

[Risk Management Guidelines]

[Protecting a Sprinkler System from Frost and Accidental Damage]

Introduction

Sprinkler systems provide excellent automatic fire protection to life, property and business.

However if they are damaged either by impact, from vehicles / equipment, or by the water in the system freezing, then the systems may not be available to function when required. This may have an adverse effect on your business in the event of a fire and / or from the resultant discharge of water.

To help safeguard against these occurrences, the following guidelines should be adopted:

Accidental Damage

Sprinkler pipe work being generally of steel has an in-built robust nature to withstand minor "knocks". Whereas the sprinkler heads by their design have less strength to resist damage from impact.

It is imperative that the initial design of the system takes into account the potential of damage occurring due to vehicular or machinery impact.

All pipework and sprinkler heads should be sited to avoid damage. Where this is not practicable, especially in low level areas, in racking etc., then barriers / warning signs should be erected to draw attention to their vulnerability and all staff using equipment with the potential to cause damage should receive preventative training / instructions.

Sprinkler heads can be fitted with wire cage guards, which offer good protection against light impact from manual handling of stock or equipment.

Water storage tanks can be easily damaged by impact. Tanks should not be sited on vehicle routes, if this is not practicable, then barriers / warning signs should be erected to prevent damage occurring.

Frost Damage

The incidence of severe winters is unpredictable. Records demonstrate that sprinkler installations are liable to freeze unless adequate precautions are taken.

Wet Systems

It is preferable for sprinkler systems to be charged with water to minimise the reaction time of the sprinkler system in the event of a fire.

Whilst rising fuel costs and the need for energy conservation is fully appreciated, the need for an adequate level of heating throughout all sprinkler protected areas involving water charged pipes cannot be overstressed.

All parts of the sprinkler protected buildings where permanently water filled pipework (wet systems) are installed, should be maintained above 4°C at all times.

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Where this is impracticable, alternate wet and dry systems may be installed in certain situations.

These systems must not be used for in-rack sprinkler protection.

Where allowed by local authorities and conditions, some systems can be charged with anti-freeze to prevent damage during freezing conditions.

Alternate wet and dry systems

Alternate wet and dry systems charge the sprinkler pipe work with air during the winter months and water during the summer months, alleviating the risk of frost damage.

Even with alternate wet and dry systems some pipework will continue to be water filled and susceptible to frost damage.

These pipes are to be protected from the effects of freezing either by providing local ambient heating or by direct protection in the form of trace heat and lagging.

Air filled parts of alternate wet and dry systems can still be susceptible to the effects of freezing, due to damp air being compressed in the system, condensing and collecting in the lowest points. These low-level points should be checked and emptied at regular intervals.

Other actions required include:

- Checking operation of all air compressor / air supplies.
- Checking full operation of all trace heating circuits.
- Checking and Maintaining all power supplies to trace heating and other heating circuits.

Trace Heating and Lagging

Trace heating and lagging uses electrical heating tapes wrapped around the pipe work / valves to maintain the pipe work above 4°C at all times and its operation is normally controlled by an air frost-thermostat.

Insulation is applied to the pipe work to trap in the heat generated thus reducing the power consumption requirements.

The design and installation of the trace heating should include visual indication of circuit status together with circuit test facility comprising of a thermostat by-pass and ammeter with pre-set indication of the normal current demand. Control equipment should be mounted 1500 mm above floor level to ensure that maintenance and monitoring of the heat tapes can be achieved.

Lagging installed on external pipework must be weather proofed.

As with all electrical systems trace heating is to be inspected and tested at regular intervals by a competent person. Further guidance is provided in other Risk Management Guidelines available from Royal & Sun Alliance

Anti-freeze Systems

The use of anti freeze in sprinkler systems is not allowed in some European countries, including the UK due to the potential of back contamination of the domestic water supply.

Where allowed, the number of sprinklers in any one section of piping protected by anti-freeze liquid must not exceed 20.

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The anti-freeze solution shall have a freezing point below the expected minimum temperature for the locality. The specific gravity of the prepared solution shall be checked using a suitable hydrometer on a regular basis.

Systems, which rely on anti-freeze liquid, shall be fitted with backflow prevention devices to prevent contamination of the water in other parts of the system.

Obstructions

Lagging must not obstruct the sprinkler heads, this normally requires the sprinkler heads to be fitted into bushed outlets to raise the sprinkler head above the lagging.

Further Information

Electric Trace Heating Industry Council (ETHIC). PO Box 87, Stockport SK6 5WZ

British Standards Institute

BSI, 389 Chiswick High Road, London, W4 4AL

BS 6351: Electric Surface heating

Part 1:1983 Specification for electric surface heating devices

Part 2:1983 Guide to the design of electric surface heating systems

Part 3:1983 Code of Practice for the installation, testing and maintenance of electric surface heating systems

BSEN 60079:Part 14: Electrical apparatus for explosive gas atmospheres

Fire Prevention Association, London Road, Moreton in Marsh, Gloucestershire, GL56 0RH

FPA Recommendations RC38 - Recommendations for frost protection measures for sprinklers

Water Supplies, Pump Houses

Fire pump houses are to be maintained above 4°C if they contain only electrically driven pumps and above 10°C if diesel driven units are present. The higher temperature required for a diesel unit is to assist in the prevention of excessive wear within the unit through cold start with reduced lubrication.

Water storage tanks are large enough not to freeze, but the infill ball valves are to be protected against freezing by installing an immersion heater into the water tank directly in line with the ball valve inlet and at a depth of 500mm below the upper water level

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These and other Risk Management Guidelines addressing a wide variety of risk control issues are freely available from:

<http://www.managerisk.royalsun.co.uk>

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