



Stay Cool

how your cold chain can withstand any inspection

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Overview: What consumers (have a right to) expect

It is one of the greatest success stories of mankind: In the vast majority of countries today, consumers can choose from an enormous variety of foods. In cities and developed regions, fresh and preserved products from all over the world are available at practically any time.

However, as the supply increases, so do the expectations. People who shop in retail outlets expect fresh and hygienically safe food. More and more consumers are also looking for complete transparency in terms of origin and supply chain.

According to a study conducted by the EU in 2022, food safety is an important issue for 70 per cent of people¹, but only 55 per cent have full confidence in the safety of the products on offer². Scandals involving food contaminated with salmonella also occur with unpleasant regularity because the cold chain has been interrupted somewhere along the delivery route or the required temperature was not maintained at all times.

Consumers have the right to expect that this will not happen. If a scandal nevertheless occurs, they turn away from the brands concerned. Conversely, this means: A secure, uninterrupted cold chain is both a competitive advantage and

insurance against loss of sales and reputation in the long term. Last but not least, it can make a significant contribution to climate protection: 41 per cent of CO₂ emissions caused by the loss of food could be avoided with uninterrupted refrigeration.³



Weak points in the market situation

Risk: Break in the cold chain

A cold chain naturally consists of several links. It ranges from storage and transport – by land, sea and air – to the refrigerated shelves of the retail or hospitality trade. It is not uncommon for the numerous stations and transfer points to be spread across different countries or even continents. This complexity is increased by further requirements. These include a wide range of product groups with their specific

packaging forms or the different temperatures for fresh and frozen products. If the cold chain breaks and the products become unsaleable, valuable stock is lost. It can be even worse if the chain is interrupted unnoticed and spoiled goods are sold – with potentially serious consequences for consumers and for the company that placed the goods on the market.

Humans as a source of error

The cold chain is only intact as long as the prescribed temperature is maintained over its entire length. This cannot be guaranteed one hundred per cent with personnel-supported monitoring and manual data recording. Spot measurements and readings from hand-held instruments are not only labour-intensive, but also extremely error-prone. Inaccurate manual checks, incorrect and missing paper logs can hardly be avoided. Overworked or inadequately trained specialists and frequent staff changes exacerbate the problem. Under these conditions, unforeseeable incidents that could lead to a criti-

cal rise in temperature are noticed too late or not at all. A timely response and remedial action can only be taken if the manual check has taken place at the right time. In addition, employees must be thoroughly trained for the complex task of valid measurement and correct documentation. This requires considerable effort, which is further increased by staff turnover and a shortage of skilled labour. However, even if a sufficient number of thoroughly trained specialists are deployed, reproducible measurement quality can hardly be guaranteed. It is practically impossible to rule out deviations between the individually performed measurements.



Relief and optimisation through technology

Reliable monitoring with digitalised monitoring

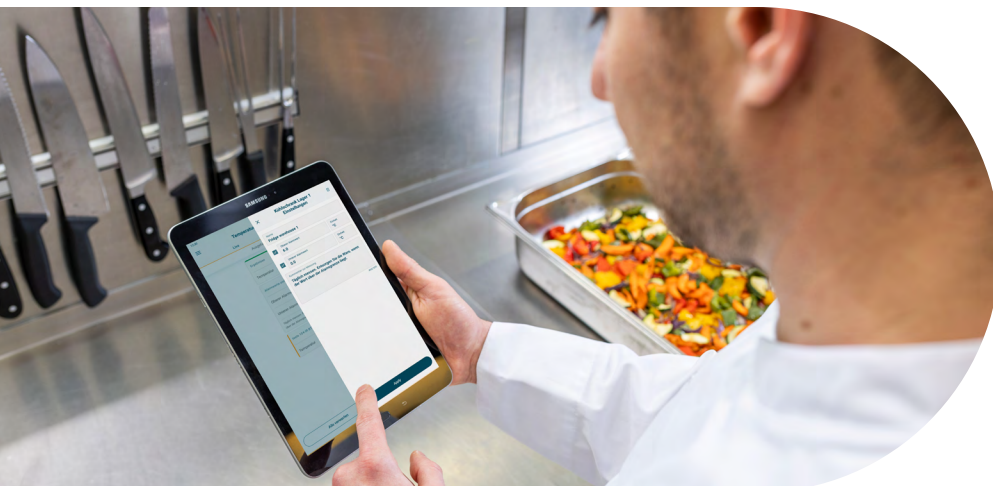
The problems and risks mentioned can be avoided almost completely. Technical solutions and digital data recording eliminate sources of error and relieve the burden on employees – countless inspection rounds can be completely eliminated. At the same time, comprehensive data records are created that can be viewed, transferred and used in a variety of ways

at any time. In this way, audit-proof documentation in accordance with HACCP, IFS or DIN 10508 is handled automatically and without additional effort. Deliberate manipulation is virtually impossible. Personnel deployment and training costs are drastically reduced. The intuitive operation offered by Testo's stationary systems is a great help here. Continuous monitoring does not require any personnel.

Energy efficiency and environmental protection

Around 17 per cent of global electricity consumption flows into refrigeration and air conditioning systems.⁴ In the food sector, the proportion is around 30 per cent.⁵ Depending on the cooling infrastructure, a deviation of just 1 degree Celsius can make up to 6 per cent difference in energy costs.⁶ Unnecessary overcooling causes correspondingly high costs. Conversely, this means:

Precisely optimised temperature control can save a lot of money. The control of the systems can be optimised based on precise values and their progression over time. In addition to direct monitoring, the use of Testo systems also enables the creation of trend analyses and application-specific benchmarking. On this basis, targeted optimisation measures can be taken.



Practical solutions

From alarm management to process reliability

Intelligent alarm management is the prerequisite for reliable process safety: As soon as a measurable problem becomes apparent, the planned corrective measures are triggered. If a defined upper or lower limit value is violated, corresponding notifications are sent to those responsible. They can then activate the appropriate escalation levels – before the situation becomes critical. Product loss as well as expensive and reputation-damaging recall

campaigns are avoided. At the same time, a centralised and detailed overview of the status of the cold chain links is guaranteed at all times. The automatically generated data can be incorporated into quality management. The measured value curves for temperature, humidity, exposure to light and other variables can be visualised in detail. This allows the conditions in a cold store or during a transport process to be tracked in detail.

Instruments and systems for every need

With Testo instruments and complete solutions, end-to-end monitoring of the cold chain can be fully automated. They enable reliable alarm management, comprehensive data evaluation and targeted process opti-

misation. Thanks to simple installation and fast commissioning, the integration effort is minimised. All components are NSF and HACCP certified for use in the food industry.

Entry-level solutions for small warehouses testo 174/175

The testo 174 and testo 175 series data loggers offer a cost-effective introduction to continuous monitoring. In addition to the temperature, they can also monitor the humidity of the cooled environment, depending

on the equipment. The compact instruments offer a wide temperature range and simple data readout. Your professional software enables efficient data analysis and export to Excel. Thanks to protection class IP 65, they can remain at the measuring location during cleaning.



WLAN-capable systems, suitable for branch networks testo 160 system

The testo 160 series online data loggers (testo 160, testo 162, testo 164) enable continuous temperature and climate monitoring with direct cloud connection and thus integration into higher-level monitoring systems. The instruments have an integrated temperature sensor and – depending on the equipment – integrated or connectable sensors for humidity, lux

and UV radiation. Users can also download the testo Smart Connect. You can use it or simply access the central data platform testo Saveris Cloud via the browser on your PC. All measured values can be viewed online and analyzed there. If a limit value is exceeded, users receive a push notification via testo Smart App, e-mail or SMS. The Testo Data Monitoring license is required to use the system.

Digital platform for convenient overall solution testo Saveris Food

The cloud-based, modular complete system combines centralised control, alarm management and documentation for monitoring the cold chain. It can be scaled as required and is just as suitable for small companies as it is for large corporations with many locations and functional units. For physical monitoring, users can select the appropriate NSF and HACCP-compliant components from a broad portfolio. In addition to the sensors for stationary monitoring and the powerful Control Unit, hand-held measuring instruments can also be integrated. The system enables the automated monitoring of storage rooms,

appliances and processes, including air and product temperatures and the monitoring of door movements. The central Control Unit uses checklists to guide you through all quality checks, triggers an alarm if necessary and indicates the corrective measures to be taken. With testo Saveris Food, the respective food safety concept can be implemented digitally and audit evidence can be provided at any time. The system helps users to fulfil the applicable regulations, protect products and systems and increase process efficiency. It enables continuous monitoring, comprehensive data analysis, predictive management and defined escalation routines.



The bottom line: Reliable cold chain ensures competitiveness

Consumers want and expect flawless, safe food. Delivering it reliably at all times is a top priority for producers and retailers. A continuous cold chain is one of the most important requirements here. Stationary sensors and digitalised systems enable its continuous monitoring, which rules out unnoticed breaks. At the same time, the instruments and systems guarantee complete documentation without any additional effort, and automatic monitoring makes it very easy to fulfil the high requirements of standards and laws. The requirements of HACCP, IFS Food/IFS Logistics, DIN 10508 or ISO 22000 are taken into account in Testo's systems. Processes can be optimised based on detailed data, for example to save energy by adjusting the storage temperature. In this way, costs can be reduced and considerable efficiency gains achieved. Compliance with the standards, including documented proof, is automated. The food supply

companies benefit in several ways, at a manageable cost. Always flawless goods create trust and satisfied customers, the brand is strengthened and there is no need to worry about problems with official inspections. In addition, a lot of time and therefore

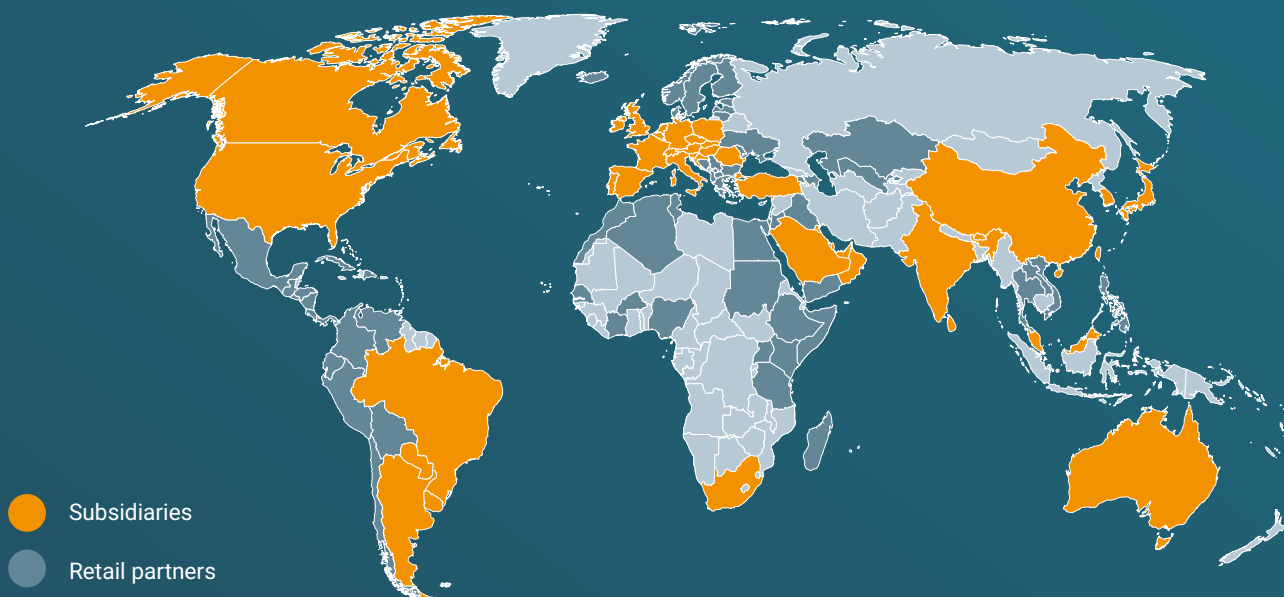
money is saved when preparing and carrying out audits. Stationary monitoring is a strategically important building block for reliably high product quality, smooth processes and a company's competitiveness.



List of sources

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High-tech from Germany's Black Forest.



World market leader
in the measurement
technology sector

For over 65 years, Testo has been known for creating innovative measuring solutions made in Germany. As a world market leader in portable and stationary measuring technology, we help our customers to save time and resources, protect the environment and people's health and improve the quality of goods and services. More than 4000 employees work in research, development, production and marketing for the high-tech company in 37 subsidiaries all over the world. Testo provides more than 1 million customers around the globe with high-precision measuring

instruments and innovative solutions for the measurement data management systems of the future. An average annual growth rate of roughly 10% since the company's foundation in 1957 and a current turnover of just short of 466.5 million Euros impressively demonstrate that southern Germany and high-tech systems go hand in hand. The above-average investments in the future of the company are also a part of Testo's recipe for success. Testo invests about a tenth of annual turnover in research and development.