

CHAPTER 28 AEROSOLS

SECTION FC 2801 GENERAL

2801.1 Scope. This chapter shall govern the manufacture, storage, handling and use of combustible Level 1, 2 and 3 aerosol products, including the display of such products in any building, structure or premises.

2801.2 Permits. Permits shall be required as set forth in FC105.6.

2801.3 Supervision. The handling and use of aerosols in quantities requiring a permit shall be performed under the personal supervision of a person holding a certificate of fitness. The storage of aerosols in quantities requiring a permit shall be under the general supervision of a person holding a certificate of fitness.

2801.4 General. Combustible Level 1, 2 and 3 aerosol products shall be manufactured, stored, handled and used in accordance with this chapter, the construction codes, including the Building Code, and NFPA 30B.

2801.5 Manufacturing prohibited. It shall be unlawful to manufacture Level 1, 2 or 3 aerosol products.

2801.6 Aerosol container size limitations. It shall be unlawful to store, handle or use Level 1, 2 or 3 aerosol products in metal cans exceeding 33.8 fluid ounces (1000 ml), or in glass or plastic bottles exceeding 4 fluid ounces (118 ml).

Exceptions:

1. Level 3 aerosol products shall be stored, handled and used in containers with a maximum capacity of 24 fluid ounces (708 ml).
2. Pressurized ether shall be stored, handled or used only in metal containers with a maximum capacity of 8 fluid ounces (236 ml).
3. Level 1, 2 and 3 oven-cleaning aerosol products shall be stored, handled or used in containers with a maximum capacity of 16 fluid ounces (472 ml).

SECTION FC 2802 DEFINITIONS

2802.1 Definitions. The following terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

AEROSOL. A product that is dispensed from a container by a propellant, classified as follows:

Level 1. Aerosol products with a total chemical heat of combustion that is greater than 0 and less than or equal to 8,600 British thermal units per pound (Btu/lb) (20 kJ/g).

Level 2. Aerosol products with a total chemical heat of combustion that is greater than 8,600 Btu/lb (20 kJ/g), but less than or equal to 13,000 Btu/lb (30 kJ/g).

Level 3. Aerosol products with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g).

AEROSOL CONTAINER. A metal can, or a glass or plastic bottle designed to dispense an aerosol.

AEROSOL WAREHOUSE. A Group H or S occupancy used exclusively for the nonretail storage and transshipment of aerosol products.

PROPELLANT. The liquefied or compressed gas in an aerosol container that expels the contents from an aerosol container when the valve is actuated. A propellant is considered flammable if it forms a flammable mixture with air, or if a flame is self-propagating in a mixture with air.

RETAIL DISPLAY AREA. The area of a Group M occupancy open for the purpose of viewing or purchasing merchandise offered for sale. Individuals in such establishments are free to circulate among the items offered for sale which are typically displayed on shelves, racks or the floor.

SECTION FC 2803 CLASSIFICATION OF AEROSOL PRODUCTS

2803.1 Classification levels. Aerosol products shall be classified as Level 1, 2 or 3 in accordance with FC2802.1. Aerosol products in cartons which are not identified shall be classified as Level 3.

2803.2 Identification. Cartons shall be identified on at least one side with the classification level of the aerosol products contained within the carton as follows: LEVEL _____ AEROSOLS.

SECTION FC 2804 INDOOR STORAGE OF AEROSOL PRODUCTS

2804.1 General. Indoor storage of Level 2 and 3 aerosol products shall comply with the requirements of FC 2804.2 through 2804.7 and NFPA 30B. Level I aerosol products shall be considered equivalent to a Class III commodity and shall comply with the requirements for palletized or rack storage set forth in NFPA 13, as modified by FC Appendix B.

2804.2 Storage in Groups A, B, E, F, I and R. Except as otherwise provided in FC2804.2.1, it shall be unlawful to store Level 2 and 3 aerosol products in Group A, B, E, F, I and R occupancies in excess of the following amounts:

1. A net weight of 1,000 pounds (454 kg) of Level 2 aerosol products.
2. A net weight of 500 pounds (227 kg) of Level 3 aerosol products.
3. A combined net weight of 1,000 pounds (454 kg) of Level 2 and 3 aerosol products.

2804.2.1 Excess storage. Level 2 and 3 aerosol products exceeding the maximum quantities set forth in FC2804.2 may be lawfully stored in accordance with FC 2804.2.1.1 and 2804.2.1.2.

2804.2.1.1 Storage cabinets. Aerosol products in a quantity not to exceed 100 percent of the maximum storage limitation may be stored in storage cabinets in accordance with FC3404.3.2.

2804.2.1.2 Storage rooms. Level 2 and 3 aerosol products in a quantity exceeding that set forth in FC2804.2 may be lawfully stored indoors in a flammable liquid storage room in accordance with FC2804.5.

2804.3 Storage in general purpose warehouses. Storage of aerosol products in general purpose warehouses, as defined in NFPA 30B, utilized only for warehousing-type operations involving mixed commodities shall comply with the requirements of FC 2804.3.1 or 2804.3.2.

2804.3.1 Nonsegregated storage. Storage consisting of solid pile, palletized or rack storage of Level 2 and 3 aerosol products not segregated into areas utilized exclusively for the storage of aerosols shall comply with the requirements of FC Table 2804.3.1.

**FC TABLE 2804.3.1
NONSEGREGATED STORAGE OF LEVEL 2 AND 3 AEROSOL PRODUCTS IN GENERAL PURPOSE WAREHOUSES^b**

AEROSOL LEVEL	MAXIMUM NET WEIGHT PER FLOOR (pounds) ^b			
	Palletized or solid-pile storage		Rack storage	
	Unprotected	Protected ^a	Unprotected	Protected ^a
2	2,500	12,000	2,500	24,000
3	1,000	12,000	1,000	24,000
Combination 2 and 3	2,500	12,000	2,500	24,000

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg, 1 square foot = 0.0929 m².

a. Sprinkler system protection and storage arrangements shall comply with the requirements of NFPA 30B. Sprinkler system protection shall extend 20 feet beyond the storage area containing the aerosol products.

b. Storage quantities indicated are the maximum allowed in any 50,000-square-foot area.

2804.3.2 Segregated storage. Storage of Level 2 and 3 aerosol products segregated into areas utilized exclusively for the storage of aerosols shall be in accordance with FC Table 2804.3.2 and FC 2804.3.2.1 and 2804.3.2.2.

2804.3.2.1 Chain-link fence enclosures. Chain-link fence enclosures required by FC Table 2804.3.2 shall comply with the following requirements:

1. The fence shall not be less than No. 9 gage steel wire, woven into a maximum 2-inch (51-mm) diamond mesh.

2. The fence shall be installed from the floor to the underside of the roof or ceiling above.
3. Class IV and high-hazard commodities shall be stored outside of the aerosol storage area and a minimum of 8 feet (2438 mm) from the fence.
4. Access openings in the fence shall be provided with either self-closing or automatic-closing devices or a labyrinth opening arrangement preventing aerosol containers from rocketing through the access openings.
5. Not less than two means of egress shall be provided from the fenced enclosure.

2804.3.2.2 Aisles. The minimum aisle requirements for segregated storage in general purpose warehouses shall be in accordance with FC Table 2804.3.2.2.

2804.4 Storage in aerosol warehouses. The total quantity of Level 2 and 3 aerosol products stored in an aerosol warehouse shall not be restricted provided such warehouse complies with the requirements of FC 2804.4.1 through 2804.4.4.

**FC TABLE 2804.3.2
SEGREGATED STORAGE OF LEVEL 2 AND 3 AEROSOL PRODUCTS IN GENERAL PURPOSE WAREHOUSES**

STORAGE SEPARATION	MAXIMUM SEGREGATED STORAGE AREA ^a		SPRINKLER REQUIREMENTS
	Percentage of building area (percent)	Area limitation (square feet)	
Separation area ^{c, f}	15	20,000	Notes b, c
Chain-link fence enclosure ^d	20	20,000	Notes b, c
1-hour fire-resistance-rated interior walls	20	30,000	Note b
2-hour fire-resistance-rated interior walls	25	40,000	Note b
3-hour fire-resistance-rated interior walls	30	50,000	Note b

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m².

- a. The maximum segregated storage area shall be limited to the smaller of the two areas resulting from the percentage of building area limitation and the area limitation.
- b. Sprinkler system protection in aerosol product storage areas shall comply with the requirements of NFPA 30B and be approved. Other building areas not containing aerosol product storage shall be protected throughout by a sprinkler system in accordance with the construction codes, including the Building Code.
- c. Sprinkler system protection in aerosol product storage areas shall comply with the requirements of NFPA 30B and be approved. Sprinkler system protection shall extend a minimum 20 feet beyond the aerosol storage area.
- d. Chain-link fence enclosures shall comply with the requirements of FC2804.3.2.1.
- e. A separation area shall be defined as an area extending outward from the periphery of the segregated aerosol product storage area as follows.
 1. The limits of the aerosol product storage shall be clearly marked on the floor.
 2. The separation distance shall be a minimum of 25 feet and maintained clear of all materials with a commodity classification greater than Class III in accordance with NFPA 13, as modified by FC Appendix B.
- f. Separation areas shall be allowed when approved.

**FC TABLE 2804.3.2.2
SEGREGATED STORAGE AISLE WIDTHS AND DISTANCE TO AISLES IN GENERAL PURPOSE WAREHOUSES**

STORAGE CONDITION	MINIMUM AISLE WIDTH (feet)	MAXIMUM DISTANCE FROM STORAGE TO AISLE (feet)
Solid pile or palletized ^a	4 feet between piles	25
Racks with ESFR sprinklers ^a	4 feet between racks and adjacent Level 2 and 3 aerosol product storage	25

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Racks without ESFR sprinklers ^a	8 feet between racks and adjacent Level 2 and 3 aerosol product storage	25
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For SI: 1 foot = 304.8 mm.

a. Sprinklers shall comply with the requirements of NFPA 30B.

2804.4.1 Sprinkler system. Aerosol warehouses shall be protected throughout by a wet-pipe sprinkler system in accordance with NFPA 30B. Sprinkler protection shall be designed based on the highest classification level of aerosol product present.

2804.4.2 Pile and palletized storage aisles. Solid pile and palletized storage shall be arranged so the maximum travel distance to an aisle is 25 feet (7620 mm). Aisles shall have a minimum width of 4 feet (1219 mm).

2804.4.3 Rack storage aisles. Rack storage shall be arranged with a minimum aisle width of 8 feet (2438 mm) between rows of racks and 8 feet (2438 mm) between racks and adjacent solid pile or palletized storage. Where early suppression fast-response (ESFR) sprinklers provide sprinkler protection, the minimum aisle width shall be 4 feet (1219 mm).

2804.4.4 Combustible commodities. Combustible commodities, other than flammable and combustible liquids, may be stored in an aerosol warehouse.

Exception: Flammable and combustible liquids in 1-quart (0.95 L) metal containers and smaller may be stored in an aerosol warehouse.

2804.5 Storage in indoor flammable liquid storage rooms. Indoor flammable liquid storage rooms shall comply with the requirements of FC3404.3.7. The maximum quantities of aerosol products shall comply with the requirements of FC 2804.5.1 or 2804.5.2.

2804.5.1 Storage rooms of 500 square feet or less. The storage of aerosol products in flammable liquid storage rooms less than or equal to 500 square feet (46 m²) in area shall not exceed the following quantities:

1. A net weight of 1,000 pounds (454 kg) of Level 2 aerosol products.
2. A net weight of 500 pounds (227 kg) of Level 3 aerosol products.
3. A combined net weight of 1,000 pounds (454 kg) of Level 2 and 3 aerosol products.

2804.5.2 Storage rooms greater than 500 square feet. The storage of aerosol products in flammable liquid storage rooms greater than 500 square feet (46 m²) in area shall not exceed the following quantities:

1. A net weight of 2,500 pounds (1135 kg) of Level 2 aerosol products.
2. A net weight of 1,000 pounds (454 kg) of Level 3 aerosol products.
3. A combined net weight of 2,500 pounds (1135 kg) of Level 2 and 3 aerosol products.

The maximum aggregate storage quantity of Level 2 and 3 aerosol products allowed in

separate indoor storage rooms protected by a sprinkler system in accordance with NFPA 30B shall be 5,000 pounds (2270 kg).

2804.6 Storage in liquid warehouses. The storage of Level 2 and 3 aerosol products in liquid warehouses, as defined in NFPA 30B, shall comply with the requirements of NFPA 30B. The storage shall be located within segregated storage areas in accordance with FC2804.3.2 and FC 2804.6.1 through 2804.6.3.

2804.6.1 Containment. Spill control or drainage shall be provided to prevent the flow of liquid to within 8 feet (2438 mm) of the segregated storage area.

2804.6.2 Sprinkler design. Sprinkler protection shall be designed based on the highest level of aerosol product present.

2804.6.3 Opening protection into segregated storage areas. Fire doors or gates opening into the segregated storage area shall either be self-closing or provided with automatic-closing devices activated by sprinkler water flow or an approved fire detection system.

2804.7 Storage in Group M occupancies. Storage of Level 2 and 3 aerosol products in occupancies in Group M shall comply with the requirements of FC Table 2804.7. Retail display shall comply with the requirements of FC2806.

**FC TABLE 2804.7
MAXIMUM QUANTITIES OF LEVEL 2 AND 3 AEROSOL
PRODUCTS IN RETAIL STORAGE AREAS**

MAXIMUM NET WEIGHT PER FLOOR (pounds)			
Floor	Nonsegregated storage ^{a, b}	Segregated storage	
		Storage cabinets ^b	Separated from retail area ^c
Basement, cellar or other area below grade	Not permitted	Not permitted	Not permitted
Ground floor	2,500	5,000	Note d
Upper floors	500	1,000	Note d

For SI: 1 pound = 0.454 kg, 1 square foot = 0.0929 m².

a. The total aggregate quantity on display and in storage shall not exceed the maximum retail display quantity indicated in FC2806.3.

b. Storage quantities indicated are the maximum allowed in any 50,000-square-foot area.

c. The storage area shall be separated from the retail area with a 1-hour fire-resistance-rated assembly.

d. See FC Table 2804.3.2.

SECTION FC 2805 OUTDOOR STORAGE

2805.1 General. The outdoor storage of Level 2 and 3 aerosol products, including storage in temporary storage trailers, shall be separated from exposures in accordance with FC Table 2805.1.

**FC TABLE 2805.1
DISTANCE TO EXPOSURES FOR OUTDOOR STORAGE OF LEVEL 2 AND 3 AEROSOL PRODUCTS**

EXPOSURE	MINIMUM DISTANCE FROM AEROSOL STORAGE (feet) ^a
Public streets or private roads	20
Buildings	50
Exit discharge to a public street or private road	50
Lot lines	20
Other outdoor hazardous material storage	50

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. The minimum separation distance indicated is not required where exterior walls having a 2-hour fire-resistance rating without penetrations separate the storage from the exposure. The walls shall extend not less than 30 inches above and to the sides of Level 2 and 3 aerosol products.

SECTION FC 2806 RETAIL DISPLAY

2806.1 General. This section shall apply to the retail display of Level 2 and 3 aerosol products.

2806.2 Retail aerosol product displays not exceeding 8 feet high. Aerosol product displays for retail sale not exceeding 8 feet (2438 mm) in height shall comply with the requirements of FC 2806.2.1 through 2806.2.4.

2806.2.1 Maximum quantity. Only aerosol products being used for display purposes shall be stored for sale in retail display areas and the total quantity of such aerosol products shall not exceed the amounts set forth in FC Table 2806.2.1.

**FC TABLE 2806.2.1
MAXIMUM QUANTITIES OF LEVEL 2 AND 3 AEROSOL PRODUCTS IN RETAIL DISPLAY AREAS**

MAXIMUM NET WEIGHT PER FLOOR (pounds) ^b			
FLOOR	Unprotected ^a	Protected in accordance with FC2806.2 ^{a, c}	Protected in accordance with FC2806.3 ^c
Basement, cellar or other area below grade	Not allowed	500	500
Ground	2,500	10,000	10,000
Upper	500	2,000	Not allowed

For SI: 1 pound = 0.454 kg, 1 square foot = 0.0929 m².

a. The total quantity shall not exceed 1,000 pounds net weight in any one 100-square-foot retail display area.

b. Per 25,000-square-foot retail display area.

c. Minimum Ordinary Hazard Group 2 wet-pipe sprinkler system throughout the retail sales occupancy.

2806.2.2 Display of containers. Aerosol containers shall not be stacked more than 6 feet (1829 mm) high from the base of the aerosol array to the top of the aerosol array unless the containers are placed on fixed shelving or otherwise secured in an approved manner. When storage or retail display is on shelves, the height of such storage or retail display to the top of aerosol containers shall not exceed 8 feet (2438 mm) from the floor.

Exception: Storage or display protected in accordance with FC2806.3.

2806.2.3 Combustible cartons. Aerosol products located in retail display areas shall be removed from combustible cartons.

Exceptions:

1. Display areas that use a portion of combustible cartons, which consist of only the bottom panel and not more than 2 inches (51 mm) of side panel are allowed.
2. When the display area is protected in accordance with Tables 6.3.2.7(a) through 6.3.2.7(l) of NFPA 30B, storage of aerosol products in combustible cartons is allowed.

2806.2.4 Retail display sprinkler system. When a sprinkler system is required for the protected retail display of aerosol products, the wet-pipe sprinkler system shall be in accordance with this code, and the construction codes, including the Building Code. The minimum system design shall be for an Ordinary Hazard Group 2 occupancy. The system shall be provided throughout the retail display area.

2806.3 Retail aerosol displays exceeding 8 feet high. Aerosol product displays for retail sale exceeding 8 feet (2438 mm) in height shall comply with the requirements of FC 2806.3.1 through 2806.3.3.

2806.3.1 Maximum quantity. Only aerosol products being used for display purposes shall be stored for sale in retail display areas and the total quantity of such aerosol products shall not exceed the amounts set forth in FC Table 2806.2.1.

2806.3.2 Fire protection. Aerosol displays shall be protected by a sprinkler system in accordance with NFPA 30B and the following requirements:

1. The fire protection required for a retail display of aerosol products shall be determined based on the height of the aerosol products in the display and the type of packaging in which aerosol products displayed more than 6 feet (1829 mm) above the finished floor are stored.
2. Uncartoned Level 2 and 3 aerosols and Level 2 and 3 aerosols in display-cut cartons may be displayed not more than 6 feet (1829 mm) above the finished floor when applying the cartoned aerosol display tables set forth in NFPA 30B.
3. Where sprinkler protection is provided for a Level 2 or 3 aerosol retail display area, such sprinkler system shall be designed to extend coverage to an area not less than 20 feet (6096 mm) in all directions beyond the display area.
4. Where ordinary and high-temperature ceiling sprinkler systems are adjacent to each other, noncombustible draft curtains shall be installed between the areas protected by the respective sprinkler systems.

2806.3.3 Fire separation. Retail displays of Level 2 and 3 aerosol products shall comply with the following separation distance requirements:

1. Level 2 and 3 aerosol display areas shall be separated from each other by not less than 25 feet (7620 mm).
2. Level 2 and 3 aerosol displays shall be separated from flammable and combustible liquids storage and display areas by one or more of the following measures:
 - 2.1. A horizontal distance of not less than 25 feet (7620 mm).
 - 2.2. A noncombustible partition extending not less than 18 inches (457 mm) above the merchandise. When the aerosol products are located within 25 feet (7620

mm) of flammable or combustible liquids, the noncombustible partition shall be liquid tight at the floor level.

2.3. Special fire protection for double-row racks in accordance with FC2806.5.

2806.4 Maximum quantities in storage areas. Aerosol products in storage areas adjacent to retail display areas shall not exceed the quantities in FC Table 2806.4.

**FC TABLE 2806.4
MAXIMUM STORAGE QUANTITIES FOR STORAGE AREAS ADJACENT TO RETAIL DISPLAY OF LEVEL 2 AND LEVEL 3
AEROSOLS**

MAXIMUM NET WEIGHT PER FLOOR (pounds)			
Floor	Unseparated ^{a, b}	Separated	
		Storage cabinets ^b	1-hour occupancy separation
Basement, cellar or other area below grade	Not allowed	Not allowed	Not allowed
Ground	2,500	5,000	In accordance with NFPA 30B, Sections 6.3.4.3 and 6.3.4.4
Upper	500	1,000	In accordance with NFPA 30B, Sections 6.3.4.3 and 6.3.4.4

For SI: 1 pound = 0.454 kg, 1 square foot = 0.0929 m².

a. The aggregate quantity in storage and retail display shall not exceed the quantity limits for retail display.

b. In any 50,000-square-foot area.

2806.5 Special protection design for Level 2 and 3 aerosols adjacent to flammable and combustible liquids in double-row racks. The display of Level 2 and 3 aerosols adjacent to flammable and combustible liquids in double-row racks shall be in accordance with FC 2806.5.1 through 2806.5.8 or FC2806.3.3.

2806.5.1 Fire protection. Fire protection for the display of Level 2 and 3 aerosols in double-row racks shall be in accordance with Table 7.4.1 and Figure 7.4.1 of NFPA 30B.

2806.5.2 Cartoned products. Level 2 and 3 aerosols displayed more than 8 feet (2438 mm) above the finished floor shall be in cartons.

2806.5.3 Shelving. Shelving in racks shall be limited to wire mesh shelving having uniform openings not more than 6 inches (152 mm) apart, with the openings comprising at least 50 percent of the overall shelf area.

2806.5.4 Aisles. Racks shall be arranged so that aisles not less than 7½ feet (2286 mm) wide are maintained between rows of racks and adjacent solid-piled or palletized merchandise.

2806.5.5 Flue spaces. Flue spaces in racks shall comply with the following:

1. Transverse flue spaces—nominal 3-inch (76-mm) transverse flue spaces shall be maintained between merchandise and rack uprights.

2. Longitudinal flue spaces—nominal 6-inch (152-mm) longitudinal flue spaces shall be maintained.

2806.5.6 Horizontal barriers. Horizontal barriers constructed of minimum ³/₈-inch-thick (10-mm-thick) plywood or minimum 0.034-inch (0.086-mm) (No. 22 gage) sheet metal shall be provided and located in accordance with NFPA 30B when in-rack sprinklers are installed.

2806.5.7 Class I, II, III, IV and plastic commodities. Class I, II, III, IV and plastic commodities located adjacent to retail Level 2 and 3 aerosol product displays shall be protected in accordance with NFPA 13, as modified by FC Appendix B.

2806.5.8 Flammable and combustible liquids. Class I, II, III A and III B Liquids shall be allowed to be located adjacent to Level 2 and 3 aerosol products when the following conditions are met:

1. Class I, II, IIIA and IIIB liquid containers: Containers for Class I, II, IIIA and IIIB liquids shall be limited to 1.06-gallon (4-L) metal-relieving and nonrelieving style containers and 5.3-gallon (20-L) metal-relieving style containers.
2. Fire protection for Class I, II, IIIA and IIIB Liquids: Automatic sprinkler protection for Class I, II, IIIA and IIIB liquids shall be in accordance with FC Chapter 34.