Good research paper on fire sprinkler

Health & Medicine, Stress

Introduction

Fire sprinkler also referred to as sprinkler head is the component of a fire sprinkler system that discharges water any time there is a fire or rather when a fire has been detected. This comes even when the increase in temperature as the fire sprinkler system is actively used in fire protection. The system consists of a water supply system that provides adequate pressure and flow rate of a water distribution piping system where the sprinkler is connected. Fire sprinklers have been recorded to control fires in buildings that are fully fitted with fire sprinklers. The fire sprinkler also includes a control valve and a device for activating an alarm when the system operates (Tsui, 2010).

Historically, the first fire sprinkler was invented in 1812 by Sir William Congreve who installed it in the Theatre Royal, Drury Lane in the United Kingdom. It consisted of a cylindrical airtight reservoir of 400 hogsheads that was fed by a 10 inch water main which branched to all parts of the theatre. Various smaller pipes fed from the distribution pipe were pierced with a series of half inch holes which poured water in case a fire broke out. However, this invention operated manually where a valve outside the building could be opened to send water through the pipes. This brought about the intervention of Hiram Stevens Maxim who was consulted on an instance where a large furniture factory had repeatedly burned down. He invented the first automatic fire sprinkler that would extinguish the areas under fire and report to the fire station. Similarly, Maxim did not manage to sell the idea and the patent for his invention expired (Bromann, 2001). Eventually, the idea was used by other inventors such as Henry S. Parmalee

from New Haven who is credited for creating and installing the first automatic fire sprinkler system in 1874. He adopted the use of solder that would melt in case of a fire and plugged holes in the water pipes. Parmalee sold his idea to insurance companies on how the sprinkler system would reduce losses. This idea was advanced by Frederick Grinnell in the United States who designed a modern and more effective version that was known as the Grinnell sprinkler. He removed the fusible joint from all contact with the water to increase sensitivity and placed a valve in the center of a flexible diaphragm. Grinnell later modified Parmalee's design and in 1881 he acquired patents for the automatic sprinkler under his name. This modification continued up until the 1890's when Grinnell invented the glass disc sprinkler that is used even to date.

The sprinkler has been in use in the United States since 1874 in factory applications to curb fires that were mostly re-current fires occurred. The fire sprinkler system is made up of various parts. These include: the alarm valve that takes over from the stop valve when the fire sprinkler system activates. It controls the flow of water into the sprinkler system by closing when the sprinkler heads are closed and open when they open. The alarm test valve allows tests to be carried out during shut off conditions. It is essential for the weekly fire pump tests that allow the running of the pump without flooding the facility every time (Bromann, 2001).

The other part is the motorized alarm that operates when the fire sprinkler system turns on. The flow of water causes a hammer to strike against a bell which creates a loud noise that alerts the occupants of the building about the danger. The sprinkler heads are valves that open in response to high

temperatures. They contain the flow of water to just the area where the fire is occurring. The stop valve usually red in color stops the flow of water from entering the fire sprinkler system from the municipal water supply when the fire sprinkler system is not going off. It also has a separate valve that monitors the stop valve to evaluate if it is open or closed.

Other parts include the booster or the jockey pump which is an auxiliary pump used to maintain pressure in the system without starting the main pump. The city bypass is a piping configuration that allows city water to bypass the fire pump and feed the sprinkler system directly. It is also used as backup while the fire pump is under maintenance. The FDC (Fire Department Connection) allows connection with the outside part of the building that connects to the discharge side of the pump. These are coupled with other components such as: the flow switch that monitors the flow of water, the pressure gauge that measures the pressure within the fire sprinkler, the pressure switch that enables the fire sprinkler to alert the fire department and the flow meter loop that allows the system testing without flowing waste water out of the system (Li, Ying Zhen, 2013).

References

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