LISTEC® GmbH
Lineare Sensor Technik

# TEMPERATURE MONITORING OF COLD STORAGE FACILITIES AND FOOD

Isen, September 2025
Early warning with the d-LIST system

Image generated by AI

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This white paper explains how the LISTEC d-LIST sensor cable system is used in cold stores and deep-freeze warehouses in the food industry for seamless temperature monitoring and to protect stored goods. LISTEC's linear sensor technology has been developed to meet the requirements of the food industry and offers a robust, precise and low-maintenance solution for temperature monitoring.

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# 1. Introduction & Press Reports

In the food industry, continuous temperature monitoring is crucial both for verifying the cold chain and for protecting frozen and stored goods. Temperature deviations can not only lead to quality losses but also jeopardise food safety and brand reputation. This is why monitoring systems that function reliably even under extreme conditions are in demand.

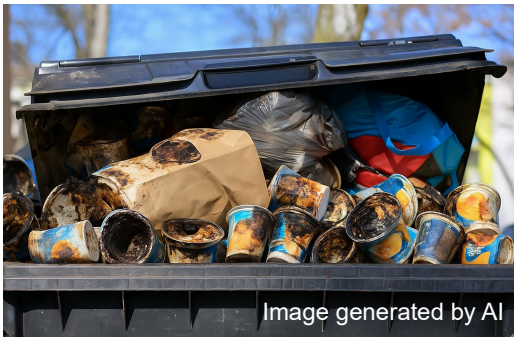
**Cold chain interruptions in cold storage facilities.**
**Examples from press reports:**

May 20, 2025, Hamburg
**Fire breaks out in cold storage facility in Hamburg-Altenwerder**

https://www.sueddeutsche.de/panorama/braende-feuer-in-kuehlhaus-in-hamburg-altenwerder-ausgebrochen-dpa.urn-newsml-dpa-com-20090101-250520-930-566791

October 09, 2024, Lüneburg
**Major fire at this yoghurt manufacturer: Production at a standstill**

https://www.agrarheute.com/management/agribusiness/grossbrand-diesem-joghurthersteller-produktion-steht-still-627076



# 2. Triggers for fires & risks of cold chain interruptions

Cold storage and deep-freeze warehouses face particular safety and operational challenges. While they are subject to strict requirements in terms of temperature stability and hygiene, they also harbour considerable risks in terms of fire, energy efficiency and plant safety. The combination of large volumes, combustible insulation materials, electrical systems and periodic defrosting processes creates a complex risk profile.

**Causes of fires in cold stores and the food industry:**

**1. Electrical causes**
- Defective or overloaded electrical systems
- Loading areas for industrial trucks
- Faulty heating systems

**2. Mechanical and operational causes**
- Hot work (e.g. welding, cut-off grinding)
- Cleaning work

**3. Technical components & systems**
- Refrigeration and evaporation systems
- Defrosting devices
- Lighting systems

**4. Structural and material-related risks**
- Combustible insulation materials
- Concealed fire spread

**5. Organisational and external factors**
- Improper storage
- Technical defects due to ageing
- External influences/arson

**Risks of cold chain interruptions:**

A cold chain interruption leads to an unwanted rise in temperature during storage, transport or handling of food – and this can have a massive impact on quality, safety and shelf life. Here is an overview of the most important consequences:

- Microbiological growth
- Loss of quality
- Shortened shelf life
- Health risk for consumers
- Economic and legal consequences

An interrupted cold chain not only poses a **risk to quality** but also a **serious food safety problem**.
That is why **continuous temperature monitoring systems** – such as LISTEC's linear heat detectors – are crucial for detecting deviations at an early stage, triggering automatic alarms and ensuring the integrity of stored goods.

# 3. LISTEC solutions

**LISTEC GmbH** has been developing, manufacturing and distributing sensor cable systems for early fire detection and temperature monitoring for over 30 years – **'Made in Germany'** near Munich for customers worldwide. Thanks to their robust, enclosed design, our sensor cables are ideal for use in cold stores and deep-freeze warehouses in the food industry. Extreme conditions prevail there: cold, humidity, icing and regular cleaning cycles with high pressure or steam place high demands on the measurement technology used. Especially in areas with sensitive stored goods, early detection of temperature deviations is crucial to avoid quality losses and ensure production reliability.

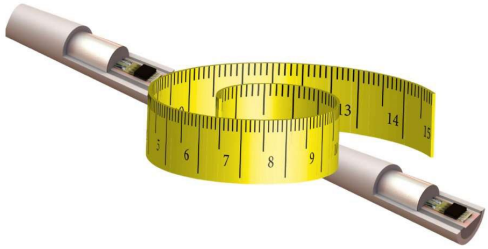
The sensor cable has integrated temperature sensors at defined intervals, which enable precise localisation of temperature changes – along refrigerated shelves, conveyor lines or in areas with loading and gate zones. This allows critical areas to be reliably monitored, unwanted heating to be detected, and potential hazards to be remedied at an early stage.

With this technology, LISTEC has been ensuring safety, quality and operational continuity for decades – even in the most demanding refrigeration and deep-freeze environments in the global food industry.

**Temperature and fire monitoring of cold stores in the food industry**
Among other things, the systems are specially designed for use in cold stores, deep-freeze facilities and production sites.

**Advantages of the d-LIST / SEC 15 system**

- Resistant to icing
- Temperature measurement from -40°C to 85°C
- Can be cleaned with high pressure/steam jet
- Resistant to dust/dirt/gases/vibrations
- Differential and maximum temperature evaluation
- Installation possible in single-branch mode or with multiple branches
- Measurement resolution (always 0.1 °C, internally 0.0625 °C for d-LIST)
- Repeatability (always ± 0.1 K along the entire cable length)
- Exact location of overheating along the entire sensor cable length
- Sensor distances freely selectable, individual identification possible at any time via cable markings
- Systems are generally maintenance-free, resulting in long-term cost savings
- Low commissioning and maintenance costs
- Calibration-free and location-specific resolution in the event of a fire over the entire service life
- Use of individual sensors for object monitoring can be integrated into the sensor cable installations



MADE IN GERMANY

# 4. Application/ Installation /Monitoring

The installation and monitoring of LISTEC sensor cable systems is simple, safe and adaptable to any cold storage structure and food warehouse. Combining robust construction, precise temperature measurement and intelligent alarm control, they offer a **future-proof solution for quality and fire protection in the food industry.**

**Typical applications in the food industry:**

- **Storage and deep-freeze areas:** Temperature monitoring along aisles, ceilings and walls.
- **Evaporator and compressor rooms:** Monitoring of hot spots on motors, fans or heating registers.
- **Loading and door areas:** Compensation for temperature fluctuations caused by door openings or defrosting processes.
- **Production and packaging areas:** Monitoring of technical equipment, cable trays and control cabinets.
- **Cold rooms with sensitive stored goods:** Ensuring even temperature distribution and HACCP-compliant documentation.

**Installation**

- A risk assessment is carried out prior to installation in order to determine the optimal cable routes.
- Zoning is carried out according to hazard areas (e.g. evaporator, ceiling, loading zone).
- Sensor distances and cable lengths are defined individually.
- Direct installation: The sensor cable is attached precisely to the areas that require monitoring (e.g. ceiling, beams, pipes).

# 1. Certificate excerpt

The **d-LIST / SEC 15 system** is a system recognised by VdS, among others, in accordance with EN 54-22:2015+A1:2020:

Anerkennung
Approval

VdS

von Bauteilen und Systemen
of Components and Systems

Inhaber der Anerkennung / Holder of the Approval

LISTEC GmbH
Am Sandberg 34
DE-84424 Isen

| Anerkennungs-Nr. / Approval No. | Anzahl der Seiten / No. of pages | gültig vom (TT.MM.JJJJ) / valid from (dd.mm.yyyy) | gültig bis (TT.MM.JJJJ) / valid until (dd.mm.yyyy) |
|---|---|---|---|
| G 221004 | 14 | 26.06.2023 | 25.06.2027 |

Gegenstand der Anerkennung / Subject of the Approval

Rücksetzbarer linienförmiger Wärmemelder /
Resettable line-type heat detector
d-LIST

Verwendung / Use

in automatischen Brandmeldeanlagen /
in automatic fire detection and fire alarm systems

Anerkennungsgrundlagen / Basis of the Approval

VdS 2344:2014-07
VdS 2543:2021-03
EN 54-17:2005 + AC:2007
EN 54-22:2015 + A1:2020

Die Anerkennung umfasst nur das angegebene Bauteil/System in der zur Prüfung eingereichten Ausführung

- mit den Bestandteilen nach Anlage 1,
- dokumentiert in den technischen Unterlagen nach Anlage 2,
- zur Verwendung in den angegebenen Einrichtungen der Brandschutz- und Sicherungstechnik.

Bei der Anwendung des Gegenstandes der Anerkennung sind die Hinweise nach Anlage 3 zu beachten.

Das Zertifikat darf nur unverändert und mit sämtlichen Anlagen vervielfältigt werden. Alle Änderungen der Voraussetzungen für die Anerkennung sind der VdS-Zertifizierungsstelle – entsamt den erforderlichen Unterlagen – unverzüglich zu übermitteln.

This Approval is valid only for the specified component/system as submitted for testing

- together with the parts listed in enclosure 1
- documented in the technical documents according to enclosure 2
- for the use in the specified fire protection and security installations.

When using the subject of the approval the notes of enclosure 3 shall be observed.

This certificate may only be reproduced in its present form without any modifications including all enclosures. All changes of the underlying conditions of this approval shall be reported at once to the VdS certification body including the required documentation.

VdS Schadenverhütung GmbH
Amsterdamer Str. 174
D-50735 Köln

Ein Unternehmen des Gesamtverbandes der Deutschen Versicherungswirtschaft e.V. (GDV), durch die DAkkS akkreditiert als Zertifizierungsstelle für Produkte in den Bereichen Brandschutz und Sicherungstechnik

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