TEMPERATURE MONITORING IN UNDERGROUND GARAGES AND PARKING GARAGES

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

This white paper describes the challenges of fire protection in underground garages and parking structures and shows how the d-LIST linear heat detection system from LISTEC GmbH locates fires and initiates further measures to protect people, buildings, and cars.

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1. Introduction & Press Reports

Underground garages and parking structures have become an integral part of the modern cityscape—they offer convenience and space for numerous vehicles. But it is precisely in places where many cars are parked in a confined space that an often underestimated danger lurks: fire. Fires occur time and again in such facilities, with the proximity to vehicles and their technical components further increasing the risk.

Fires in underground garages and parking garages.
Examples from press reports:

July 08, 2025, Wedel (Pinneberg district)
Underground parking garage and parts of the central bus station in Wedel at risk of collapse after fire

https://www.ndr.de/nachrichten/schleswig-holstein/tiefgarage-und-teile-des-zobs-in-wedel-nach-brand-einsturzgefaehrdet,shnews-148.html

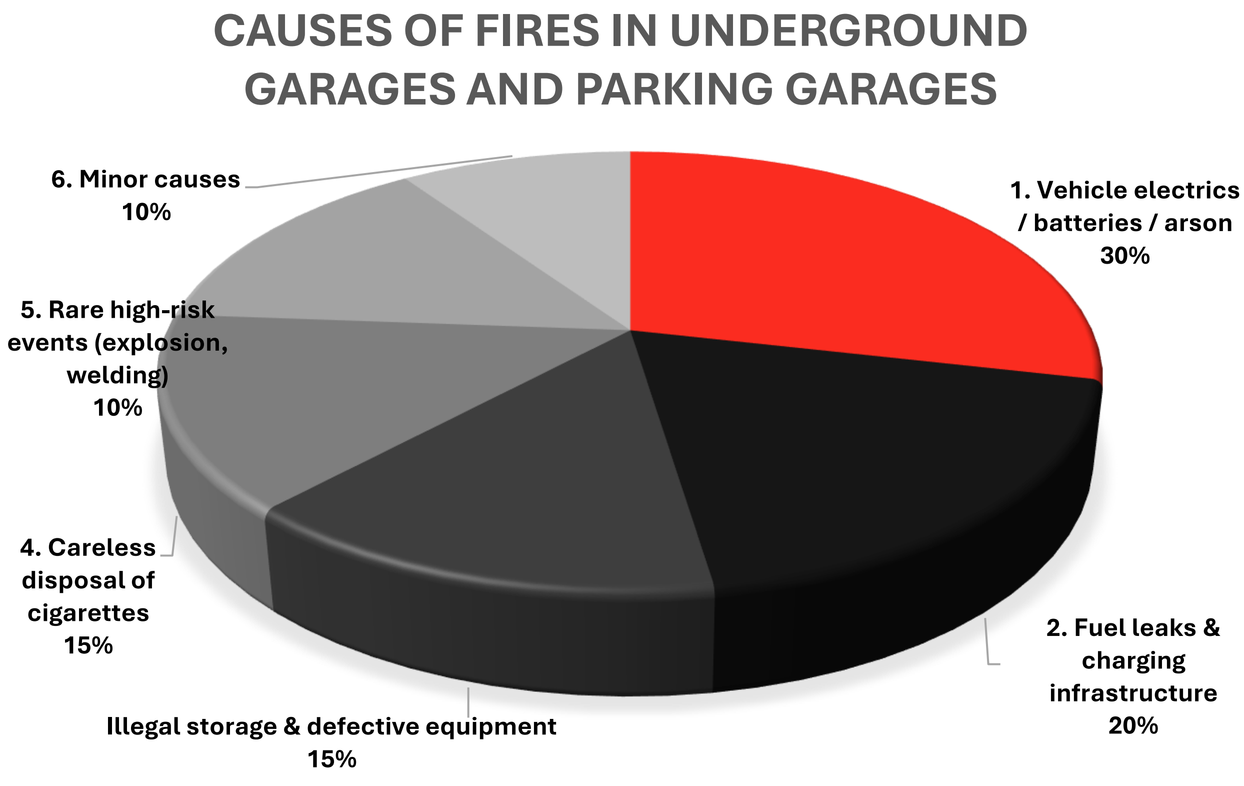
February 08, 2025, Blankenfelde train station
Fire at Blankenfelde train station extinguished—no danger of collapse

https://www.rbb24.de/panorama/beitrag/2025/02/brand-bahnhof-blankenfelde-parkhaus-autos-gefahr.html

2. Fire hazards & triggers

Fires repeatedly break out in underground garages and parking structures. The risk of fire is always particularly high in the vicinity of cars and engines. Electric car charging stations are especially hazardous locations. In general, cars contain large quantities of various combustible materials such as rubber, plastics, lubricants, and fuels. In addition to the intense heat generated by such fires, dense and toxic smoke is often produced. Buildings and inventory are quickly damaged by the aggressive smoke gases, requiring costly repairs. Parking garages are usually large and often have multiple floors. The interaction of several safety devices is therefore sensible and effective.

- Defective electrical systems in vehicles (short circuits, cable fires)
- Battery fires in electric and hybrid vehicles, as well as e-bikes (high fire load, difficult to extinguish)
- Fuel leaks & flammable liquids
- Short circuits in charging infrastructure (electric charging stations, sockets)
- Arson in vehicles
- Overheating of engines/catalytic converters
- Illegal storage of flammable materials (paints, canisters, trash)
- Defective electrical systems in the garage (lighting, wiring)
- Carelessly discarded cigarettes
- Defective ventilation or heating systems
- Improper work (welding, angle grinding without fire protection)
- Explosion due to gas or chemical storage
- Lubricant fires in elevators or conveyor systems
- Illegal use of the garage as a workshop or party room
- Dust and oil deposits ignite
- Minor fires caused by defective lighting
- Vandalism (e.g., burning trash can)



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.

Our sensor cables are ideal for use in demanding environments such as underground garages and parking garages thanks to their robust, enclosed design. Conditions in these locations are often difficult: dust, moisture, exhaust fumes, and extreme temperature fluctuations are not uncommon. Especially in areas with high vehicle density, early detection of temperature rises is crucial to prevent fires and protect people and property.
The LISTEC sensor cable has integrated temperature sensors at defined intervals, which enable precise localisation of temperature changes – along parking bays, in technical rooms, or in areas with charging infrastructure. This allows critical zones to be reliably monitored and potential sources of fire to be detected at an early stage.
With this technology, LISTEC has been ensuring greater safety and operational continuity for decades – including in underground garages and parking structures worldwide.

Temperature monitoring of underground garages and parking garages

For early fire detection and efficiency monitoring, seamless temperature monitoring of buildings is essential. This is where the d-LIST system can enable significant improvements.

- Protection of human life
- Comprehensive early fire detection and monitoring
- Temperature monitoring
- Control of cooling and extinguishing systems
  (see existing VdS protection concept S619004)
- Control of systems and separation from the grid

Advantages of the d-LIST system (SEC 15 + d-LISTcontroller / SCU)

- Resistant to dust/dirt/gases/vibrations
- Differential and maximum temperature evaluation
- Installation possible in single-branch operation or with multiple branches
- Measurement resolution (always 0.1 °C, internally 0.0625 °C for d-LIST)
- Repeat accuracy (always ± 0.1 K along the entire cable length)
- Detection of overheating along the entire cable length
- Freely selectable sensor spacing, 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
  sensor cable installations

Automatic extinguishing systems, video cameras, emergency exits, escape staircases, wall hydrants, fire extinguishers and sound systems with loudspeakers for information announcements complement the d-LIST system, which guarantees seamless temperature monitoring even in areas that are difficult to access.

4. Application/Installation/Monitoring

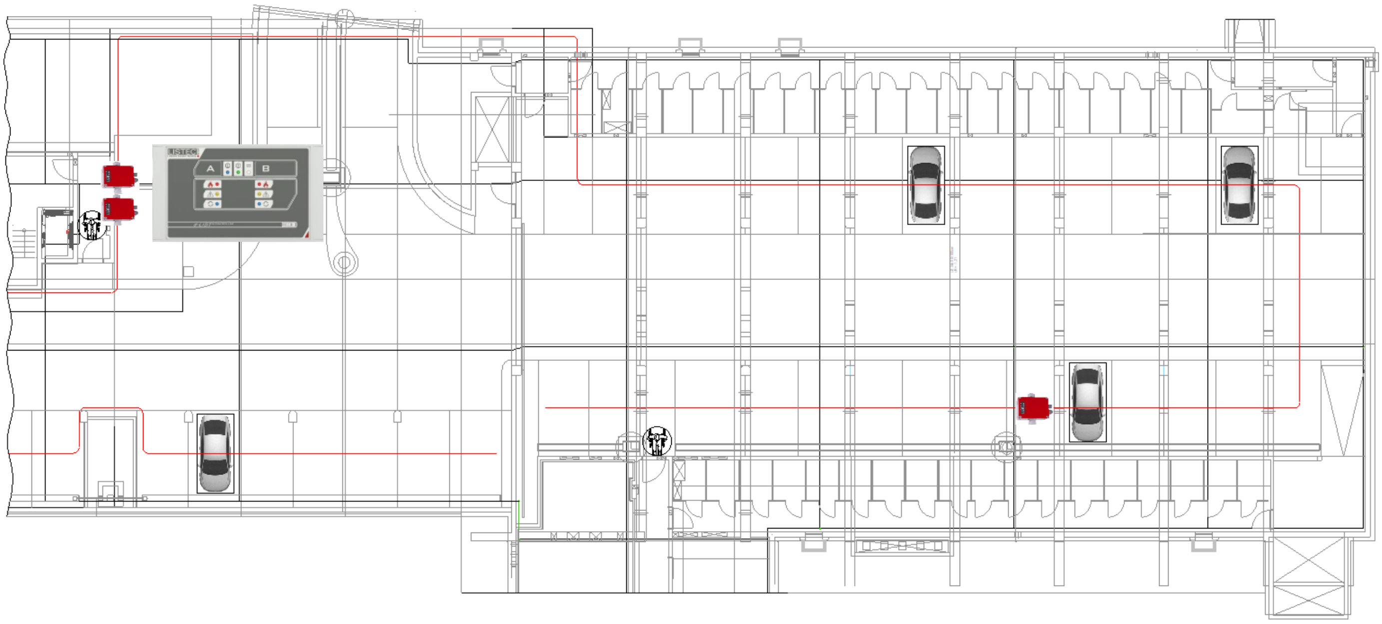
- Attachment of the sensor cable to the ceilings and beams in the garages
- The recommended sensor spacing for car parks is 3 m or 4 m (SEC 15/03, SEC 15/04)

- Fastening the sensor cable with polyamide clamps
- The sensor cable can be easily fastened anywhere
- Can also be fastened to the suspension cable using cable ties FEMC

Example of sensor cable installation in an underground parking garage, monitoring of parking spaces

- Sensor cable SEC 15/04
- connecting cable CC 15


CBO 15 connection box



5. Certificate excerpt

The d-LIST / SEC 15 system is, among other things, a VdS-approved system 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 – mitsamt 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.

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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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