crease the clearance up to 36 in over large, closely packed piles of combustible cases, bales, cartons, or similar stock

6 Corrosion of sprinklers in such locations as bleacheries, dye houses, or chemical operations *Use sprinklers specially protected for use in such locations*

7 Inadequate supply of water because of faulty design or poor maintenance *Verify that water conditions have not changed since original plant installation It is important that the system be sturdily installed and anchored because explosions can jolt the piping and render the system ineffective*

Water spray systems

Water spray is effective on all types of fires where there is no hazardous chemical reaction between the water and the material that is burning These systems are independent of, and supplemental to, other forms of protection —not a replacement for automatic sprinklers

Fixed water spray systems are similar to the standard deluge system except that the open sprinklers are replaced with spray-type nozzles The water supply to the system can be controlled automatically or manually They are generally used to protect flammable liquid and gas tankage, piping and equipment, cooling towers, and electrical equipment, such as transformers, oil switches, and motors (Fig 43–32) Because of its low electrical conductivity, water spray applied through fixed piping systems on electrical equipment with voltages as high as 345,000 volts has proved practical When applied on some types of electrical equipment, water spray may cause short circuits by forming a continuous path of water between energized parts In such cases, means should be provided for cutting off the electric current before the water spray is applied (See NFPA Standard No 15, *Water Spray Fixed Systems*)

The type of water spray required depends upon the nature of the hazard and the purpose for which the protection is provided The basic principle of water spraying is to give a complete surface wetting with a pre-selected water density, taking into consideration nozzle types, sizes, spacing, and water supply

Water spray systems can be designed effectively for any one or any combination of the following

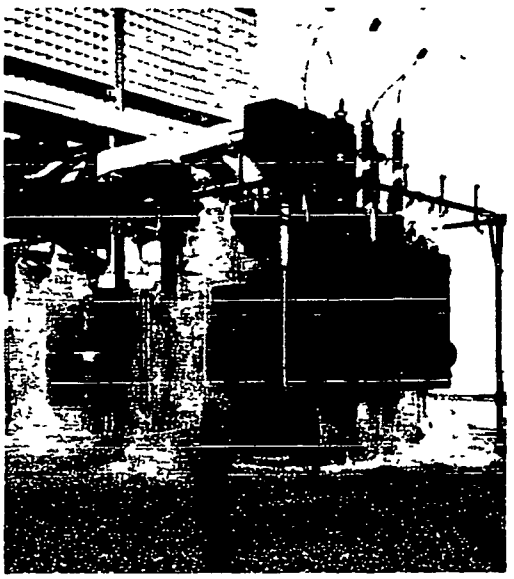


FIG 43–32 —A water spray system for oil-filled electric power transformers A thick layer of crushed stone and subsurface drainage is provided around the base of the transformer installation to prevent burning oil from flowing beyond the area protected by the spray

Courtesy National Fire Protection Association

1 Extinguishment of fire

2 Control of fire where extinguishment is not desirable, such as gas leaks

3 Exposure protection, that is, absorb the radiant heat by evaporation of the spray

4 Prevention of fire

Since the passages in a water spray nozzle are small in comparison with those in the ordinary sprinkler, they can easily be clogged by foreign matter in water Therefore, strainers are ordinarily required in the supply lines of fixed-piping spray systems The strainer basket should have holes small enough to protect the smallest orifices of the nozzles used In cases where the nozzles have extremely small water passages, they may have their own internal strainer in addition to the supply-line strainer