

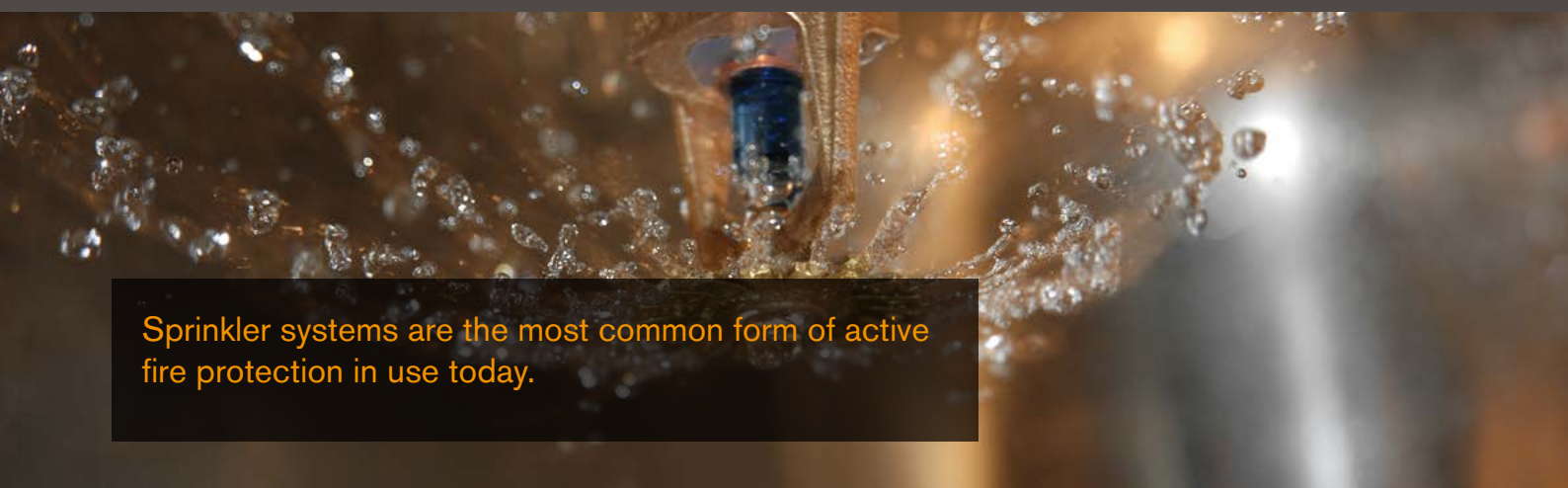
Sprinkler Systems - Non-domestic Installations

This guidance highlights the different types of sprinkler systems and the ongoing maintenance required to ensure they meet expected standards.

RISK ADVICE LINE

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Sprinkler systems are the most common form of active fire protection in use today.

Why Install Sprinklers?

Sprinkler systems are the most common form of active fire protection in the world and are installed for a variety of reasons including:

- To protect life and high monetary values of property at risk.
- A fire engineered approach to the design of a building with large undivided floor areas.
- To reduce fire risks presented by some process and storage activities.
- A trade off with enforcing authorities allowing for dispensation from other fire safety requirements.
- Regional Governments in Wales and Scotland require sprinkler protection in certain residential settings. From November 2020 the installation of a sprinkler system in all high rise residential flats above 11 metres in England became mandatory.
- A requirement of insurers in order to either obtain cover or qualify for a discount from the fire premium being offered.
- A means of building resilience to enable business continuity.

How do Sprinklers Work?

An automatic sprinkler installation comprises of a range of pipework installed at, or near, the ceiling on each floor of a building and connected through one or more controlling valves, to one or more water supplies.

At intervals on the pipework are sealed outlets referred to as sprinkler heads. The sprinkler heads are activated when the surrounding air temperature reaches a pre-determined level, discharging water in the form of a spray over the floor below. The discharge pattern from any two sprinkler heads will overlap and in doing so leaves no part of the area below the ceiling unprotected.

As water flows from the pipework through the sprinkler heads, water pressure drops and allows the main control valve to open and replenish the pipework from the water supply. At the same time it activates an internal and external alarm system.

Types of sprinkler system

Wet System

In this arrangement the system is one that is permanently charged with water under pressure and installed in a property where there is no danger of the pipes ever freezing.

Dry System

This type of system is usually found when protection is required in an area that is subject to freezing at all times, such as cold stores. To prevent the system freezing, the pipework is permanently charged with air or nitrogen under sufficient pressure to hold back the water supply. Once a sprinkler head is activated the air or nitrogen is released and the pipework fills with water and operates in the same manner as a wet system.

Variations

Dependent on the environment into which a system is being installed, a number of other specialised systems are sometimes encountered including:

Alternate Wet & Dry installations. These can be found where the risk of freezing is present during certain periods (i.e. winter months). During these periods the system can be filled with air or nitrogen and operate as a dry system. Once the risk of freezing has ceased the system is once again filled with water and operates as a conventional wet system. Alternate Wet & Dry installations are no longer being installed.

Pre-Action Systems. These can be found where contents may be particularly susceptible to water damage, such as computer rooms, museums and art galleries. This is a dry system that is integrated with an independent approved fire alarm system of heat or smoke detection installed in the same protected area. Actuation of the smoke or heat detection system automatically opens the main valve and charges the pipes with water in readiness to be discharged once a sprinkler head is activated by a fire.

Water supplies

There are a number of water supplies acceptable for use in a sprinkler installation. The most commonly found are:

- A town mains supply having the necessary pressure and flow requirements to provide water to the sprinkler heads.
- Automatic suction pumps which draw water from a tank sized to suit the pumps and type of system (preferred option) or in the case of some older installations from a river or lake.

Sprinkler heads

Although there are several different designs of sprinkler head, the conventional type generally comprise of a metal threaded head and deflector plate together with a small valve to hold back water. The valve itself is held in place by either a fusible solder link or frangible glass bulb containing a liquid sensitive to heat.

The Fusible Solder type of sprinkler head operates when a soldered strut designed to melt at a pre-determined temperature releases two pieces of metal holding a valve cap over an orifice. Once this orifice opens water flows onto the fire.

The Glass Bulb type comprises of a small glass cylinder containing a quantity of liquid holding the water valve in place. A rise in temperature causes the liquid to expand resulting in the bulb breaking and water in the pipe to flow onto the source of the fire.



In addition to conventional sprinkler heads specially designed Concealed Heads have a soldered cap that covers the head but falls off at a temperature lower than the operating temperature of the sprinkler head itself. These are used for cosmetic appearance in offices, private dwellings and when malicious operation is to be discouraged such as schools and similar institutions.

Alarm Valve Operation

All valve types operate using the same principle:

- The sprinkler head opens
- Pressure in the system reduces
- The valve “clacker” lifts
- Water flows into the system
- Water flows to a hydraulic gong & electronic pressure switch
- A signal is sent to the Fire Brigade via a 24 hour monitoring centre.



Maintenance requirements

In accordance with the current sprinkler rules (LPC Rules for Automatic Sprinkler Installation 2015 Incorporating BS EN 12845) all systems must be subject to periodic maintenance and testing.

This includes weekly checks usually carried out by a competent member of staff or approved contractor. A record of the findings must be made using Test Cards provided by the fire insurance provider for the building being protected.

Furthermore, systems require servicing at least annually and very often on a quarterly basis. Insurers insist on this work being performed by a Loss Prevention Council Certification Board approved contractor.

Further inspections are required at 3, 10 and 25 year periods.

Conclusion

In conclusion, a sprinkler installation is the only fire protection system that will:

- Detect a fire
- Call the Fire Brigade
- Fight the fire by releasing water in the affected area
- Mitigate the consequences of the fire.
- Sound an alarm

Common myths and misconceptions

All Sprinklers go off at once

This is incorrect. 60% of all fires are extinguished or controlled by sprinkler systems with a maximum of four heads operating. Only the sprinkler heads in close proximity to a fire are activated.

Sprinkler heads are activated by smoke

Again this is incorrect. Smoke alone will not cause an activation. In order to activate, all sprinkler heads require the application of heat at a predetermined temperature.

Sprinklers cause more damage than fire

This is not true. Ten sprinkler heads operating produce the same amount of water as a single fire hose.

Sprinklers can go off accidentally

This is highly unlikely. The risk of an accidental discharge of water, due to manufacturing defects, is 1 in 14,000,000 per year of service.

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