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Aerosols

Many aerosol cans typically contain highly flammable propellants such as propane and butane in addition to a flammable product (e.g. paints, cleaners, adhesives, etc.). Consequently, the storage of products in aerosol cans presents unique fire challenges due to the possibility that the cans will rupture and rocket when they are exposed to intense heat generated by a fire. The rocketing cans leave a trail of burning flammable liquids and spread fire to adjacent areas such that ordinary sprinkler systems are quickly overmatched.

The fire hazards are not the same for all aerosol products (e.g. compare shaving cream to spray paint). Aerosol products are grouped into Levels 1, 2 and 3 based on the percentage concentration of soluble and insoluble flammable liquids. Level 1 aerosol products are predominately water-based and their fire hazard is about the same as ordinary combustible goods in cartons. Typical Level 1 aerosol products include shaving cream, window cleaners, starch, rug shampoos, alkaline oven cleaners, etc.

Level 2 aerosols are predominately water miscible flammable/combustible liquids; they produce intense fires that also cause ruptured cans to be propelled in several directions. Though the fire can spread, the relative small amount of water miscible liquid is quickly extinguished by sprinklers. Typical Level 2 aerosol products include hair sprays, deodorants, antiseptics, some furniture polishes, windshield deicers, etc.

Level 3 aerosol products present the greatest challenge. They contain predominately insoluble flammable/combustible liquids that also produce intense fires, with the added hazard that a ruptured can releases flammable/combustible liquids that are not easily extinguished by sprinklers. Typical Level 3 aerosol products include paint, lacquer, lubricants, some furniture polishes, engine cleaners, some insecticides, oil-based antiperspirants, etc.

The actual Level of the aerosol can be determined by testing or through a determination of the percentage of soluble and insoluble flammable liquids in the product. Once the level is determined, protection can be designed in accordance with the relative hazard.

Level 1 aerosol products can be protected as Class 3 commodities in both palletized and rack storage.

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Storage of Level 2 and 3 aerosol products needs to be protected through a specially designed sprinkler system in combination with segregation of the aerosol products from other storage and means of containment for the rocketing cans. Small quantities (up to six pallet loads) may be kept in small, low-cost metal frame or concrete block buildings outside a warehouse, in trailers away from the building, or under covered docks external to the warehouse well away from any openings to the warehouse. Many different protection options are available for palletized or rack storage of Level 2 and 3 aerosol products in warehouses, using standard sprinklers, large-drop heads, or ESFR sprinklers.

At mercantile locations, small quantities of such products in selling areas do not present an unusual fire hazard in sprinklered buildings as long as all combustible packaging is removed. However, in the stockrooms these products present a greater hazard and they need to be relocated to small noncombustible detached buildings or to small sprinklered cut-off rooms. Storage within such rooms should be limited to one pallet in height and the sprinkler system should be designed to provide a density of 0.30 gpm/sq. ft (for Level 2 storage) or 0.60 gpm/sq. ft. (for Level 3 storage) over the entire area. When the quantity of storage in stockroom is only one or two pallet loads, the cans should be removed from the shipping cartons and stored in open top noncombustible portable bins that are kept well away from other combustible storage.

Conclusion

The storage of aerosol products presents severe hazards that need to be controlled. In occupancies where such storage is incidental to the main operations, measures should be taken to reduce the quantity on hand and to segregate the storage from ordinary combustible materials. In warehouses where large quantities of Level 2 and Level 3 aerosol products must be stored, extensive analysis is required to ensure that this storage is protected in accordance with the applicable standards. Quest Loss Control Services Inc. can help develop design criteria that would provide adequate protection for such facilities.