updates are also provided to ensure that the unit is working to the latest release state.

The calibration certificate is stored within PTM1200 data loggers allowing not only immediate access to the calibration data for audit purposes but also to allow set-up of data logger offsets as a key part of CQI-9 or AMS2750 TUS work.


PhoenixTM
Phoenix Temperature Measurement

CERTIFICATE OF CALIBRATION

Certificate Number: 10051908
Date of Issue: 10 May 19
Issued By: PhoenixTM Ltd
PhoenixTM Reference: 13391
Customer: Philips Avent
Customer Address: Lower road, Glemsford, Suffolk, CO10 7QS

Data Logger Model: PTM1-000-K-C
Data Logger Serial Number: 1091
Thermocouple Type: K
Data Logger Condition: Used, Good Condition
Date of Calibration: 10 May 19
Date Calibration Due:

Basis of Calibration: PhoenixTM specification as the Manufacturer
Accuracy Specification: +/- 0.3°C
Resolution / Sensitivity Specification: 0.1°C

Ambient Temperature: 22°C (± 2°C)
Equipment Used: Martel 3001 Precision Calibrator serial number 2937163 calibrated at UKAS ISO17025 laboratory number 0822 on 12 JUL 2018, Certificate number 51683
Traceability Statement: All measuring traceable to Na
Uncertainty of Measurement: The uncertainty a coverage fa approximately Type K, N: +/-C Type J: +/-0.3C Type T: +/-0.5C Type R, S: +/-C Type C: +/-0.5

PhoenixTM

Kalibrierschein / Calibration Certificate

Erstellt durch das Kalibrierlaboratorium
Issued by the calibration laboratory

PhoenixTM GmbH
Dehmer Str. 48
32549 Bad Oeynhausen

G2110011
D-K-21323-02-00
2021-10

Gegenstand / Object: 20 Kanal Datenlogger
Hersteller / Manufacturer: PhoenixTM
Typ / Type: PTM1-220-N
Fabrikat/Serien-Nr. / Serial number: 2507
Auftraggeber / Customer:
Auftragsnummer / Order-No.: 0
Anzahl der Seiten des Kalibrierscheines / Number of pages of the certificate: 8
Datum der Kalibrierung / Date of calibration: 01.10.2021
Kalibrierzeichen / Calibration mark

Datum der Ausstellung / Date of issue: 01.10.2021
Freigabe des Kalibrierscheins durch / Approval of the certificate of calibration by:

PhoenixTM GmbH - Dehmer Str. 48 - 32549 Bad Oeynhausen
Tel: +49 5731 30028 0 - Fax: +49 5731 30028 14
Geschäftsführer: Michael Taake - HRB 11975

In-House Calibration and Quality Accreditations

TÜV NORD CERT GmbH – DIN EN ISO 9001

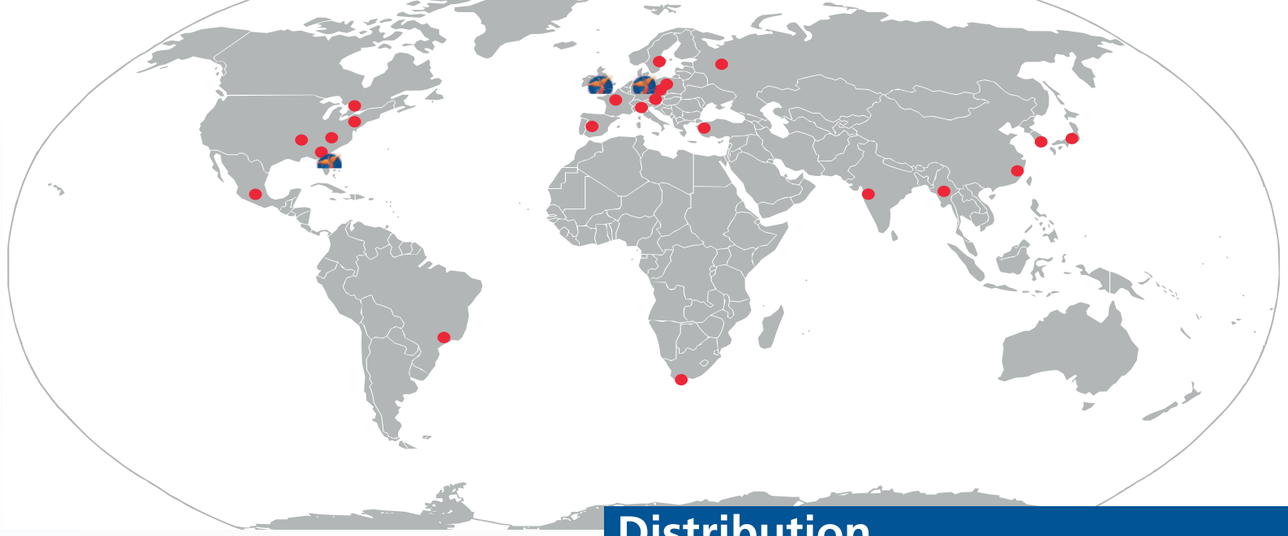
DAkkS Deutsche Akkreditierungsstelle D-K-21323-02-00

PhoenixTM GmbH

ilac-MRA

UKAS CALIBRATION 10560

PhoenixTM Ltd



Distribution

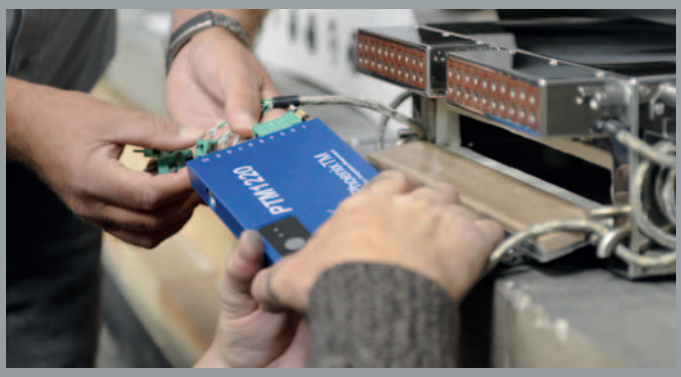
Local-Service

We provide personal and competent advice in all important industrial countries of the world. Long-standing cooperation partners as well as our own sales and service branches guarantee perfect on-site service. Of course, our partners are continuously trained for this important task.

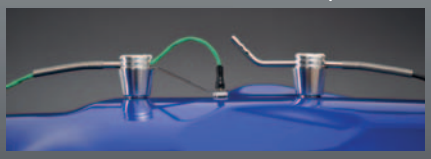
You can find the contact details of our cooperation partners on our website www.phoenixtm.com or directly via one of our branches.

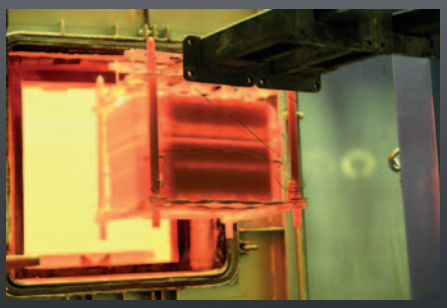
Training and Commissioning

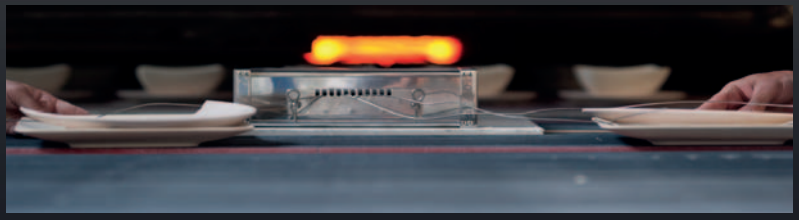
Especially with systems for high-temperature applications, the project does not end for us with the delivery of the system. After the software training and a general introduction to the system, when required we carry out the first measurement together with you.



... where experience counts!







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