



Property Risk Consulting Guidelines

A Publication of AXA XL Risk Consulting

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MANUFACTURE AND STORAGE OF AEROSOL PRODUCTS

INTRODUCTION

National Fire Protection Association (NFPA) documents describe a level of fire protection agreed on by persons representing a variety of interests. The guidance in these documents does not reflect unique conditions or special considerations, such as system performance under adverse conditions. Nor does NFPA guidance reflect the increased system reliability that AXA XL Risk Consulting recommends for high valued properties.

This AXA XL Risk Consulting Guideline takes a position on the provisions of NFPA 30B that AXA XL Risk Consulting believes require clarification or changes. To understand the position, this AXA XL Risk Consulting Guideline must be read with a copy of NFPA 30B. The provisions of the NFPA document are not repeated.

By definition, an aerosol product is a combination of a container, a propellant, and a material that is dispensed. The propellant can be either a gas or a blatter that will expel the base product. When using the blatter as the propellant, the base product is injected into the container and the blatter expands. When the dispensing valve is pressed, the blatter contracts, forcing the base product out.

POSTITION

Classification of Aerosol Products

Since aerosols come in glass, metal, and plastic containers and contain various products, different classification schemes have been created. Those areosols in metal containers not greater than 33.8 fl oz (1000 ml) and plastic or glass containers not greater than 4 fl oz (118 ml) are classified as Level 1, Level 2, Level 3 aerosols or Aerosol Cooking Spray Products. Aerosol products in plastic containers larger than 4 fl oz (118 ml) and less than 33.8 fl oz (1000 ml) are classified as either Plastic Aerosol 1 Products or Plastic Aerosol X Products depending on the contents. The US DOT does not allow glass containers greater than 4 fl oz (118 ml) to be considered an aerosol container.

As a result of numerous tests, a generic list of products for each level has been developed for Level 1, Level 2, and Level 3 aerosol products. This list should be used only as a guide to give an approximate level. Due to changes in formulations to meet new ecological demands, the level may change. Cooking spray products were once considered in this classification, but after testing, it was determine it needed its own classification.

Level 1 Aerosol Products

Typical aerosols in this category are:

- Air Fresheners
- Bathroom Foam-Type Cleaners
- Oven Cleaners
- Pre-Soak
- Pre-Wash
- Starch and Sizing Sprays
- Rug or Upholstery Cleaners
- Window Cleaners

Level 2 Aerosol Products

Typical aerosols in this category are:

- Anaesthetic and Antiseptic Sprays
- Antiperspirant and Deodorant Sprays (except Dry Powder Antiperspirant which is Level 3)
- Spray Colognes and Perfumes
- Decongestant Sprays
- Hair Sprays
- Engine Starter Sprays
- Window Deicer Sprays
- Some Furniture Polishes and Dusting Aids
- Insect Repellents

Level 3 Aerosol Products

Typical aerosols in this category are:

- Carburetor and Engine Cleaners
- Lubricants and Rust Removers
- Lacquers and Paints
- Insecticides
- Dry Powder Antiperspirants

Building Construction

Cut-off manufacturing operations from storage operations with a 3 h fire rated fire wall. Protect openings in the fire wall with 3 h fire rated fire doors.

Segregate the storage of Level 2 and Level 3 aerosols from the rest of the warehouse by a 2 h fire barrier. Protect all openings in the fire barrier with a single 2 h rated fire door. The chain link fence or separation areas allowed in this code are not viable alternatives to the fire barrier. A fire barrier prevents a fire, on either side of the barrier, from spreading to the other side by radiant energy, flying flammable liquids or floor pool fires. The barrier also limits the spread of heat thus operating sprinklers only in the fire area.

A deflagration suppression system is required to be installed in existing rooms where deflagration venting cannot be installed. However, these systems may only be effective against explosions resulting from small gas releases. Therefore, it is not acceptable to use these systems in lieu of damage-limiting construction consisting of deflagration venting and pressure-resistant construction.

Sprinkler Design

Where ESFR sprinkler design is indicated, use only pendent ESFR sprinklers. Upright ESFR sprinklers are not approved for aerosol protection.

Some of the sprinkler design tables indicate an area of application for spray sprinklers that AXA XL Risk Consulting considers marginal because total sprinkler operation can be markedly influenced if:

- One or two sprinklers over the initial fire area fail to operate or become plugged.
- The fire starts in the aisle.

Palletized and Solid Pile Storage of Cartoned Level 2 And Level 3 Aerosols

The design requirements for spray sprinklers indicate a 2500 ft² (232 m²) area of application could be used. AXA XL Risk Consulting believes the area of application should be 3000 ft² (278 m²) and no adjustment made to the density.

Rack Storage of Cartoned Level 2 Aerosols

The design requirements for spray sprinklers indicate a 2500 ft² (232 m²) area of application could be used. AXA XL Risk Consulting believes the area of application should be 3000 ft² (278 m²) and no adjustment made to the density.

Rack Storage of Cartoned Level 3 Aerosols

The design requirements for spray sprinklers indicate a 1500 ft² (140 m²) to 2500 ft² (232 m²) area of application could be used. AXA XL Risk Consulting believes the area of application should be 2000 ft² (185 m²) to 3000 ft² (278 m²) and no adjustment made to the density.

Rack Storage of Uncartoned Level 2 And Level 3 Aerosols

The design requirements for spray sprinklers indicate a 2000 ft² (186 m²) or 2500 ft² (232 m²) area of application could be used. AXA XL Risk Consulting believes the area of application should be 2500 ft² (232 m²) to 3000 ft² (278 m²) and no adjustment made to the density.

In-Rack Sprinklers

Pendent in-rack sprinklers are preferred to upright in-risk sprinklers due to response time performance.

Fire Protection

Manual Firefighting

In most fire tests the sprinklers failed to extinguish the burning stacks and 1½ in. (40 mm) hose streams were necessary to achieve final extinguishment. This emphasizes the need for adequate interior hose connections, well equipped emergency brigades, and detailed pre-emergency planning to make manual firefighting operations as effective as possible.

Hose Stream Demand

AXA XL Risk Consulting agrees with the hose stream demand for nonsprinkler buildings and for those buildings protected with ESFR sprinklers due to their fire suppression capabilities. However, when spray or control mode-specific application (CMSA) sprinkler protection is provided, provide 750 gpm (2850 L/min) for combined inside and outside hose stream demand due to the need of additional fire control and extinguishment.

Water Supply Duration

AXA XL Risk Consulting does not believe the water supply duration, given in the tables, to be adequate for the hazards of aerosol storage. Provide a 3 h water supply for sprinkler system and hose stream demands when spray or CSMA sprinkler protection is provided and a 2 h water supply for sprinkler system and hose stream demands when ESFR sprinkler protection is provided.

Storage Arrangements

Limited Quantity Storage In Occupancies Other Than Warehouses

Store Level 2 and Level 3 aerosols in other than warehouses or sales display area of mercantile occupancies in flammable liquid cabinets or protect in accordance with the “Special Protection Design” section.

Limited Quantity Storage In General Purpose Warehouses

Do not mix aerosol storage with other commodities in general purpose warehouses. Depending upon the quantity, use one of the following storage methods:

- Flammable liquids cabinets in accordance with NFPA 30.
- Segregated storage areas in accordance with the “Segregated Aerosol Product Storage Areas in General-Purpose Warehouses” section and this guide.
- Separate, inside, flammable liquid storage rooms in accordance with the “Storage of Aerosol Products in Inside Liquid Storage Areas, Liquid Storage Rooms, and Liquid Storage Control Areas” section and this guide.

This code does not cover the presence of aerosols in order picking type occupancies. The presence of Level 2, Level 3 aerosols, Aerosol Cooking Spray Products, and Plastic Aerosol X Products in a mixed commodity order picking area is acceptable when protected in accordance with all of the following:

- Limit the maximum quantity to 1000 lb (454 kg) net weight of Level 2 aerosols or 500 lb (224 kg) net weight of Level 3 aerosols or 1000 lb (454 kg) net weight of combined Level 2 and Level 3 aerosols. Limit the quantity to 2500 lb (1135 kg) for Aerosol Cooking Spray Products and 250 lb (115 kg) for Plastic Aerosol X Products.
- Limit aerosols to the first 6 ft (1.8 m) of height in ordinary racks or sloped order picking racks. Racks containing aerosols can be no more than 8 ft (2.4 m) deep in the direction of loading.
- Provide minimum ½ in. (12.7 mm) plywood barriers to form a continuous enclosure directly above and on all sides of the aerosols with the exception of the side facing the picking area. Only aerosols shall be in the enclosure.
- Provide face and flue in-rack sprinklers within the aerosol enclosure on maximum 5 ft (1.5 m) horizontal spacing. Use pendent, quick response, ordinary temperature rated, K 5.6 or K 8 (K 80 or K 115) in-rack sprinklers and hydraulically design for the most remote 8 sprinklers flowing 30 gpm (114 L/min) each.
- Protect the exposed storage by providing a single line face in-rack sprinklers at the top of the second tier of storage in the rack across the aisle facing the aerosol picking rack. Use pendent, quick response, ordinary temperature rated, K 5.6 or K 8 (K 80 or K 115) in-rack sprinklers on maximum 5 ft (1.5 m) horizontal spacing and hydraulically design for the most remote 8 sprinklers flowing 30 gpm (114 L/min) each.
- Design the ceiling sprinkler system based on the demand of the surrounding occupancy or a minimum of 0.30 gpm/ft² (12.2 L/min/m²) over 3000 ft² (278 m²), whichever is greater.

Storage of Aerosol Products In Separate, Inside Flammable Liquid Storage Areas

The section that covers aerosols stored in liquid storage rooms 500 ft² (47 m²) or less, allows up to a maximum quantity of 1000 lb (454 kg) net weight of Level 2 aerosol products or 500 lb (227 kg) net weight of Level 3 aerosol products or 1000 lb (454 kg) net weight of combined Level 2 and Level 3 aerosol products to be stored in the areas. These weight limits, with most aerosol products, are equal to 1 or 2 pallet loads. Based on this limited amount of aerosol products, protect these rooms with an automatic sprinkler system designed for a minimum of 0.30 gpm/ft² (12.2 L/min/m²).

The section that covers aerosols stored in liquid storage rooms greater than 500 ft² (47 m²) could contain up to a maximum quantity of 1135 kg (2500 lb) net weight of Level 2 aerosol products or 454 kg (1000 lb) net weight of Level 3 aerosol products or 1135 kg (2500 lb) net weight of combined

Level 2 and Level 3 aerosol products. Protect these areas in accordance with the applicable “Basic Requirements” section sprinkler protection table.