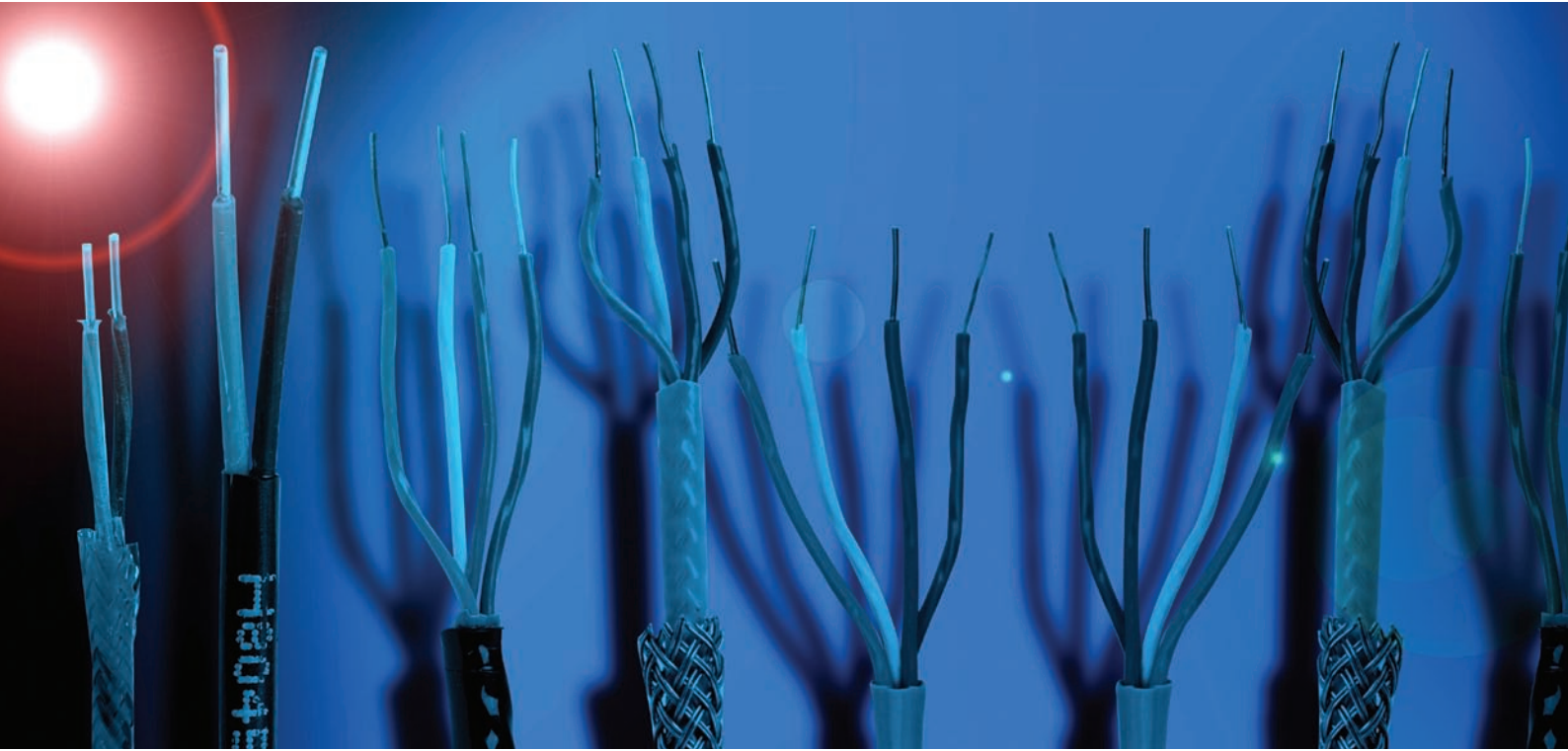
ALARMLINE
Linear Heat Detection

Application Guides



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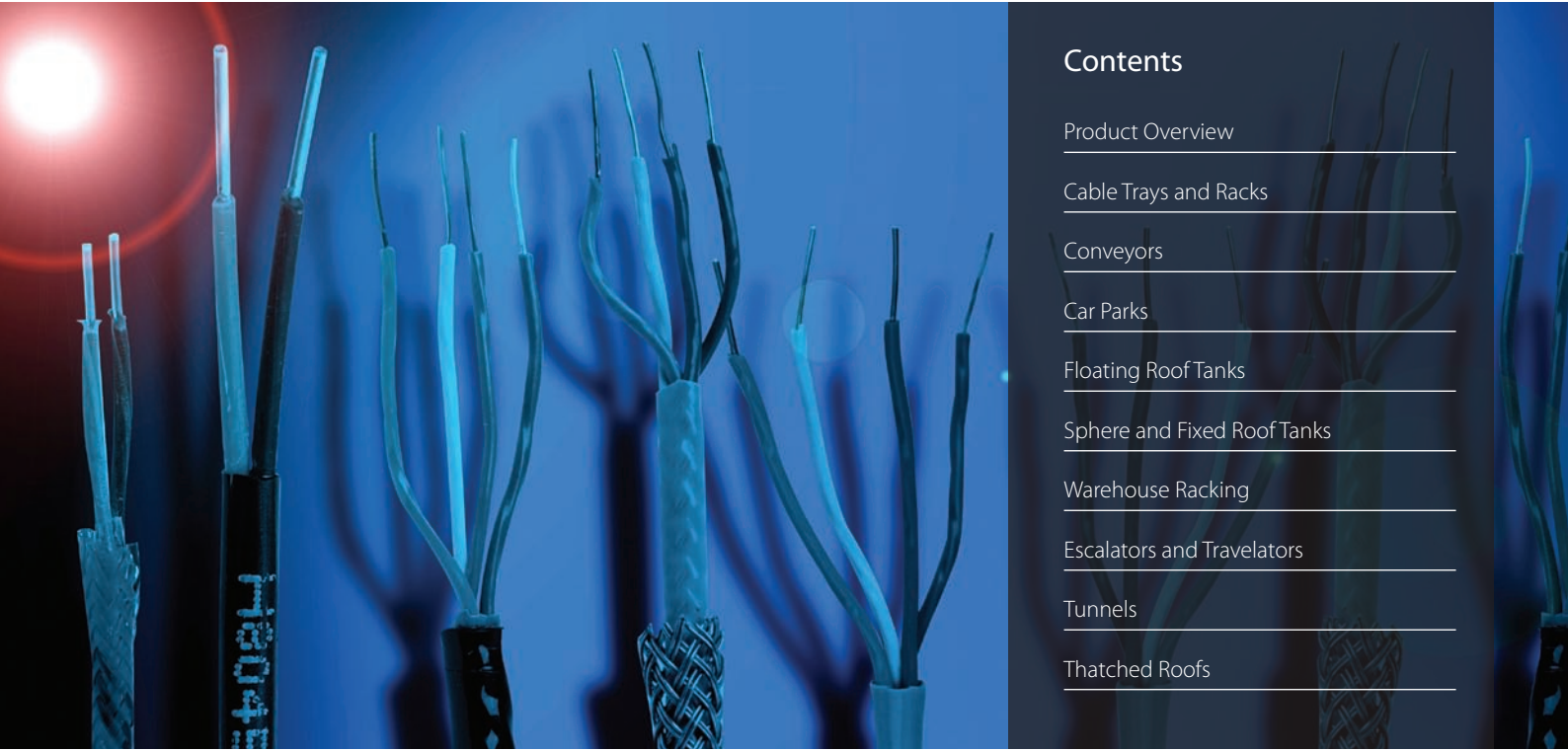
Application Guides



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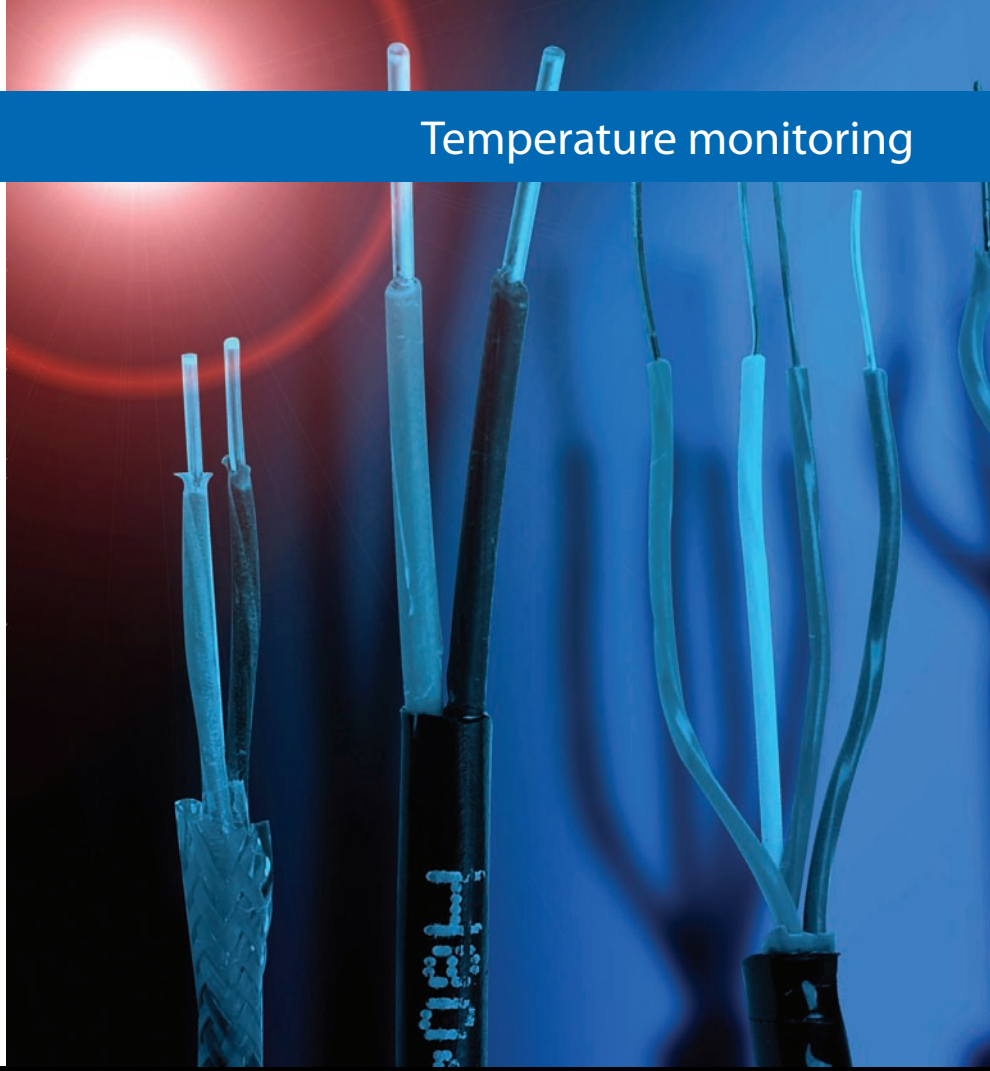
Temperature monitoring



Kidde Alarmline Linear Heat Detection (LHD) is a cable based system that provides economical temperature monitoring at the precise point of risk. The system is reliable, flexible and has the ability to detect abnormal temperature variances before it develops into a fire situation. The comprehensive Alarmline portfolio consists of both Analogue and Digital systems, allowing a large range of both commercial and industrial overheat and fire risks to be protected, ranging from ambient temperatures of -40ºC to + 200ºC.

Alarmline cable and its associated controllers allow integration with many fire alarm and extinguishing control systems offering a complete system solution.

The use of ATEX approved junction boxes and Intrinsically Safe barriers enable the Alarmline system to be used in hazardous areas.

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Analogue

Alarmline Analogue is a four core cable, which senses temperature variations by continuously monitoring the resistance of the specially doped Negative Temperature Coefficient (NTC) polymeric insulation. A change in the temperature produces a relative change in resistance which is monitored by a dedicated Alarmline Analogue Controller.

Analogue cable is provided with a selection of protective outer sheaths to suit various applications:

Standard (K82017)
Standard protection

Nylon coated (K82021)
Chemical/environmental protection

Bronze braided (K82078)
Mechanical protection

Nylon + Stainless Steel braid (K98166)
Chemical/environmental and mechanical protection

The Analogue controller (LHD4) provides the facility to select the temperature at which the Alarmline system will activate: using a simple chart (Nomogram). The LWM-1 controller additionally provides dual functionality to operate as a fixed temperature heat detector as well as detecting sudden increases in temperature i.e. Rate of Rise.

Digital

Alarmline Digital is a twin conductor cable with temperature sensitive insulation protecting the inner conductors. Alarmline Digital operates by melting the internal insulation at a predetermined temperature, this results in the conductors short circuiting which provides a fire alarm signal. Fire and Fault conditions are provided by continuously monitoring for a short circuit (Fire) or an open circuit (Fault) state by the fire alarm panel.

A range of five temperature cables are provided:

H8040N	Alarm temperature 63-70ºC
H8045N	Alarm temperature 79-95ºC
H8028	Alarm temperature 101-108ºC
H8069	Alarm temperature 177-189ºC
H9650	Alarm temperature 229-251ºC

The digital cables are protected by a range of outer sheaths nylon, PVC or high temperature chemical resistant Fluoropolymer to meet specific application requirements.

Temperature monitoring at the precise point of risk

System design and installation

The design and installation of the Alarmline system is unique to every site and application therefore it is recommended that this work is only undertaken by trained and competent persons following the manufacturers guidelines.

How do I choose between Analogue and Digital cable?

The choice of Alarmline system will depend on a number of factors including but not limited to:

- Nature of the risk
- Maximum ambient temperature
- Risk of mechanical damage
- Chemical resistance
- Exposure to the elements
- Hazardous area requirements
- Interfacing requirements

The following simple questions can provide a guide to selection:

- Is an adjustable alarm setting required on site?
- Does the system require detection of rapid increases in temperature i.e. Rate of Rise detection?
- Is periodic testing of the cables alarm temperature required?
- Are specific system status indications required local to the risk area?
- Do you require specific alarm and fault relay outputs for each Alarmline detection zone?
- Does the application require mechanical protection of the sensor cable?

If the answer to any of the above questions is yes then the Alarmline Analogue system would be the required option.

If the answer to the above questions is no then an Alarmline Digital system could be considered.

Digital cable additional benefits

- Suitable for high and low ambient temperatures
- Suitable for a high temperature alarm applications: 240ºC
- High temperature Fluoropolymer option for Chemical / UV radiation resistance.
- Simple interfacing to existing fire systems.

Basic installation guidelines

- Unless specifically required to monitor surface temperature, Alarmline should not be in contact with any material which may act as a heat sink
- Alarmline should be supported at a maximum of every metre with suitable fixing clips to prevent sagging in the sensor cable
- Neoprene sleeving must be used with metal fixing clips to prevent the clip from acting as a heatsink
- Alarmline must be supported either side of a bend

Typical applications include:

- Cable trays
- Car parks
- Conveyors
- Escalators
- Floating roof tanks
- Sphere and fixed roof tanks
- Thatched roofs
- Tunnels
- Warehouse racking

Other typical applications not included in this guide:

- Dust/dirty environments
- Pumps
- Silos
- Transformers
- Vehicle engines

For more information on these applications, please contact Kidde AirSense directly.

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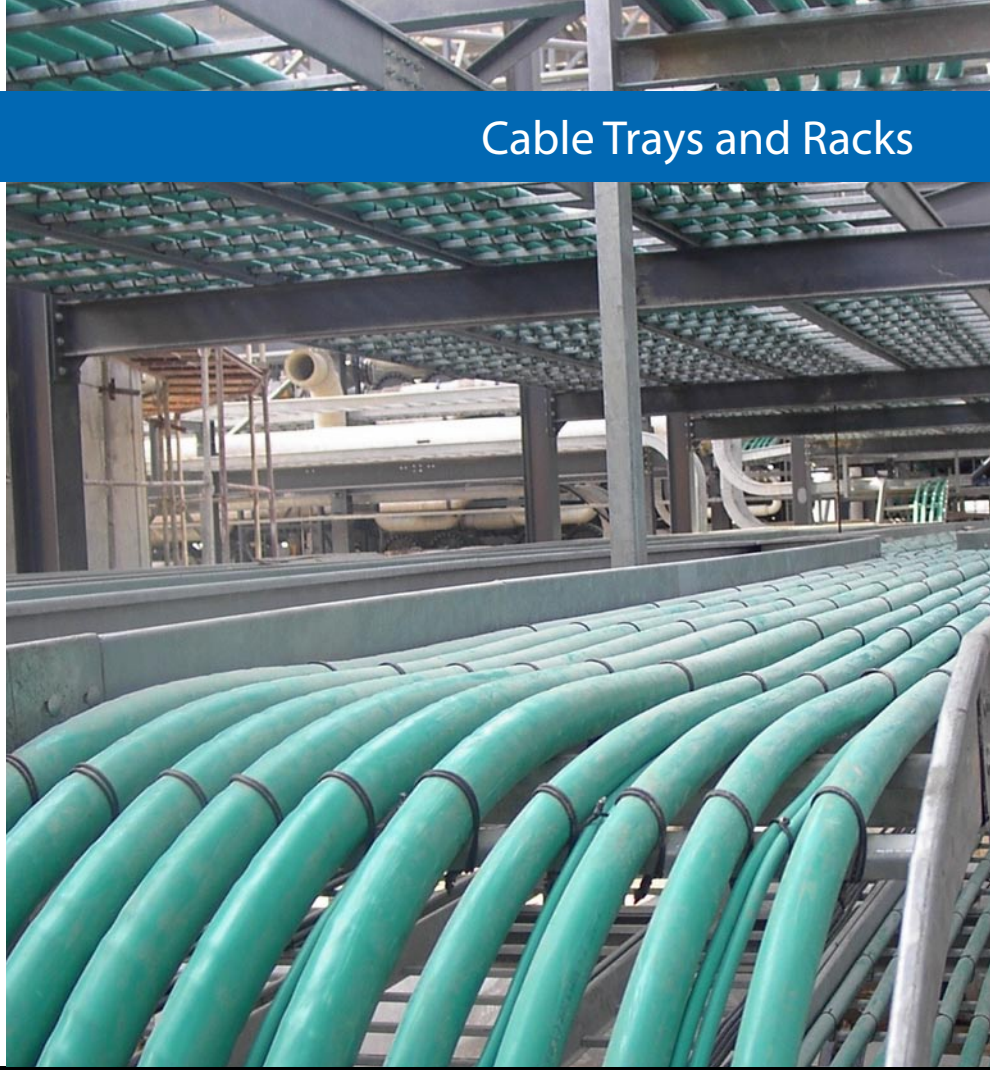
Cable Trays and Racks



The main cause of fires in cable trays is due to overheating cables caused by over voltage, short circuit, etc. Cable trays generally consist of a number of cables running side by side tightly packed together. Development of a fire in a single cable can very rapidly spread to other cables due to the close proximity, causing severe consequential losses.

Generally cable trays are located in restricted spaces (service tunnels/vertical risers) making access difficult and potentially leading to undetected fire spread therefore early detection of an overheat condition is necessary to prevent a major disaster.

Alarmline is ideally suited to this type of application as it can be installed very close to the point of risk giving the earliest possible detection of an overheat condition. Alarmline is unaffected by the environmental conditions which may cause false alarms with other detection types i.e. dust, humidity etc.

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Cable Trays and Racks

Design and installation guidelines

Depending on the configuration of the cable trays or racks, i.e. whether it is a single run or multiple levels of cable trays, it would generally be necessary to split the cable trays into smaller detection zones making identification of the overheat location easier. Zoning can be configured in relation to:

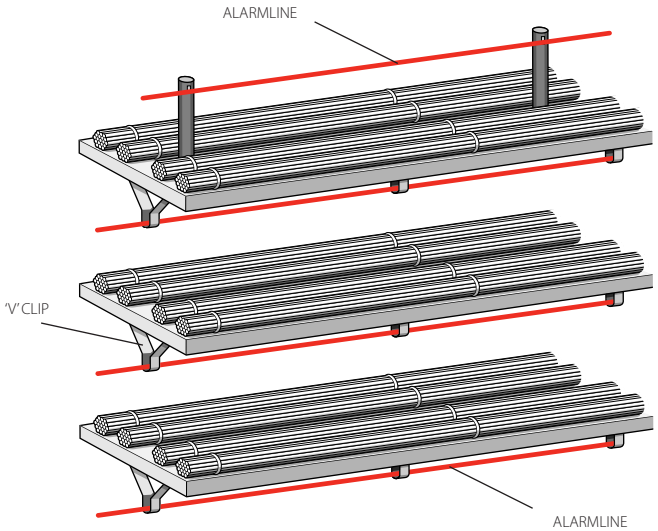
- Physical barriers
- Defined sections of cable tray or rack
- Existing extinguishing zones

The interface used for monitoring Alarmline may be located in the detection zone or remotely, the latter requiring an interposing cable from the interface to the detection zone, connected to Alarmline via a suitable junction box and fire rated cable.

The width of the cable trays will be significant in determining the amount of Alarmline required to provide the best detection. As a guideline:

- A single run of Alarmline will cover a cable tray <600mm wide
- Cable trays >600mm wide will require additional runs of Alarmline

Alarmline must be supported at a maximum of one meter spacing and should be installed no more than 200mm above each cable tray/rack. This provides maximum operating sensitivity without obstructing access to the cables. A further run of Alarmline is recommended on the underside of the bottom tray/rack to protect against any 'debris' fire.



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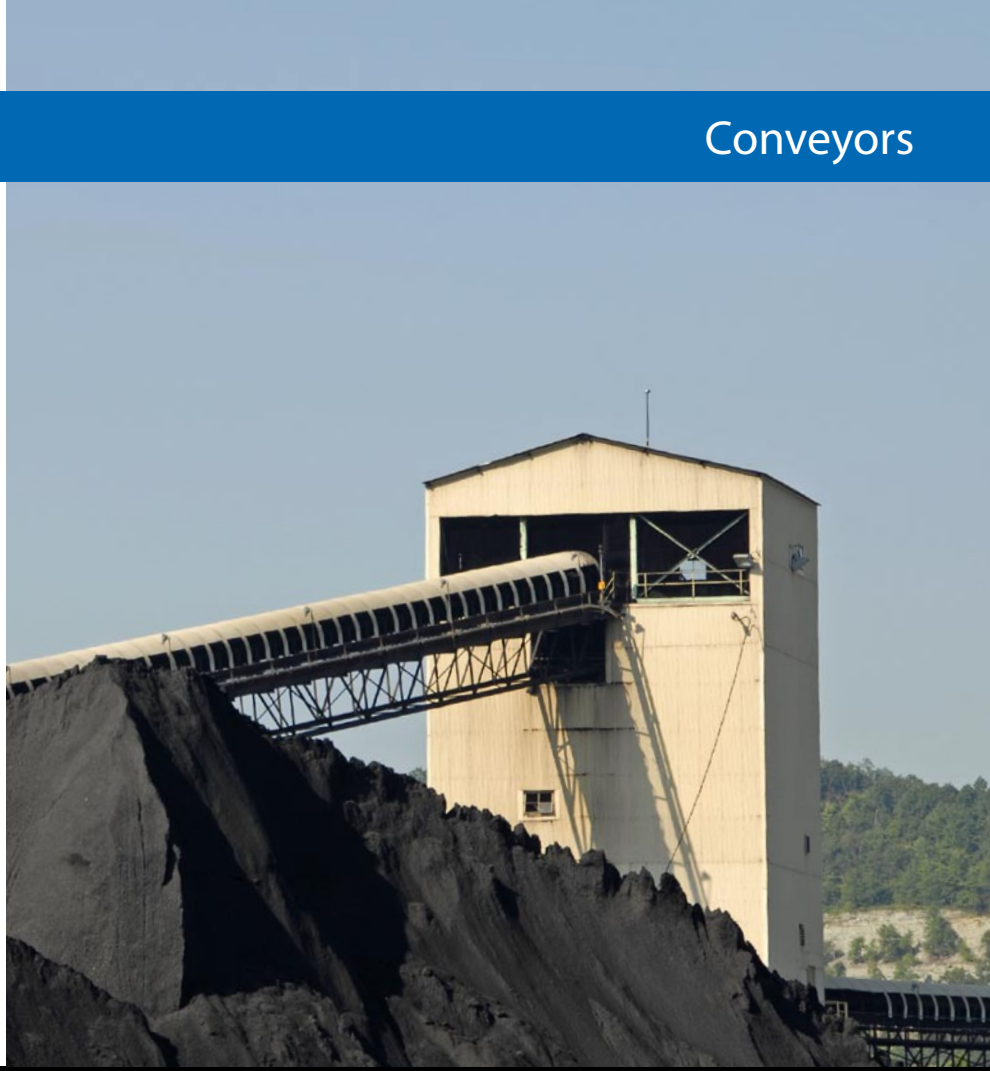
Conveyors



Conveyor fires are most commonly caused by friction. This occurs when the roller bearings used to move the conveyor belt seize and the rubber conveyor belt rubs against the seized bearing causing an overheat condition. This overheat if not detected early can cause ignition of the fuel being carried on the conveyor, the conveyor belt and other adjacent combustibles.

A fire generated by friction, which if allowed to spread can cause severe damage to the belt, and the housing containing the conveyor. Alarmline can be used to provide point of risk detection to give an early warning of an overheat condition. Interfacing with other control equipment can initiate conveyor shut downs and operation of suppression systems to prevent the spread of a fire.

Alarmline is particularly suitable as it can be installed where high levels of dirt, dust, wind and moisture exist and still be effective. The design of the conveyor will determine which type of

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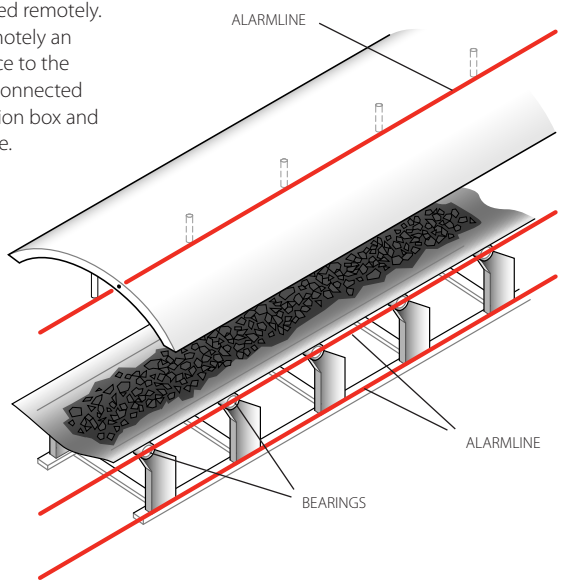
cable to use, as a minimum the cable will require mechanical protection but where exposed to the elements mechanical and chemical protection would be required.

Design and installation guidelines

The recommended design is to install Alarmline down each side of the conveyor clipped to the roller supports to detect an overheat on the bearings, with a further run under the bed plate on each side to detect overheat fires caused by the spillage of product from the conveyor belt.

If the conveyor is enclosed or covered then it would be recommended to install Alarmline above the conveyor belt to detect any fires on a stationary conveyor belt. Other areas of conveyors which should also be considered for the use of Alarmline would be the drive motors and oil filled gear boxes

It is recommended that the conveyors should be spilt into zones, to limit search areas and combine with any proposed sprinkler/ suppression systems. The interface used for monitoring Alarmline may be located in the detection zone or it may be installed remotely. If the interface is to be located remotely an interposing cable from the interface to the detection zone is required, this is connected to Alarmline using a suitable junction box and should be a suitably fire rated cable.



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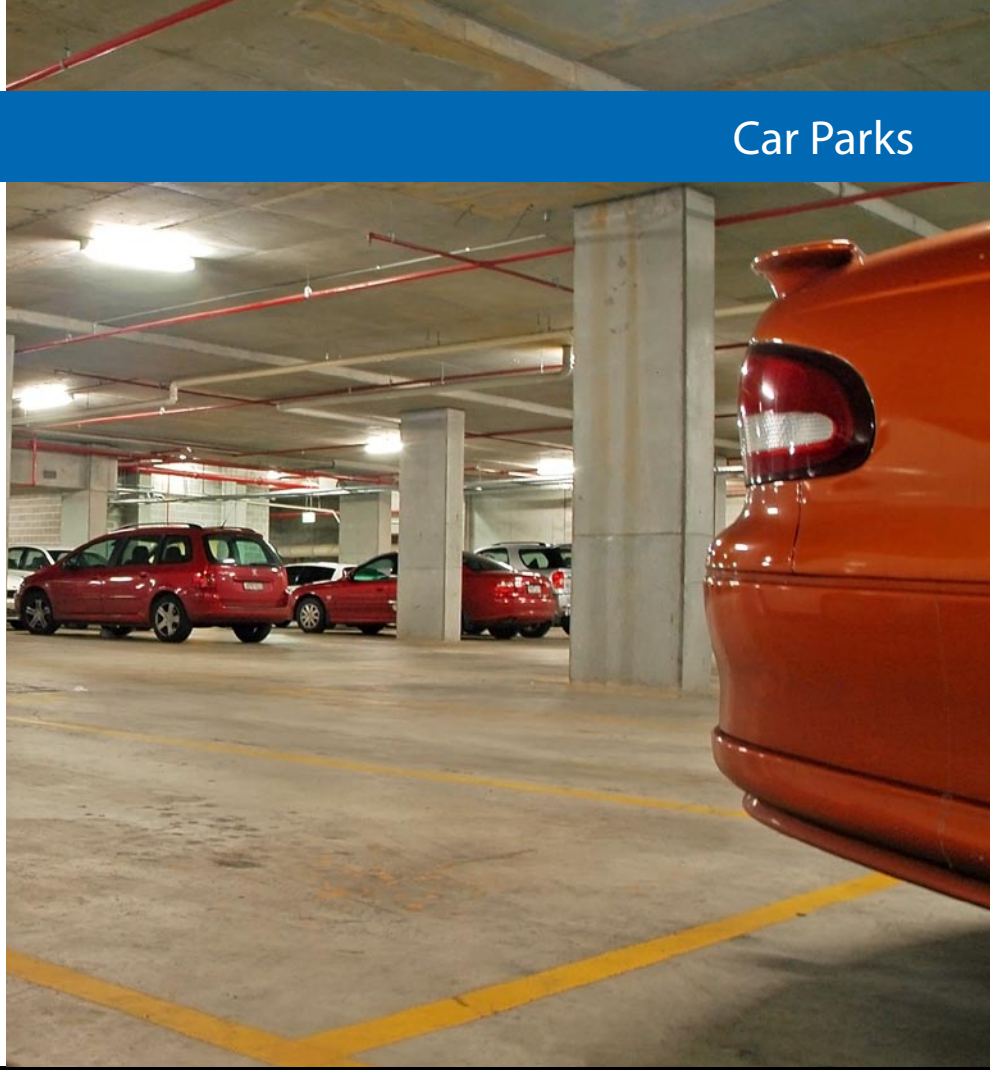
Car Parks

Multi-storey and underground car parks have always been vulnerable to fire. The combustible materials used in the manufacture of modern passenger vehicles results in fires that burn more intensely and generate higher temperatures than ever before with the opportunity for fire spread significant. Detection systems in car parks are often subjected to the elements and possibly vandalism.

Alarmline is prevalent for this type of application as it can be installed in environments where wind, dust and moisture are present; which can commonly lead to false alarms for other detection types. Alarmline if installed correctly is unaffected by temperature variations caused by seasonal weather conditions and provides a discrete form of detection.



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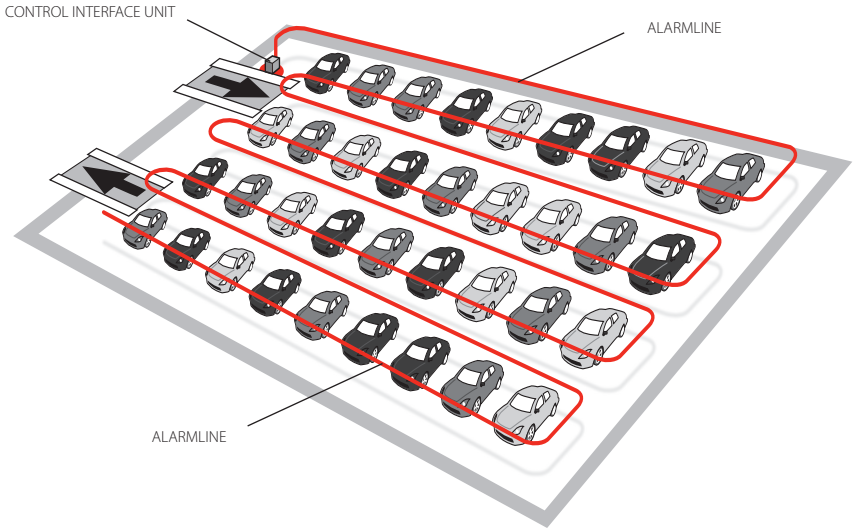
Design and installation guidelines

In this application, Alarmline provides area protection as opposed to point of risk therefore the design shall follow the guidelines for normal point type heat detectors regarding maximum spacing between cable runs and zone size. Due to the flexibility of Alarmline, it can be run in any location to provide the best coverage to ensure all vehicles are adequately protected.

It is recommended in this application that nylon coated Alarmline is used, which will provide protection against the elements as well as hydrocarbons from exhaust fumes.

The interface used for monitoring Alarmline may be located in the detection zone or it may be installed remotely. If the interface is to be located remotely an interposing cable from the interface to the detection zone is required, this is connected to Alarmline using a suitable junction box and should be a suitably fire rated cable.



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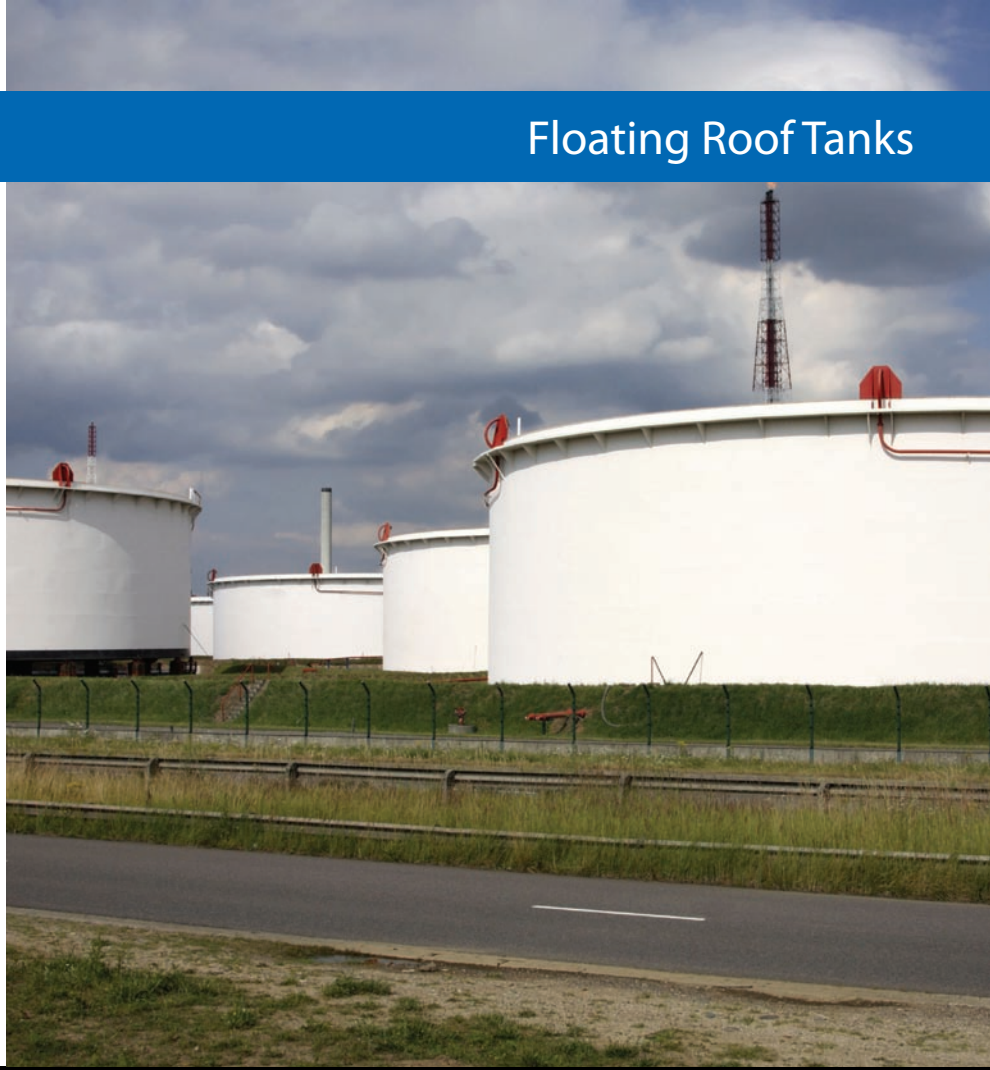
Floating Roof Tanks



Floating roof tanks are most commonly used for storing highly flammable products making them a potential catastrophic fire risk. The main risk of fire is from the ignition of vapour escaping from a damaged/worn rim seal. It is essential that fires are detected at the earliest possible opportunity to prevent a widespread fire and activate suitable fire suppression systems.

With a range of high temperature chemical resistance cable, Alarmline offers the most cost effective and reliable method for rim seal fire protection, it is easy to install close to the rim seal. Installation of ATEX approved junction boxes and intrinsically safe barriers/isolators between Alarmline and the interface unit provides the necessary protection for hazardous areas.

Design and installation guidelines

The design of each floating roof tank can differ greatly dependent on the manufacturer therefore Kidde recommends close liaison with the end

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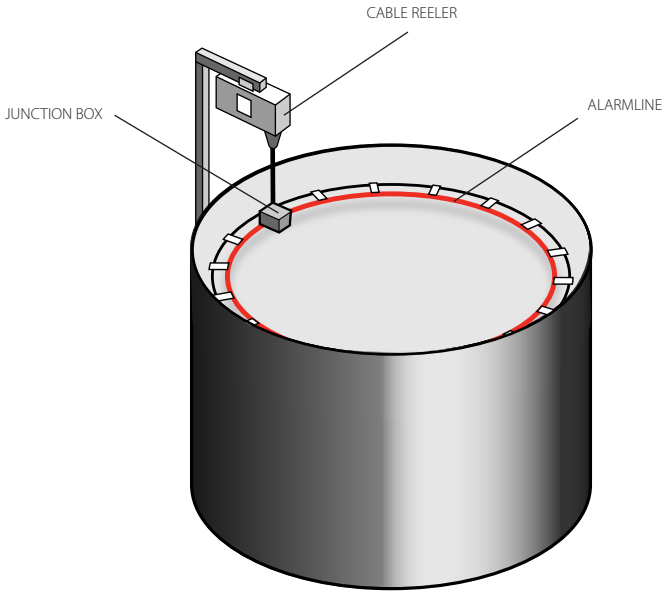
user/site owner during the installation and design phases.

Where possible the recommendation would be to use edge clips on the foam dam with a distance piece to position the Alarmline cable between the dam and the outer wall of the tank close to the rim seal. Alarmline should be supported every metre around the circumference of the rim seal. A suitable ATEX approved junction box will be provided on the roof top for termination of Alarmline. To connect Alarmline back to the control unit electrical connections between the tank top and rim are made using either an automatic cable reeler or a cable collector with retractable cables to accommodate the rise and fall of the tank roof.

The interface unit being used to monitor Alarmline will be located in a non-hazardous area and to maintain the safety of the system Alarmline connections to the control unit will be connected through suitable intrinsically safe barriers/isolators.



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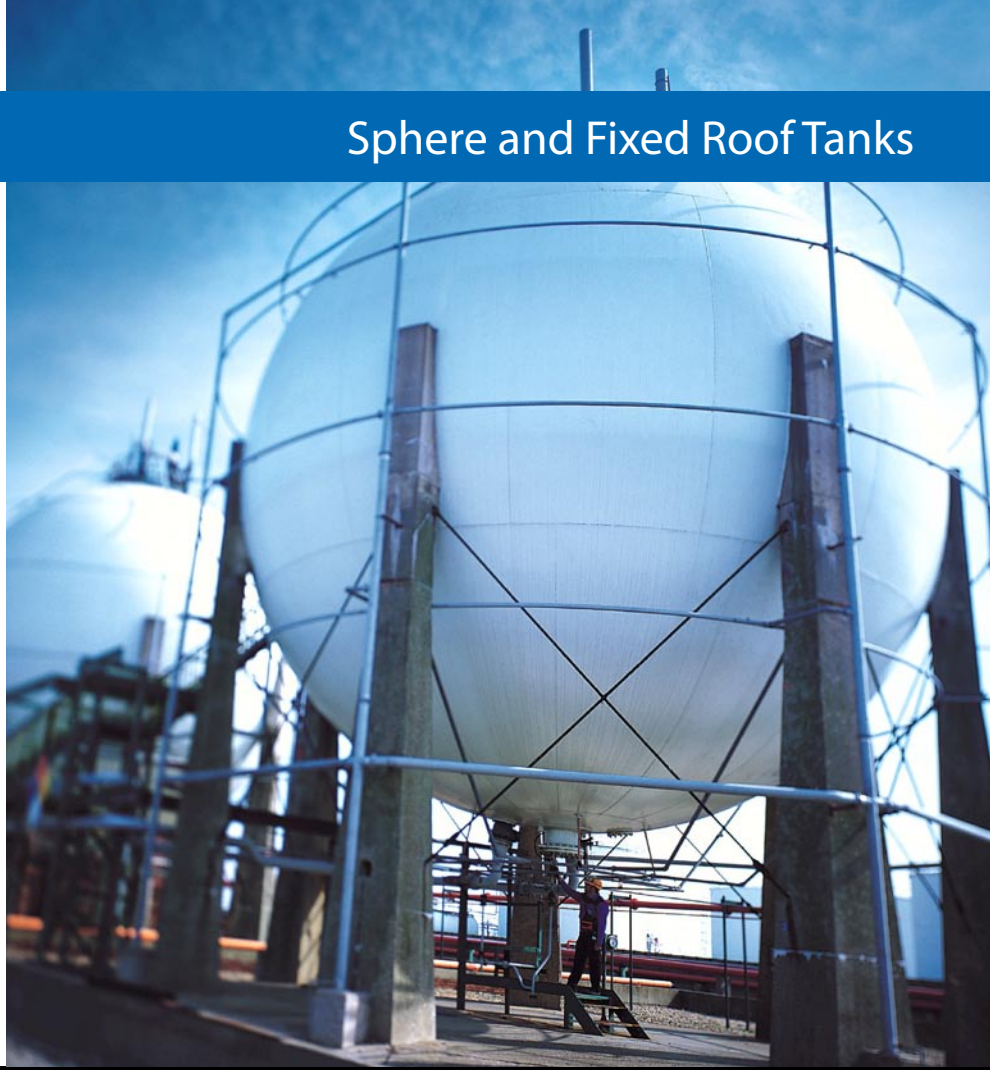
Sphere and Fixed Roof Tanks



The construction layout of tank farms often results in tanks containing highly flammable material that are in close proximity to each other. This makes them a considerable fire risk with a significant threat of a fire spreading between tanks.

Alarmline can be installed on the tanks and in close proximity to monitor the vents, flanges, gauging points, manholes, and general bund areas for fire. The system can be linked into a main fire system to trigger activation of a deluge water spray/foam system.

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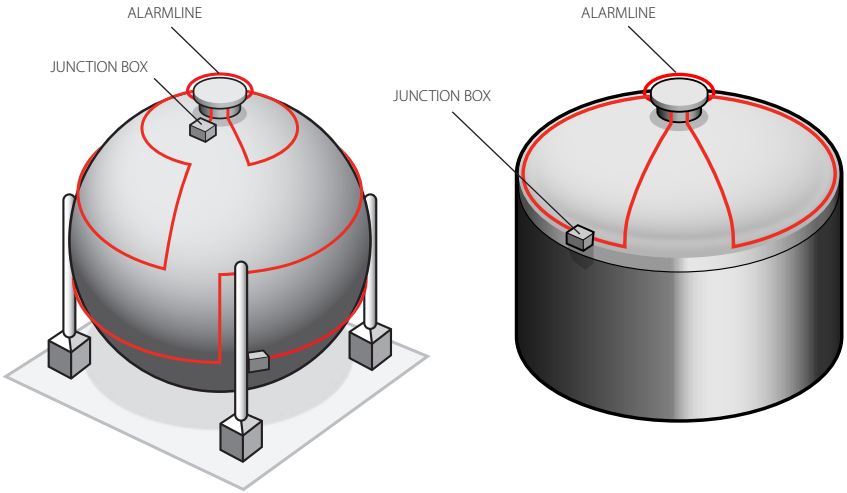
Sphere and Fixed Roof Tanks

Design and installation guidelines

The recommended installation of each tank will vary based on the physical design but each tank will generally be protected by one continuous zone of Alarmline.

Alarmline will be terminated in a suitably certified junction box with interposing fire rated cabling and connected to the control unit, located in a safe area. As the tanks will be located in a hazardous area the cable should be connected to the control unit via approved intrinsically safe barriers/isolators.

The clips and fixings for Alarmline will depend on the physical design of the tank but in most cases these would need to be fixed to the surface of the tank using a suitable adhesive.



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Warehouse Racking

Fires in densely packed racking can be detected with a localised Alarmline detection system. Alarmline can be installed within the racking to provide detection very close to the point of risk, providing a discrete detection system which is unaffected by the normal working environment.

Alarmline can be zoned within the racking and is often used to trigger the pre-action stage of a sprinkler system to ensure rapid detection and control of the spread of fire.

Design and installation guidelines

The recommendation is to install Alarmline at the ceiling and within the rack, fixing it to the existing shelf supports in a position where it will not be damaged when loading and unloading the shelves.

The warehouse and racking can be split in to zones to reduce the search area and to activate the relevant sprinkler/suppression system.

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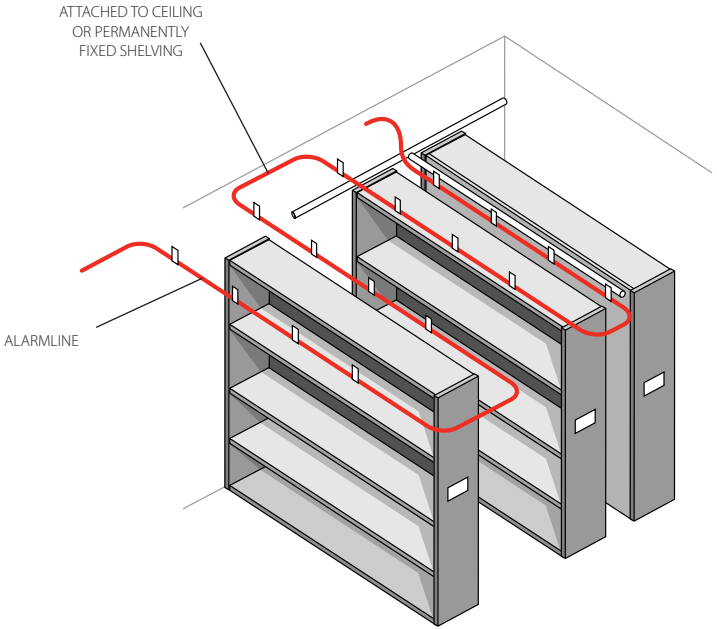
Warehouse Racking

The interface used for monitoring Alarmline may be located in the detection zone or it may be installed remotely. If the interface is to be located remotely an interposing cable from the interface to the detection zone is required, this is connected to Alarmline using a suitable junction box and fire rated cable.

Freezer warehouses

Where a warehouse is used for cold storage and operates at low temperatures Alarmline can be used to provide general area protection. The design follows the guidelines for point type heat detectors or installed as 'in-rack' protection. The following specialist recommendations should be noted:

- Nylon coated cable should be used
- Minimum operating temperature:
  Digital sensor -65°c
  Analogue Sensor -40°C
- Minimum installation temperature -11°C
- Interface units must be installed in areas with an ambient temperature above 0°C



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Escalators and Travelators

Fires on escalators and travelators can develop rapidly into a major fire and can spread because of the continued mechanical movement. The public nature of this application means that it is crucial to have the earliest possible detection system to initiate emergency procedures.

Alarmline can be installed at the point of risk, and can protect the following potential fire risks:

- Drive motors
- Roller bearings
- Truss rollers
- Dust collector trays

Due to the movement of mechanical parts it would be recommended that Alarmline should have mechanical protection; chemical protection should also be considered due to the presence of oil and grease.

Design and installation guidelines

Alarmline can be used to protect the roller trusses and any other moving parts for risk

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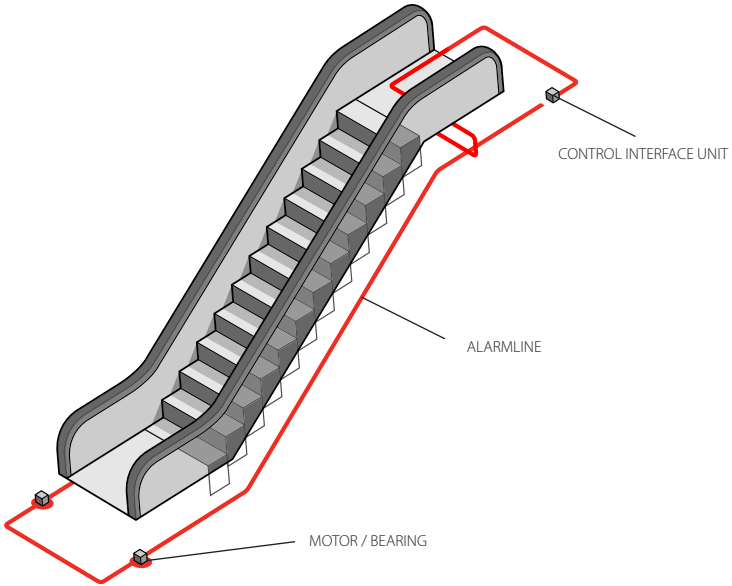
Escalators and Travelators

of overheat due to friction. Alarmline should be installed on both sides of the escalator to protect the rollers, and at the top and bottom of the escalator to detect potential fires in the dust collection trays.

Where necessary the escalator or travelator can be split into smaller detection zones. If the Alarmline system is to be used in conjunction with a suppression system it may be necessary to install two independent systems to provide coincidence operation.

Care should be taken when attaching the Alarmline to the roller bearings to ensure that it is not damaged by the moving treads of the unit.

The interface used for monitoring Alarmline may be located in the detection zone or it may be installed remotely. If the interface is to be located remotely an interposing cable from the interface to the detection zone is required, this is connected to Alarmline using a suitable junction box and fire rated cable.



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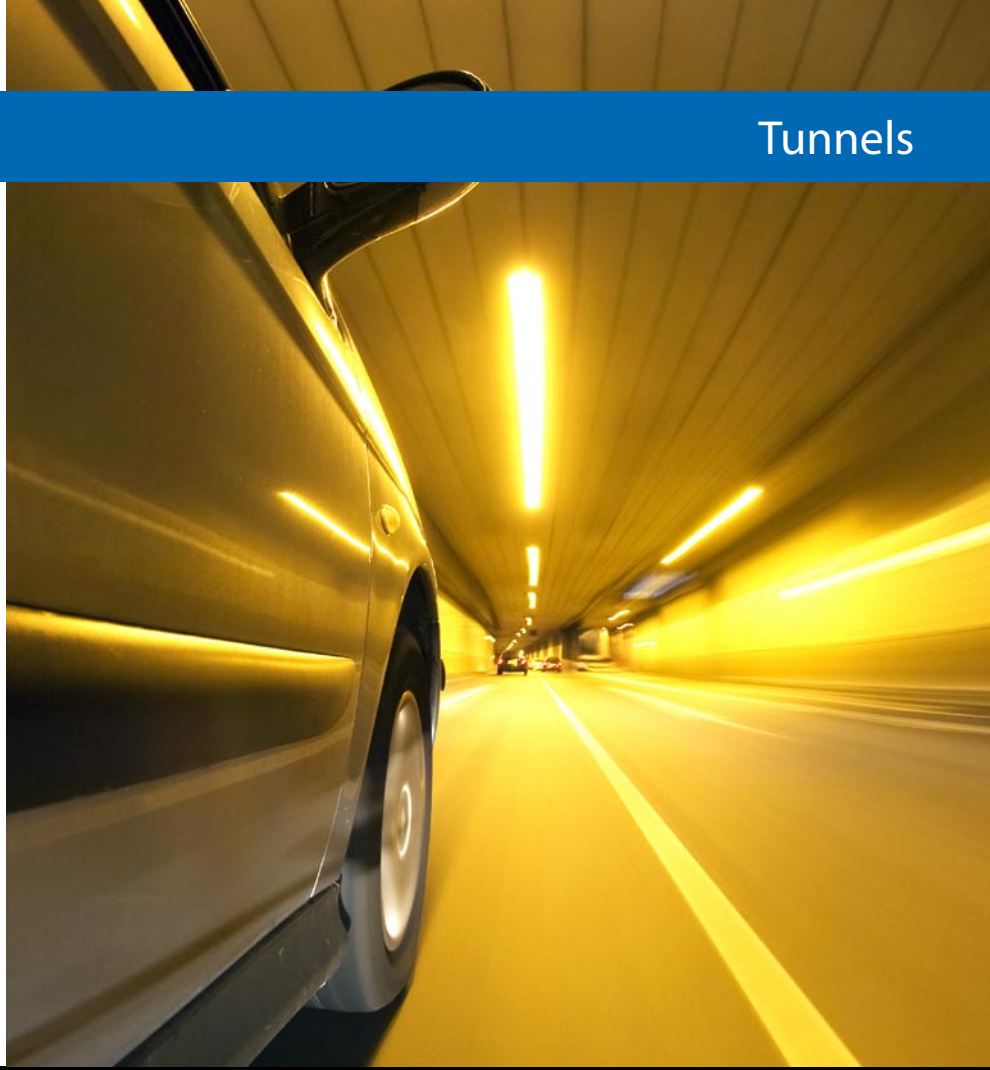
Tunnels



Tunnels pose a challenging fire threat due to their confined structure. Tunnels primarily offer limited access/egress points, making it crucial that fires are detected at the earliest opportunity to enable evacuation and extinguishing of the fire.

Alarmline detection offers a cost effective solution that can provide protection for all the different facets of the tunnel system, with design capabilities to be compatible with the other tunnel operating systems.

There are many different potential hazards within the tunnel environment such as electrical services, motor vehicle accidents, vehicle load fires, vehicle fires, fuel fires, etc.

Design and installation guidelines

Specific electrical risks can be protected by installing Alarmline at the point of risk. The biggest risk is vehicle fires which can cause significant problems including intense heat and thick black toxic smoke making access and egress difficult.

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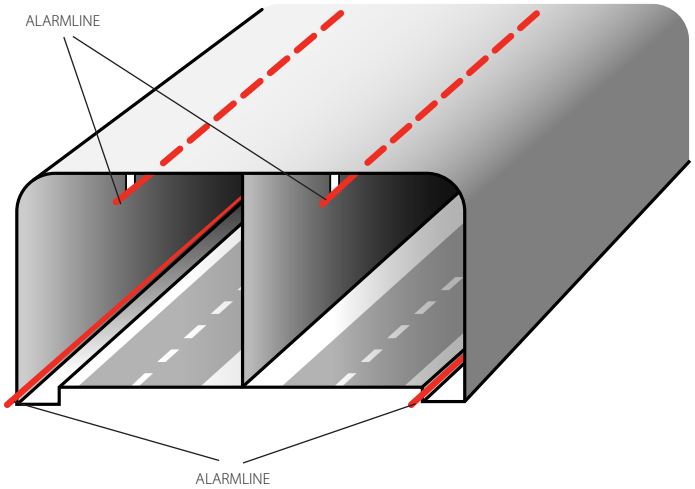
Tunnels

To detect vehicle or fuel fires we would provide a general area type protection with Alarmline installed directly over the roadways inside the tunnel. Alarmline can be split into separate zones depending on the width and length of the tunnel. Detection zones could be linked to suppression systems for localised fire fighting or ventilation zones to activate extraction systems.

Alarmline can also be used to detect fires in sumps and drains designed for containment of fuel or oil spills. These systems can be linked to a foam suppression system to provide extinguishing of any fire.

Due to the environmental conditions Alarmline installed within tunnels should have a nylon coating.

The interface used for monitoring Alarmline may be located in the detection zone or it may be installed remotely. If the interface is to be located remotely an interposing cable from the interface to the detection zone is required, this is connected to Alarmline using a suitable junction box and should be a suitably fire rated cable where possible.



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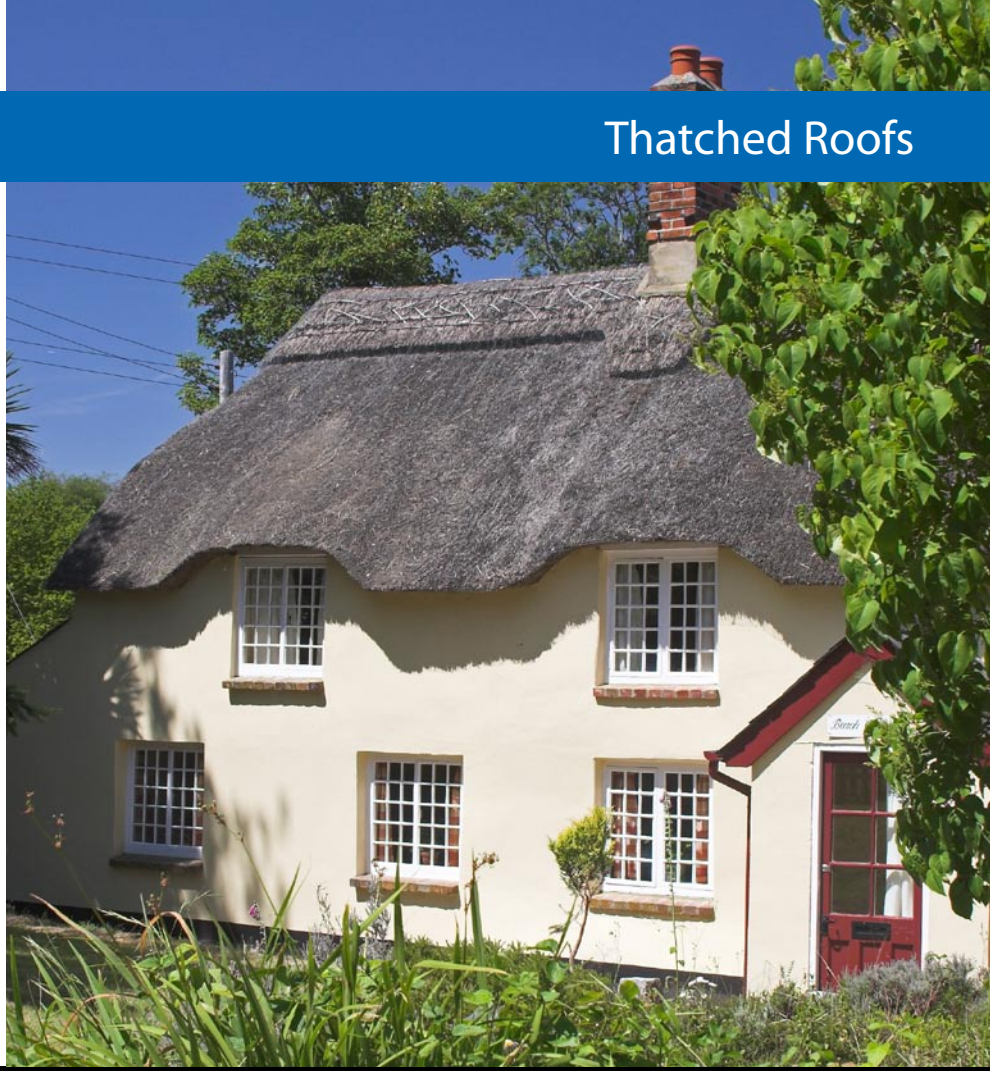
Thatched Roofs

Thatched roof fires are becoming more common with the main cause (approximately 90 per cent) being linked to poorly maintained chimneys.

Fires are due to either hot spots within the chimney caused by build up of soot and debris or by cracks in the chimney brickwork causing hot gases to escape into the thatch layer. This causes the temperature to rise within the thatched layer where it eventually reaches a point of ignition. Thatch layers can be quite thick which means a fire can be well established before it is noticed and the fire service summoned.

Early detection of these increases in temperature is critical to minimise the amount of damage that can be caused by a thatched roof fire. Alarmline Digital cable has been independently tested and approved for use in this application by the National Society of Master Thatchers.



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Thatched Roofs

Design and installation guidelines

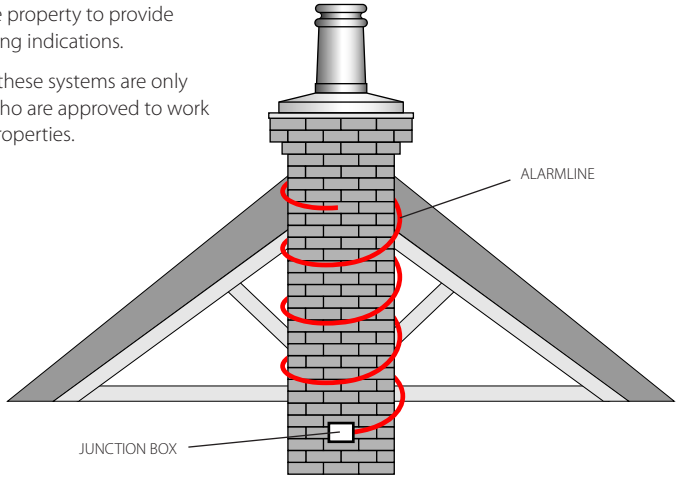
To protect against fires caused by heat transfer from the chimney, Alarmline can be installed discreetly between the thatch layer and the brickwork of the chimney to detect any increases in temperature through the chimney wall. As Alarmline is a continuous sensor it can be installed around the chimney stack providing large area coverage. Installation of two different temperature cables can provide indication of a pre-alarm condition followed by an alarm condition.

It is also possible to install Digital Alarmline within the thatch itself threading the Alarmline through the thatch layer at a regular spacing to detect fires caused by other ignition sources. Shakespeare's Globe theatre is one of many properties which is fitted with such a system.

Digital Alarmline can also be used to provide detection within the roof space, underneath the thatch layer the cable can be fixed to the existing roof struts at regular intervals to provide general area coverage. Alarmline will not be susceptible to false alarms caused by high levels of dust typically found in these environments.

Alarmline is compatible with any conventional fire alarm panel which can be located at a suitable point within the property to provide audible and visual warning indications.

Kidde recommend that these systems are only installed by engineers who are approved to work in listed and thatched properties.



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