

FIRE EXTINGUISHMENT AND CONTROL

mechanical damage can be accomplished by connecting to the piping an automatic, low-pressure air supply that compensates for minor system leakage. A rapid reduction in pressure resulting from, say, an accidental breakage of the piping, sends a trouble signal without tripping the water-control valve.

The preaction valve, which controls the water supply to the system piping, is actuated by a separate automatic detection system, which is located in the same area as the sprinkler, and not by the operation of a sprinkler. Because the detection system is more heat sensitive than the sprinklers, the water-supply valve opens sooner than in a dry-pipe system. The water-supply valve can also be operated manually.

Usually an alarm is sounded when the valve opens and starts filling the system with water. There may then be time to put out the fire with portable equipment before the sprinklers go into action and drench the area with water. This system is especially effective where valuable merchandise is handled or stored.

Deluge. The deluge system wets down an entire area by admitting water to sprinklers that are opened at all times. Deluge valves that control the water supply to the system are actuated by an automatic detection system located in the same area as the sprinklers. The water supply valves can also be operated manually.

This type of system is primarily designed for extra-hazard occupancies where great quantities of water may have to be applied immediately over large areas. Deluge systems are ordinarily used to best advantage where rapidly spreading or flash fires may be anticipated, such as in explosives plants, plants handling or processing nitrocellulose materials, lacquer plants, and buildings which contain large quantities of flammable materials. Deluge systems are also used in aircraft hangars and large assembly plants where ceilings are unusually high and where the possibility of drafts could cause sprinklers adjacent to the fire to operate instead of those directly above the fire.

Another application of a deluge system is an open system of outside sprinklers for distributing water over the roof, exterior of a building, or at windows, cornices, etc.,

to protect it against fire from adjoining property. This type is usually manually operated and is used where construction is inadequately protected by design or by distance from adjacent fire hazards.

In special applications, open sprinklers and closed sprinklers may be combined in a single system where deluge protection is not needed over the entire area. However, it must be remembered that separate automatic detectors are also required in the area covered by the closed sprinklers, that operation of a closed sprinkler will not activate the entire system, and that a fire in the area of the closed sprinkler will also cause water to discharge from all of the open sprinklers.

Automatic alarms, operated by the flow of water through the system, should be a part of every standard sprinkler installation. Such an alarm may be connected to a central-station fire alarm service or to the municipal fire department, or may be a local alarm signal. Its purpose is to give prompt notice that the sprinkler system is operating. It also signals water leakage or discharge from causes other than fire.

The automatic alarm system must be tested and inspected frequently and be maintained by persons thoroughly familiar with it.

Temperature rating of sprinklers. Sprinklers should be selected on the basis of temperature rating and occupancy. The proper rating is determined by the maximum temperature to which they will be subjected during normal (no fire) operating conditions. Sprinklers are built with heat-actuated elements of solder that melt, or with special devices in which chemicals melt or expand to open them. Table 34-A shows the ratings and distinguishing colors of sprinklers.

Quick operation of sprinklers—an advantage when over a fire—may be a disadvantage elsewhere, wasting water and wetting down materials that might otherwise be unaffected. Tests* conducted by the Fac-

*"Temperature Rating and Sprinkler Performance." *NFPA Quarterly* (July 1963)