

A photograph showing a person wearing a black protective hood and gloves, working with a large, white, multi-layered cryogenic storage container. The container is covered in frost and has several drawers or compartments. The person is using a white tool to interact with one of the drawers. The background is slightly blurred, showing what appears to be a laboratory or industrial setting.

Ultra-low temperature storage

SecuriHeat ADW

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1 Introduction

Although commercial deep freezers usually have an operating temperature range of -30°C to -15°C (-22°F to 5°F), sometimes they operate at even lower temperatures for various purposes. Such Ultra-Low Temperature (ULT) storage units, with a temperature down to -40°C (-40°F), are the focus of this Case Study.

Food or other commodities that are generally stored in ULT facilities are valuable or even critical, and a larger supply chain depends on them. Keeping them stored under their proscribed conditions is essential. Any interruption to the ULT storage operation – for example through a fire detected late or due to a false alarm – can result in the entire contents being written off. Therefore, reliable and early detection of a fire is essential, to allow time for an intervention while preserving operational integrity. On the other hand, temperatures below -30°C are a very challenging environment for electronic devices generally, and many fire detection systems cannot survive in such an environment, let alone operate.

Despite the low temperature, potential fires in refrigerated storage facilities can still be caused by problems with electrical distribution, lighting equipment, and hot work during maintenance operations. Combustibles including food products and packing materials could be ignited due to these failures. Once a fire is ignited, it can rapidly escalate due to the high density of goods and vertical high racking storage which are ideal conditions for fire spread. Other challenges such as the ongoing service and maintenance of fire detection systems in a difficult environment for humans and electronic devices alike must also be taken into account when designing a suitable detection system. Unnecessary site visits to attend frequent service needs can have a negative impact on suitability and cost of a fire detection system for such unique applications.

Reliable fire detection is a critical part of best practices of a fire engineering solution to address these challenges. A well-designed and reliable fire detection system provides risk mitigation to potentially prevent a fire from happening or developing out of control before orderly system shutdowns can be put in motion. Multiple stages fire alert and alarm can also facilitate the local site or nearby fire services response well before the situation develops into a life-threatening situation. A suitable fire detection system can also be used to actuate gaseous suppression systems and mechanical fan operation as part of a comprehensive emergency response plan.

Securiton's SecuriHeat ADW line-type heat detector (LTHD) offers a robust, reliable and quick-acting fire detection system well suited for all types of harsh industrial and challenging environments. It is certified for use in ambient temperatures down to -40°C. SecuriHeat ADW LTHD is a sensing tube system that has been specially designed for EN 54-22. Sensing tube material can be copper or stainless steel and can be installed in a challenging environment like ULT. As well as its capability to work in extremely harsh environments, including extremes of temperatures, key advantages include relatively high sensitivity, its real-time system fault self-check and alarm, and the fact that it is free of routine maintenance, fully water resistant, discreet and easy to install.

The purpose of this Case Study is to provide fire safety and protection consultants, qualified fire system specifiers, design engineers or technicians, with recommendations for the application and use of SecuriHeat ADW LTHD to protect ULT storage of varying size and design. A key design objective is to enhance fire detection methods to provide risk-based object and area protection both inside and outside ULT storage, mitigate risks through best fire prevention practices. Where applicable, the Case Study also provides key requirements on inspection, testing and maintenance of SecuriHeat ADW.

2 Aspects of Fire Safety and Prevention

Ultra-low temperature (ULT) storage units come in various sizes, from small modular freezers for fixed uses or transportation, to large-scale cold stores. They are designed to store materials that require very low temperatures, to provide precise temperature control to protect products from temperature fluctuations better than common freezing storages of -18°C (-0.4°F) provide, and/or require very fast freezing. Food manufacturers and retailers may use ultra-low temperature freezers to keep food products as fresh as possible.

The design and construction of ULT storage is the same as for standard refrigerated storage. In both cases they are designed to meet the specific requirements of the facility owners or operators. Common design considerations include facility parameters/dimensions, available local utility for firefighting (e.g. water supply), storage commodity, stock handling and construction methods (wall, floor and roof). Further considerations include space configurations; durability and functional requirements; energy-efficiency; safety and security of people and goods, health and comfort levels; as well as emerging issues throughout the life of the building such as change of storage commodity or expanded use of AS-RS¹ equipment as a retrofit [1] [2].

Critical storage conditions of temperature, relative humidity, presence of CO_2 , ethylene, air circulation, light etc. are among the unique characteristics of refrigerated storage building environments and their operation. Significant variations of airflow in each freezer room or compartment are required depending on the goods stored. Airflow is also subject to the percentage of capacity of stored goods, and the need for pre-cooling, rapid cooling or steady storage conditions. The ventilation systems can also change their operation mode to ensure other ambient conditions, such as humidity, CO_2 and O_2 concentration (required in modified atmosphere storage for selective commodities), are correctly regulated and maintained.

Excluding intentionally lit fires, electrical distribution and lighting are by far the major causes of fire in warehouses and storage facilities [3]. Fire hazards inside ULT storage are generally assessed in line with the classification of occupancy as well as the stored commodities (for example NFPA 1 [4] and FM Global DS 8-1 [5]). Specific to storage fire safety, material, waste and hazard of contents are further divided into varieties of classes (e.g. FM Global DS 8-9 [6] Storage of Class 1, 2, 3, 4 and Plastic Commodities).

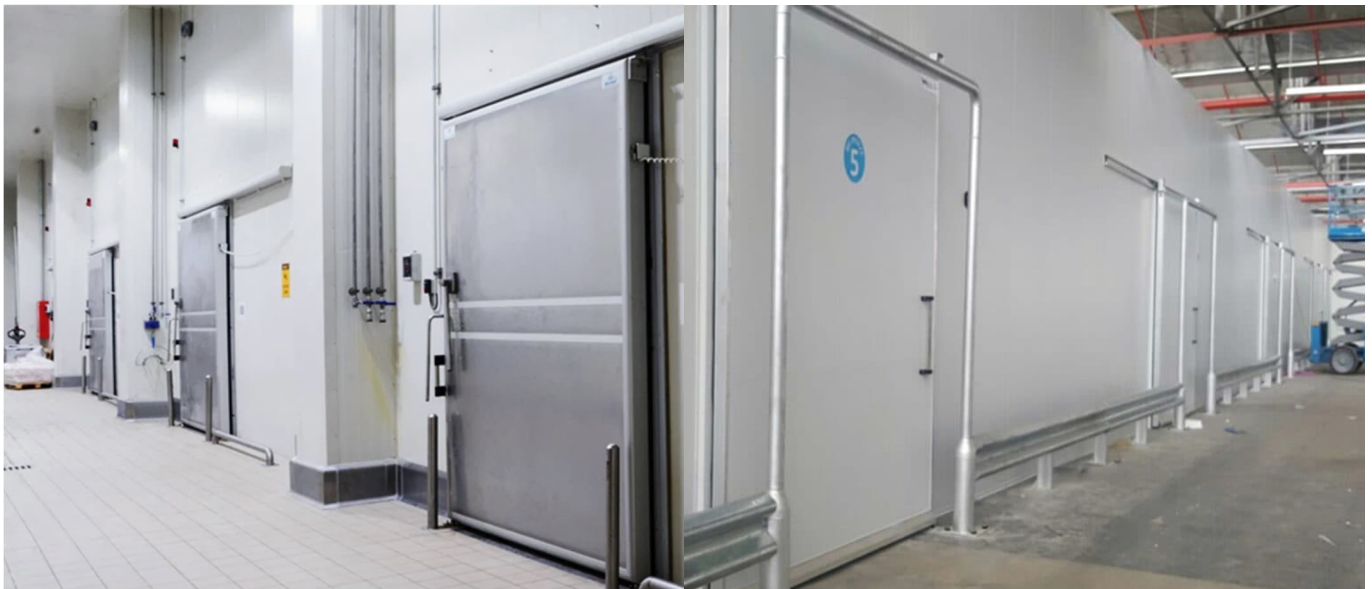
From a fire prevention and safety perspective, these varying ambient conditions, coupled with the extreme low temperature and the large fuel loads, represent significant challenges to timely and reliable fire detection.

2.1 Ultra-low Temperature (ULT) Storage

Food industry companies, from manufacturers to retailers, use ULT storage to store just about any food with few exceptions, to preserve the food for longer periods. Any interruption to ULT storage operation due to incidents of contamination can result in immediate losses or subsequent food recalls. These are not just a threat to public health, but they also damage brand reputation. The average direct cost of a recall for a food company is found to be \$10 million [7].

The focus of this Case Study covers Ultra Low Temperature (ULT) storage units with a freezing temperature of below -30°C (-22°F). Examples are illustrated in Figure 1 below.

¹ AS-RS: Automatic Storage and Retrieval Systems



(a) Illustration of typical refrigerated storage and deep freezer construction from outside



(b) Large open space deep freezers with pallet racks and high-bay storage

Figure 1 Ultra-Low Temperature (ULT) Storage

Typical multi-commodity refrigerated storages are built with separate chambers each designed to offer the maximum capacity of intended stored commodity types. They include ULT storage and are supported by common anterooms, docking areas and grading/sorting areas. Large open space deep freezers can feature pallet racks and high-bay storage (Figure 1 (b)).

For ULT storages that involve crates/palletized storage components and material handling systems, hi-bay racking systems are often constructed to maximise total goods storage volume. Forklift manoeuvring and staging is designed to serve the racking systems to the maximum storage height, while avoiding the need for frequent and long exposure of warehouse operators to the ULT areas. In addition, each cold storage facility features a plant room. Cooling is achieved with ventilation systems, high-efficiency compressor, cooling coil and condensers.

The ventilation system plays a significant role in maintaining the integrity and efficiency of ULT storage ambient environments. The critical business operation relies upon the ventilation system to maintain consistent temperature, humidity, and air quality in the refrigerated storage space, preventing the buildup of harmful gases and ensuring the longevity of stored products.

ULT storage usually requires precise ventilation, they are designed to deliver and maintain the airflow that can achieve ambient condition requirements within the storage space. As such, rapid air circulation inside ULT storage with high airflow blast can move smoke, in the event of a fire incident, out of the room space quickly.

To maintain business continuity for ULT storage, it is also important to protect essential support infrastructure, such as plant and electrical control rooms. While this Case Study focuses on the specific and unique challenges posed by extreme low temperature areas, other Securiton Case Studies and Design Guides cover these support applications. The most relevant are listed in the table below.

Application	Securiton publication
Ambient warehousing	Distribution Logistics & Warehousing Industry Design Guide, June 2020
Standard refrigerated storage	Refrigerated Storages Design Guide, September 2021
Loading docks	Loading Docks Case Study, February 2023
Electrical cabinets	Early Warning Fire Detection for Electrical & It Cabinet Protection Case Study, September 2022
Electrical cabling	Early Warning Fire Detection for Ceiling Voids and Raised Floors Case Study, June 2021
Plant rooms	Large Industrial Machinery & Equipment Case Study, September 2024
Food processing and manufacturing	Food Processing Facilities Design Guide, May 2025

2.2 Fire Risk, Consequence and Safety

Despite the freezing temperatures, ULT storage poses well documented fire hazards and risks of fire. The cold, extremely dry environment means combustibles including food products and packing materials are commonly ignited by electrical failures related to lighting, refrigeration and other equipment. Inside a rather compact space, there are cables with high current running 24/7. All electrical and electronic equipment, and cabling connectors, are vulnerable to fire due to premature corrosion and high energy current within isolated areas and concealed spaces. Over 25% of fires in storage warehousing facilities originated from electrical distribution, lighting equipment or heating equipment.

Once a fire is ignited, it can rapidly escalate due to the high density of goods and vertical high racking storage systems, favoured by ventilation openings with enhancement of oxygen supply, hence, the fire growth. ULT storage can be large with little operator access or unmanned in the cases of a fully automated warehouse, render emergency response to a fire critically time sensitive with many relying on fully automatic fire safety systems from detection to suppression to control ventilation system in a logical and timely manner, contain and minimise smoke or fire damages.

On the other hand, false activation of an extinguishing system can result in substantial downtime and financial loss. Most refrigerated storages either hold goods for the owning business or as a service hub connecting businesses to their customers: either way, they are generally part of a tight and critical supply chain. Business continuity and avoiding any loss due to fire are paramount. Regardless of storage occupancy or type of commodities handled, reliable fire detection is a key to risk management of such storage facilities to ensure a high level of service availability and reliability. Naturally, any fire or non-fire incident, such as a false fire alarm can result in significant downtime of the facility's operation and services.

Fire safety in refrigerated storage has been a focus for fire engineering and risk management professionals [8]. A US study found that, while sprinklers are deemed as standard fire protection for storages, only about 30% of the warehouses from which fires were reported were actually equipped with extinguishing systems. Of these, 12% were deemed as failure to operate or to operate ineffectively [9], [10]. Even in warehouses with installed fire detection systems, some of these did not activate alarms as expected in the event of a fire. Below are examples of actual fires associated with refrigerated storage, as documented in the state of Washington in the USA:

- In the early hours of August 21, 2021, a fire broke out at the Puyallup Cold Storage Facility. The facility contained 450 kg (1,000 lbs) of anhydrous ammonia refrigerant which made the task of extinguishing the fire more difficult, dangerous and dynamic. The fire caused the destruction of 9,300 m² of the facility, and the owner for bankruptcy 4 months after the fire [11].
- The Lineage Logistics warehouse in Kennewick, Washington, caught fire on April 21, 2024. The cold storage facility smouldered for nearly two months from vegetables and packaging under a 9 m (30 ft) pile of debris. The fire destroyed a 48,774 m² (525,000 ft²) of cold storage. The 150 m (500 ft) wide, 300 m (1,000 ft) long area under inferno presented a monumental challenge to firefighting effort. More than 12.7 ton (28,000 lbs) of ammonia stock was lost in the fire. It was estimated cost more than \$80 million to just rebuild the structure [12].

While fire hazards and risk mitigation measures may vary depending on the actual building or facility occupancy and risk profile, a common fire safety and fire protection principle is to ensure a suitable fire detection system is provided for both alarm and firefighting system actuation. With a reliable fire detection system for ULT storage, fire incidents can be managed to avoid or minimise operation interruption and damages. Unnecessary power-shutdowns may also be avoided. Even as the fire situation progresses, fire services or nearby emergency response teams can be notified automatically and arrive at the scene much earlier before the fire spreads from the fire of origin to the surrounding compartments in the buildings.

3 Challenges to Reliable Fire Detection

The primary difficulty of fire detection in an ultra-low temperature environment is the extreme temperature itself, which renders most available fire detectors incapable of operating. Modern warehousing is best protected using aspirating smoke detectors (ASDs), which are capable of actively sampling air across a large space and still provide early warning of an incipient fire. ASDs are also commonly deployed in standard refrigerated storages: although many models on the market require the main detector/controller unit to be placed outside the cold store – with the condensation problems in the piping that this entails – Securiton's SecuriSmoke ASD is actually capable of operating in temperatures as low as -30°C and can therefore be located in the same temperature zone as the pipe.

However, as temperatures drop even lower, ASD units begin to struggle with the issues of condensation and other problems associated from having the detector/controller in a radically different environment to the protected area. On the other hand, most electronics start to malfunction at temperatures well above those found in ULT storages, rendering many other available devices – including most heat detectors - unsuitable.

The challenges to fire detection in ULT storage areas are summarised as follows:

- Operating conditions can be challenging in which the ambient temperature for ULT storage are operating at below -30°C (-22°F).
- The cold, extremely dry environment compounded with the various combustibles including food products and packing materials are commonly ignited during lighting, refrigeration, and/or other equipment failures.
- High air circulations, extremely low temperatures paired with condensation issues bring unique challenges to the proper use of electronic fire detection systems while conventional point type smoke or heat detectors are not suitable for such ambient conditions at all.
- Tall built and large open space structures, high density fuel load, coupled with narrow aisle widths present a challenge for detecting a fire at its incipient or early development stage.
- Fire could also spread beyond compartment itself to adjacent operation areas, and beyond.
- Condensation, and often change of temperature range to suit for operational needs or for the purpose of energy efficiency, which can all affect detection and operation performance if inappropriate detection products are selected.

Securiton's SecuriHeat ADW line-type heat detector, with its sealed, inert sensing tube system, is a cost-effective solution for various types of ULT storage unit. SecuriHeat ADW offers a robust, reliable and quick-acting fire detection system well suited for all types of harsh industrial and challenging environments. Only the sensing tube – available in copper or stainless steel– need be installed inside the cold store. Because the tube is a sealed and inert system and the controller unit simply monitors the pressure in it to gauge, it can be positioned in environments down -40°C without adverse effects on performance or lifespan/maintenance cycles. Other key advantages include its relatively high sensitivity; its real-time system fault self-check and alarm; and the fact that it is free of routine maintenance, fully water resistant, discreet and easy to install. The table below summarises how SecuriHeat ADW meets the various key challenges of fire detection in ULT storage units.

Challenge	Securiton advantages
Extreme ambient temperature	SecuriHeat ADW LTHD uses inert sensing tubes (metal or Teflon) that work in extreme temperature environments. The main control unit, which itself has an operating temperature range of -30 to +70°C (-22 to +158°F), can easily be located outside the ULT zone.
Complex internal layouts including high racking of combustible goods	Sensing tube can be bent to shape to cater for open space and object localised detection.
Difficult environment to access for ITM	The main detector unit can be installed outside the monitored area and requires very little regular testing or maintenance.
False alarms have serious repercussions	<p>Unique highly sensitive rate-of-rise detection combined with fixed threshold alarm for maximum reliability.</p> <p>The Dynamic Heat Watch feature allows the system to discern between ambient heat rises and a real fire by verifying rate-of-rise anomaly after initial detection.</p>

4 Optimised Design & Use Case

SecuriHeat ADW is an integrating line-type heat detector with a response behaviour based on heat differential and/or maximum heat. It is a reliable, fit-for-purpose fire safety solution to protect ULT storages that require single fire zone coverage. The self-check feature and the periodic, automatic test are other advantages for use in applications such as ULT storage where the legally prescribed functional and maintenance checks are performed at difficult access sites due to environmental and operational conditions.

This chapter outlines design recommendations and methods using SecuriHeat ADW to protect ULT storage.

4.1 Design Codes of Practices

The unique fire hazards, risks and consequences from fire damage in ULT refrigerated storage facilities are addressed through international and national codes and standards. Stakeholders from insurance companies and industry bodies to local AHJ's have develop various refrigerated storage protection guidelines or directives, such as FM Global DS 8-29 for Refrigerated Storage [13]; CEBA European Division's Guidelines for the Design, Construction, Specification and Fire Management of Insulated Envelopes for Temperature Controlled Environments [14]; IPENZ Practice Note for Coldstore Engineering in New Zealand [15]; CEA Specifications for the Protection of cold areas for EU [16]; FPA Design Guide for the Fire Protection of Buildings for stand-alone cold stores in UK [17]; BIS Code of Practice for Fire Safety of Industrial Buildings: General Storage and Warehousing Including Cold Storages in India [18]; and Chinese national standard GB50072-2010 for cold store design.

Other fire detection and protection codes may also apply in terms of location requirements of fire protection system. Examples of these are FM Global and AXA XL Risk Consulting [19] and NFPA 13 [20]), which cover where and how such fire protection systems are installed based on hazard type and fuel loads.

Although there might be marginal differences from one country to another in Deem-to-Satisfy (DtS) prescriptive building and fire code requirements on fire detection, a combination of DtS prescriptive and risk-based design approach is the best engineering practice to meet prescriptive requirements as well as to satisfy facility operators' need for business continuity and property protection.

Performance-based Design (PBD) is typically implemented when elements of fire safety and protection system design are not covered in the prescriptive codes among others due to unique building structure, environmental conditions, added detection for early warning or extended egress considerations [21]. A PBD approach is commonly adopted for either of the following:

- As a means to determine equivalency to a prescriptive code or standard
- As an approach to achieve broadly defined fire safety goals and objectives

While codes and standards may not explicitly prescribe the exact fire safety and protection measures for ULT storage, the risk-informed PBD method is a fitting fire engineering methodology to devise a suitable detection solution taking into account specific risk areas within the ULT storage for both open space and object-oriented fire safety design. Note that SecuriHeat ADW meets all response classes and all environment groups per EN 54-22 [22]; and supports key temperature classes and range of spacing options per NFPA 72 [23].

4.2 Design Criteria: SecuriHeat ADW LTHD

This chapter describes design criteria using SecuriHeat ADW LTHD in ULT storage. SecuriHeat ADW LTHD represents sealed system that is immune to dust and moisture. Provided the right grade of tubing or cable is used, it can resist chemicals and high pressure washing. It detects temperature changes by monitoring the air pressure in the tube and can alert almost instantly to any potential fire incident or developing fire event.

Table 1 illustrates how LTHD Fire Detection system performance and other design parameters such as environmental conditions and typical applications, are defined.

Design Parameters	BS/EN 54-22 [22] ²	NFPA 72 [23]
Class vs. Detection Range	Response Class	Detection Range °C (°F)
	A1	54 - 65 (129 - 149)
	A2	54 - 70 (129 - 158)
	B	69 - 85 (156 - 185)
	C	84 - 100 (183 - 212)
	D	99 - 115 (210 - 239)
	E	114 - 130 (237 - 266)
	F	129 - 145 (264 - 293)
	G	144 - 160 (291 - 320)
Environment Group	Environment Group	Temperature Class
	(E)1	Ordinary
	(E)2	Intermediate
	(E)3	High
Typical Applications and Boundary Conditions	Temperature Range °C (°F)	n/a
	E1: Indoor; Stable and Clean Conditions; Commercial and industrial	
	E2: Indoor; Varying and polluted environment; Commercial and industrial	
	E3: Outdoor; Harsh conditions	

Table 1 SecuriHeat ADW LTHD key performance parameters

A summary of SecuriHeat ADW LTHD key performance parameters is shown Table 2 in below.

Model	Key performance parameters
SecuriHeat ADW Classes and tube	
Classes	See Table 1
Sensing tube length	2 x 10 - 200 m (33 - 656 ft) ³
Tube type	Copper (TU 5/4 Cu), stainless steel (TU 5/4 SS)
Rating and operational data	
IP device approvals	IP65
Operating temperature (main control unit)	-30 to +70°C (-22 to +158°F)
Operating temperature (sensing tubes)	Copper/stainless steel: -40 to +300°C (-40 to +572°F)
# of Relays: Built-in (Expanded – Module)	2 (10 – 2 x RIM36)
Product Type Approval Standards and compliance level	
EN 54-22	Classes A1I to GI
UL 521 – ULC-S530-M91	per EN 54-22 Classes A1I to GI
FM 3210 / NFPA 72	Classes Ordinary, Intermediate, High

Table 2 SecuriHeat ADW product key performance parameters

² ISO 7240-22 is derived from BS/EN 54-22.

³ For EN 54-22 designs the sensing tube length is limited to 2 x 10 - 140 m (33 - 459 ft)

In general, simply follow relevant codes and standards for the design of heat detection system to meet prescriptive requirements. Sensing tube can be flexibly installed for open space ceiling level protection or localised area protection in likely area of heat build-ups caused by incipient fires. The main control units themselves can be located outside of the protected area – note that this then requires that an external sensor (ART 535) be added to the design, as the ADW otherwise uses an embedded sensor in the control unit to calibrate temperature. All tubing types are suitable for ULT storage protection. In all cases, SecuriHeat ADW LTHD sensing tubes must be earthed to avoid sparks and arcing should it become electrically charged.

To protect ULT storage, SecuriHeat ADW can be used following the risk-informed, Performance-Based Design (PBD) principle in addition to prescriptive code requirements. The essence of the design objective is to place SecuriHeat ADW tubing at ceiling level as well as lower level in-rack detection where hi-bay racking systems require it. Based on the actual business operation, additional considerations may be required to address different fire risk scenarios and ambient conditions to ensure high level of protection as a whole.

4.3 Application Scenarios

To protect ULT storage, SecuriHeat ADW can be used following the risk-informed, Performance-Based Design (PBD) principle in addition to prescriptive code requirements. The essence of the design objective is to place SecuriHeat ADW tubing at ceiling level as well as lower level in-rack detection where hi-bay racking systems require it. Based on the actual business operation, additional considerations may be required to address different fire risk scenarios and ambient conditions to ensure high level of protection as a whole.

Figure 2 is an illustration of a possible sensing tube layout inside a ULT storage. The run of tubes has been designed to offer ceiling level and in-rack heat detection without interfering with access by machinery to the goods in the racks. For smaller storages, a simple ceiling level layout may be preferred.

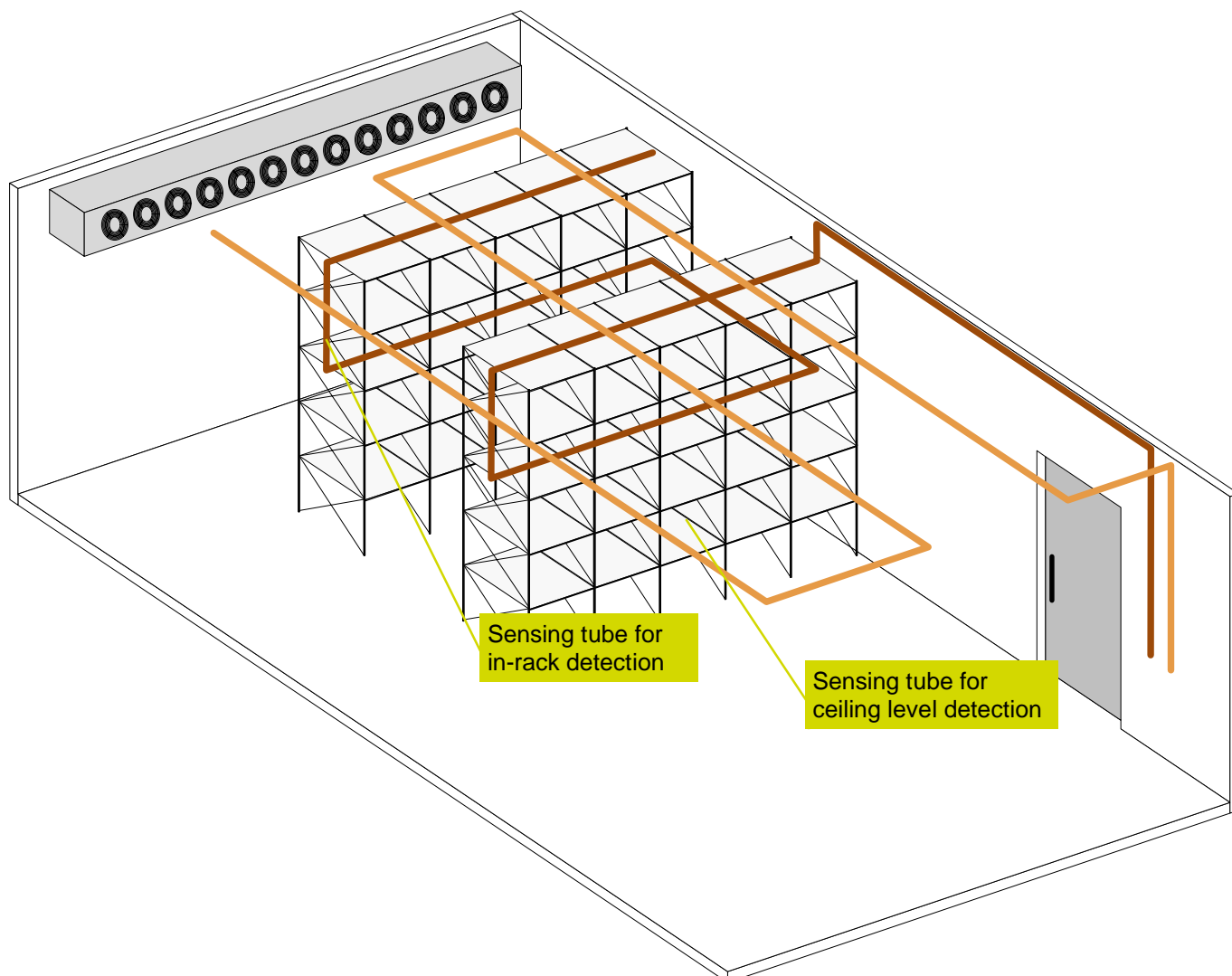


Figure 2: Example of ADW tubing layout for in-rack and ambient protection in a ULT storage

Variable	Design recommendation
Spacing	<ul style="list-style-type: none"> ▪ Different standards may have different spacing requirements. NFPA 72 requires that all points (spot-type heat detectors) on the ceiling have a spacing within a distance of 0.7 times the listed spacing of the heat detector, commonly known as Point 7 (0.7) Rule. Furthermore, reduction in listed spacing (of up to 15 m (50 ft)) must be applied when detectors are mounted on ceilings higher than 3 m (10 ft). For example, for ceiling height of 8.5 to 9.1 m (28 to 30 ft), 34% of listed spacing applies, meaning a spacing of 5 m (17 ft) for heat detectors with a maximum listed spacing of 15 m (50 ft). ▪ Spacing is also reduced when the heat detectors are installed on other than flat, smooth or slightly sloped (generally a slope no greater than 10% of the roof height) ceilings. ▪ To incorporate risk-based design where placement of SecuriHeat ADW LTHD tubes is in close proximity of the protected objects or areas, the same tubing can be extended to cover areas in the same room, or the two-channel version of the ADW allows for a second tubing run from the same controller (see Figure 2). ▪ If needed, additional sensing coil (see Figure 3) can be added for specific location detection and alarm.
Placement	<ul style="list-style-type: none"> ▪ Under the ceiling for general open spaces protection taking into account relevant code requirements. For example, NFPA 72 stipulates that LTHD cables or tubing installed must be no more than 508 mm (20 in) from the ceiling. ▪ Distance to the wall and to the ceiling when the sensing tubes are mounted on the wall are also prescribed depend on the adopted design codes and standards. For example, when installed on the ceiling, NFPA 72 stipulates that spot type heat detectors must be located a minimum of 100 mm (4 in) from side walls; when installed on side walls, the detector must be between 100 mm (4 in) and 300 mm (12 in) from the ceiling. As per BS/EN 54-5 [24], heat detectors may be positioned 3.5m (11 ft) from a wall. ▪ For in-rack detection, the sensing tube can run at the same level or one level above in-rack extinguishing systems. Use pipe clamps, no more than (1.5 m) 5 ft in spacing, to avoid unintentional damage of the sensing tube.
Orientation	<ul style="list-style-type: none"> ▪ Sensing tube at ceiling level can be positioned taking into account other fixtures such as lighting and blast fans; ▪ Sensing tube generally runs in straight lines but is flexible enough to go around obstacles, safety barriers or other structural fittings when needed.
Additional notes	<ul style="list-style-type: none"> ▪ Follow NFPA 70 National Electrical Code or equivalent for wiring SecuriHeat ADW and connecting it to building fire alarm panel. ▪ Although the ADW control unit can tolerate temperatures of -30°C, it is best to position it outside the cold store for ease of access, even when storage unit's operational range is expected to remain within the ADW's tolerances. An ART 535 external sensor (rated to -50°C) should be placed in the cold storage area to allow the control unit to correctly calibrate temperatures. ▪ When integrating with other building control systems, only Securiton authorised accessories and modules, such as RIM 36, XLM 35 and SIM 35 can be installed. ▪ Test coil may be installed for functional test away from the protected areas or outside the protected rooms (see Figure 4). ▪ Choice of Max-Alarm, Diff-Alarms threshold respectively; Integration Alarm to enable Pre-signal for early alert for rapid local site response. ▪ It is possible to use ADW 535-2 dual detector/2-channel sensing tube for 2 individual ULT storage compartments in very close proximity of each other. ▪ When SecuriHeat AWD is the only fire detection for code compliance, the area of coverage includes the entire zone in accordance with relevant fire code requirements, such as compartmentation, fire alarm notification or need for fire extinguishing system integration.

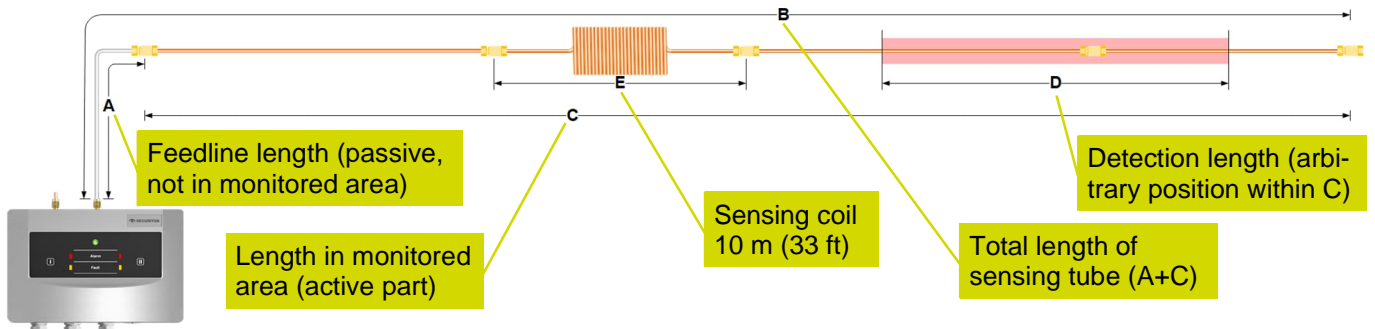


Figure 3 Typical SecuriHeat ADW sensing tube arrangement

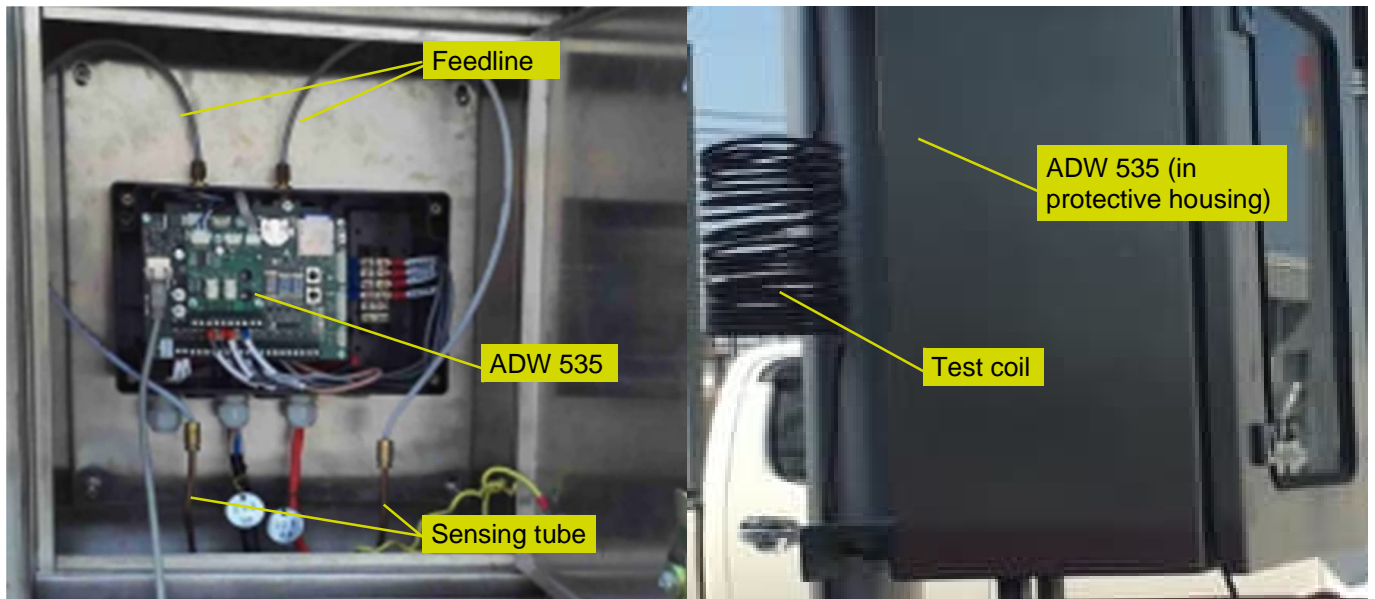


Figure 4 Connection of feedline to tube and ADW; test coil

4.4 Features and Benefits

Securiton AG as a whole is certified in accordance with ISO standards 9001, 14001 and 45001 and thus meets globally applicable standards with regard to quality management, environmental management, and occupational health and safety management systems.

SecuriHeat ADW 535 offers optimal protection from false alarms with in-built intelligent DHW algorithm (Dynamic Heat Watch) and self-check constantly via an integrated pressure generator, ensuring maximum reliability and minimal maintenance. ADW is one of the most cost-effective ways of providing reliable heat-based early fire detection in many challenging environments indoor or outdoor. A single unit can cover up to 1'600 m² (17,222 ft²) of open space with 2-zone individual alert and fire alarm.

Features	Benefits
Copper or steel tubing	Resistant to harsh outdoor conditions to achieve best cost/benefit
Dynamic Heat Watch algorithm	Elimination of false alarms
Fully automatic system monitoring	Minimal maintenance
2 Levels of Alert/Alarm	Pre-signal: Verify and control (manually initiate the suppression) Alarm: Initiate fire alarm; call fire brigade; initiate suppression

For ULT storage with a number of freezing compartments configuration across a large site, SecuriHeat ADW LTHD may be connected to a laptop for easy services and troubleshooting. During the normal operation, networked SecuriHeat ADW LTHD main control units are connected to a building FAS via RS485, Ethernet with SecuriLine expansion card. If a pre-action type extinguishing system is used, SecuriHeat ADW LTHD can also be configured to actuate the release of the fire extinguishing systems.

4.5 Minimal System Access for ITM

Due to advanced automatic sealing test and SecuriHeat ADW LTHD system self-test functions, the whole detection system is largely maintenance free. If local codes and standards require in-person periodic function check or visual inspection, make use of the conveniently located test coil (see [Figure 4](#)) for a safe execution of functional test without entering the difficult access area or disrupting operations inside the protected areas.

4.6 Support with Peace of Mind

SecuriHeat ADW LTHD products are supported with range of software tools as followings:

Design	ADW HeatCalc allows the planning of security systems at a very early stage.
Install and service	EasyConfig for simple systems. The practical ADW Config software tool is used for more complex systems and application-specific adaptations.
Monitor and manage	ADW HeatCalc and ADW Config. Extensive analysis functions and setting options ensure safe, cost-effective operation of the whole SecuriHeat LTHD system.

Applications and design support includes mainly:

- Partner accreditation program
- Application and field engineering support
- Worldwide reach through a network of partners as well as subsidiaries and investment companies, with branch offices or local employees on every continent.

List of References

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