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Aerosol fire extinguishing system

This website uses cookies for improved experience but you can opt-out if desired. The text will discuss fire extinguishing agents covered by NFPA 2010, which need to be electrically non-conductive. Fire fighting mediums called aerosols consist of finely divided particles with diameters less than 10 microns. Aerosol-based technologies for fire fighting come in two types: Condensed aerosols and Dispersed aerosols. Condensed aerosols are created through a combustion process involving specific solid compounds. These systems use an 'aerosol generator' that releases a gas discharge containing particles like potassium salts, which helps extinguish fires. Dispersed aerosols on the other hand consist of extinguishing powder diffused by a carrier gas. Out of these two types, condensed aerosols are most commonly used for fire fighting. When aerosols hit flames, they dissociate into smaller particles that interfere with combustion reactions, thus putting out the fire. Aerosols are effective on Class B fires involving flammable liquids and can also be used for Class A and C fires. However, they should not be used for deep-seated fires in certain materials or chemicals. It's essential to note that aerosol systems may not be suitable for all types of fires, especially those involving reactive metals or chemicals like cellulose nitrate or hydrazine. When unsure, users must consult the manufacturer and local authorities. Additionally, safety considerations should always be taken into account when using fire extinguishing agents. In environments where condensed aerosol generators are used, it's crucial to respect the minimum safety distances specified in their listing. The distance between discharge ports and personnel should not exceed 75°C (265°F) or combustible materials not exceeding 200°C (392°F). A predischarge alarm and time delay system must be implemented to prevent human exposure to aerosol agents. In case of failure, personnel exposure should not exceed 5 minutes. The system design should include alarms, indicators, or both to indicate operation, hazards, or device failures. Abort switches may be used within the protected area, but manual emergency controls should override the abort function. To calculate the necessary quantity of aerosol-forming compound, the formula m = d × f × V is applied. Design factors must take into account factors such as tee design, unclosable openings, and ambient pressure variations. For achieving 95% of the design application density, the discharge time requirement should not exceed 60 seconds for condensed aerosol systems or 10 seconds for dispersed aerosol systems using halocarbon agents. For inert gas systems, the maximum discharge time is 60 seconds (including a 30% safety factor), as stipulated by the AHJ.

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