



APPENDIX C CODE CHANGE PROPOSAL NORTH CAROLINA BUILDING CODE COUNCIL

B-4

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Petition for Rule Making

Item Number _____

Granted by BCC _____
Denied by BCC _____

Adopted by BCC _____
Disapproved by BCC _____

Approved by RRC _____
Objection by RRC _____

PROPONENT: Kate Whalen _____ PHONE: (919) 647-0033
REPRESENTING: NC OSFM – Engineering and Codes _____
ADDRESS: 1429 Rock Quarry Rd, Suite 105 _____
CITY: Raleigh _____ STATE: NC _____ ZIP: 27610 _____
E-MAIL: kathryn.whalen@ncdoi.gov _____ FAX: () - _____

North Carolina State Building Code, Volume 2024 NC Fire Code _____ - Section 202, 203, 608, 911, 3307, 5003 and Reference Standards

CHECK ONE: Revise section to read as follows: Delete section and substitute the following:
 Add new section to read as follows: Delete section without substitution:

~~LINE THROUGH MATERIAL TO BE DELETED~~

UNDERLINE MATERIAL TO BE ADDED

Please type. Continue proposal or reason on plain paper attached to this form. See reverse side for instructions.

See attached.

Will this proposal change the cost of construction? Decrease Increase No
Will this proposal increase to the cost of a dwelling by \$80 or more? Yes No
Will this proposal affect the Local or State funds? Local State No
Will this proposal cause a substantial economic impact (\geq \$1,000,000)? Yes No

- Non-Substantial – Provide an economic analysis including benefit/cost estimates.
- Substantial – The economic analysis must also include 2-alternatives, time value of money and risk analysis.
- Pursuant to §143-138(a1)(2) a cost-benefit analysis is required for all proposed amendments to the NC Energy Conservation Code. The Building Code Council shall also require same for the NC Residential Code, Chapter 11.

REASON:

These changes are amending the 2024 NC building codes to update A2L refrigerant related code provisions to align with the 2024 I-Code provisions: these amendments follow the language suggested by the ICC to amend the 2021 I-codes to include the new 2024 provisions. These changes will update the 2024 NCFC to align with the associated A2L related changes to the 2024 NCMC and to align with the chemical classifications and labeling provisions from latest edition of the Globally Harmonized System of Classification and Labeling of Chemicals.

BCC CODE CHANGES

Signature: Kate Whalen

Date: 11/1/23 FORM 11/26/19

INSTRUCTIONS

Each proposed Code change request shall comply with the following policies:

Rule 1: The Original and twenty-two (22) copies of the proposed Petition for Rule-Making along with supporting documentation shall be filed with the Building Code Council Secretary. Submit one (1) electronic copy via email.

Rule 2: The filing shall be received by the first day of the month prior to the quarterly scheduled meeting date. Example: A December meeting date will require filing by November 1 prior to the meeting.

Rule 3: Each request shall be typewritten on this form and shall contain the following:

- (1) The proposed rule change must be set forth in full and contain explicit reference to the affected section or sections of the Code.
- (2) The request shall state the reasons for the proposed rule change with supporting documentation.
- (3) The proposed rule change shall comply with the standards set forth in GS 143-138(c) and reference to the particular standards shall be set forth in the request for the amendment.
- (4) The proposed rule change shall contain an economic impact analysis as required by GS 143-138(a).
- (5) A proposed rule change to the NC Energy Conservation Code shall have an accompanying cost-benefit analysis as required by GS 143-138(a1)(2).

Rule 4: When a request is improperly filed or not in accordance with all the rules listed above, the BCC Secretary shall reject the submittal and notify the applicant of the proper procedure to follow.

Rule 5: Upon the proper filing of a request, the BCC Secretary shall forward one copy of said request to each council member prior to the scheduled meeting date. Persons filing proposed petitions are hereby notified of the place and time of the scheduled hearings. The BCC Secretary shall cause to be published the notice of public hearing as specified in GS 143-138(a).

Rule 6: The Council shall either Grant or Deny the proposed Petition for Rulemaking at the meeting following receipt of the proposed rule change. The Council will take no further action on items that are Denied. Granted items may be referred to Committee for review.

Rule 7: The Council will hold a public hearing on Granted items at the next quarterly scheduled meeting. The Council will take final action on Granted items at the next quarterly scheduled meeting after the public hearing.

Timeline Example

Petition received:	February 1
Petition Granted:	March BCC meeting
Notice of Hearing published:	April NC Register
Committee review:	May - June
Hearing held:	June BCC meeting
Final Adoption:	September BCC meeting
Rules Review Meeting:	November RRC meeting
Approved:	December 1

SECTION 202 GENERAL DEFINITIONS

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FLAMMABLE GAS. A material that is a gas at 68°F (20°C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure [a material that has a *boiling point* of 68°F (20°C) or less at 14.7 psia (101 kPa)], ~~which also meets one of the following~~ subdivided as follows:

1. ~~Is~~ Category 1A.

1. A gas that is ignitable at 14.7 psia (101 kPa) when in a mixture of 13 percent or less by volume with air; or
2. ~~Has~~ A gas with a flammable range at 14.7 psia (101 kPa) with air of not less than 12 percent, regardless of the lower limit., unless data show compliance with Category 1B.

2. Category 1B.

A gas that meets the flammability criteria for Category 1 A, is not pyrophoric or chemically unstable, and meets one or more of the following:

1. A lower flammability limit of more than 6 percent by volume of air; or
2. A fundamental burning velocity of less than 3.9 in/s (10 cm/s).

The limits specified shall be determined at 14.7 psi (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E681.

Where not otherwise specified, the term “flammable gas” includes both Category 1A and Category 1B.

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[F] 203.7.4 High-hazard Group H-2. Buildings and structures containing materials that pose a deflagration hazard or a hazard from accelerated burning shall be classified as Group H-2. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA *flammable or combustible liquids* that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103.4 kPa).

Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3 of the *International Building Code*.

Cryogenic fluids, flammable.

Category 1A Flammable gases.

Category 1B Flammable gases having a burning velocity greater than 3.9 inches per second (10 cm/s).

Organic peroxides, Class I.

Oxidizers, Class 3, that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103 kPa).

Pyrophoric liquids, solids and gases, nondetonable.

Unstable (reactive) materials, Class 3, nondetonable.

Water-reactive materials, Class 3.

[F] 203.7.5 High-hazard Group H-3. Buildings and structures containing materials that readily support combustion or that pose a *physical hazard* shall be classified as Group H-3. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA *flammable or combustible liquids* that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103.4 kPa) or less

Combustible fibers, other than densely packed baled cotton, where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3 of the *International Building Code*.

Consumer *fireworks*, 1.4G (Class C, Common)

Cryogenic fluids, oxidizing

Category 1B flammable gases having a burning velocity of 3.9 inches per second (10 cm/s) or less.

Flammable solids

Organic peroxides, Class II and III

Oxidizers, Class 2

Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103 kPa) or less

Oxidizing gases

Unstable (reactive) materials, Class 2

Water-reactive materials, Class 2

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[M] 608.17 Electrical equipment. Where refrigerant of Groups A2, A3, B2 and B3, as defined in the *International Mechanical Code*, are used, refrigeration machinery rooms shall conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70.

~~**Exceptions**~~**Exception:** Ammonia machinery rooms that are provided with ventilation in accordance with the Section 1101.1.2 of the *International Mechanical Code*.

- ~~1. Ammonia machinery rooms that are provided with ventilation in accordance with Section 1101.1.2, Exception 1 of the *International Mechanical Code*.~~
- ~~2. Machinery rooms for systems containing Group A2L refrigerants that are provided with ventilation in accordance with Section 608.18.~~

~~**[M] 608.18 Special requirements for Group A2L refrigerant machinery rooms.** Machinery rooms with systems containing Group A2L refrigerants that do not comply with the Class I, Division 2, hazardous location electrical requirements of NFPA 70, as permitted by Section 608.17, Exception 2, shall comply with Sections 608.18.1 through 608.18.2.~~

~~**608.18.1 Ventilation system activation.** Ventilation shall be activated by the refrigerant detection system in the machinery room. Refrigerant detection shall be in accordance with Section 608.9 and all of the following:~~

- ~~1. The detectors shall activate at or below a refrigerant concentration of 25 percent of the LFL.~~
- ~~2. Upon activation, the detection system shall activate the emergency ventilation system in Section 608.18.2.~~
- ~~3. The detection, signaling and control circuits shall be supervised.~~

~~**[M] 608.18.2 Emergency ventilation system.** An emergency ventilation system shall be provided at the minimum exhaust rate specified in ASHRAE 15 or Table 608.18.2. Shut down of the emergency ventilation system shall be by manual means.~~

**[M] TABLE 608.18.2
MINIMUM EXHAUST RATE**

REFRIGERANT	Q (m ³ /sec)	Q (cfm)
R32	15.4	32,600
R143a	13.6	28,700
R444A	6.46	13,700
R444B	10.6	22,400
R445A	7.83	16,600
R446A	23.9	50,700
R447A	23.8	50,400
R451A	7.04	15,000
R451B	7.05	15,000
R1234yf	7.80	16,600
R1234ze(E)	5.92	12,600

~~[M] 608.18.3 Emergency ventilation system discharge.~~ The point of discharge to the atmosphere shall be located outside of the structure at not less than 15 feet (4572 mm) above the adjoining grade level and not less than 20 feet (6096 mm) from any window, ventilation opening or exit.

[M] 608.18 Group A2L and B2L Refrigerant. Machinery rooms for Group A2L and B2L refrigerant shall comply with Section 608.18.1 through Section 608.18.3.

[M] 608.18.1 Elevated Temperatures. Open flame-producing devices or continuously operating hot surfaces over 1290°F (700°C) shall not be permanently installed in the room.

[M] 608.18.2 Refrigerant Detector. In addition to the requirements of Section 1105.3 of the *International Mechanical Code*, refrigerant detectors shall signal an alarm and activate the ventilation system in accordance with the response time specified in Table 608.18.2

[M] 608.18.3 Mechanical Ventilation. The machinery room shall have a mechanical ventilation system complying with ASHRAE 15.

**[M] TABLE 608.18.2
GROUP A2L AND B2L DETECTOR ACTIVATION**

<u>Activation Level</u>	<u>Maximum Response Time (seconds)</u>	<u>ASHRAE 15 Ventilation Level</u>	<u>Alarm Reset</u>	<u>Alarm Type</u>
<u>Less than or equal to the OEL in Table 1103.1 of the International Mechanical Code</u>	<u>300</u>	<u>1</u>	<u>Automatic</u>	<u>Trouble</u>
<u>Less than or equal to the refrigerant concentration level in Table 1103.1 of the International Mechanical Code</u>	<u>15</u>	<u>2</u>	<u>Manual</u>	<u>Emergency</u>

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**TABLE 911.1
EXPLOSION CONTROL REQUIREMENTS^f**

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems
Hazard Category			
Combustible dusts ^a	—	Not required	Required
Cryogenic fluids	Flammable	Not required	Required
Explosives	Division 1.1	Required	Not required
	Division 1.2	Required	Not required
	Division 1.3	Not required	Required
	Division 1.4	Not required	Required
	Division 1.5	Required	Not required
	Division 1.6	Required	Not required
Flammable gas	Gaseous	Not required	Required ^h
	Liquefied	Not required	Required ^h
Flammable liquids	IA ^b	Not required	Required

	IB ^c	Not required	Required
Organic peroxides	Unclassified detonable	Required	Not permitted
	I	Required	Not permitted
Oxidizer liquids and solids	4	Required	Not permitted
Pyrophoric	Gases	Not required	Required
Unstable (reactive)	4	Required	Not permitted
	3 detonable	Required	Not permitted
	3 nondetonable	Not required	Required
Water-reactive liquids and solids	3	Not required	Required
	2 ^e	Not required	Required
Special Uses			
Acetylene generator rooms	—	Not required	Required
Electrochemical energy storage systems ^g	—	Not required	Required
Energy storage systems ^g	—	Not required	Required
Grain processing	—	Not required	Required
Liquefied petroleum gas distribution facilities	—	Not required	Required
Where explosion hazards exist ^d	Detonation	Required	Not permitted
	Deflagration	Not required	Required

- a. Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.8.2. See definition of “Combustible dust” in Chapter 2.
- b. Storage or use.
- c. In open use or dispensing.
- d. Rooms containing dispensing and use of hazardous materials where an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.
- e. A method of explosion control shall be provided where Class 2 water-reactive materials can form potentially explosive mixtures.
- f. Explosion venting is not required for Group H-5 Fabrication Areas complying with Chapter 27 and the *International Building Code*.
- g. Where explosion control is required in Section 1207.6.3.
- h. Not required for Category 1B flammable gases having a burning velocity not exceeding 3.9 in/s (10 cm/s).

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3307.2.1 Pipe cleaning and purging. The cleaning and purging of flammable gas piping systems, including cleaning new or existing piping systems, purging piping systems into service and purging piping systems out of service, shall comply with NFPA 56.

Exceptions:

1. *Compressed gas* piping systems other than fuel gas piping systems where in accordance with Chapter 53.
2. Piping systems regulated by the *International Fuel Gas Code*.
3. Liquefied petroleum gas systems in accordance with Chapter 61. *
4. Cleaning and purging of refrigerant piping systems shall comply with the *International Mechanical Code*.

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TABLE 5003.1.1(1)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD^{a, j, m, n, p}

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE ^b			USE-CLOSED SYSTEMS ^b			USE-OPEN SYSTEMS ^b				
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)			
Combustible dust	NA	H-2	See Note q	NA	NA	See Note q	NA	NA	See Note q	NA			
Combustible fibers ^d	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA			
	Baled ^o		(1,000)			(1,000)			(200)				
Combustible liquid ^{e, i}	II	H-2 or H-3	NA	120 ^{d, e}	NA	NA	NA	NA	NA	30 ^d			
	IIIA	H-2 or H-3		330 ^{d, e}						80 ^d			
	IIIB	NA		13,200 ^{e, f}						3,300 ^f			
Cryogenic flammable	NA	H-2	NA	45 ^d	NA	NA	45 ^d	NA	NA	10 ^d			
Cryogenic inert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA			
Cryogenic oxidizing	NA	H-3	NA	45 ^d	NA	NA	45 ^d	NA	NA	10 ^d			
Explosives	Division 1.1	H-1	1 ^{e, g}	(1) ^{e, g}	NA	NA	NA	NA	NA	0.25 ^g			
	Division 1.2	H-1	1 ^{e, g}	(1) ^{e, g}						0.25 ^g	(0.25) ^g	0.25 ^g	(0.25) ^g
	Division 1.3	H-1 or H-2	5 ^{e, g}	(5) ^{e, g}						1 ^g	(1) ^g	1 ^g	(1) ^g
	Division 1.4	H-3	50 ^{e, g}	(50) ^{e, g}						50 ^g	(50) ^g	NA	NA
	Division 1.4G	H-3	125 ^{e, l}	NA						NA	NA	NA	NA
	Division 1.5	H-1	1 ^{e, g}	(1) ^{e, g}						0.25 ^g	(0.25) ^g	0.25 ^g	(0.25) ^g
	Division 1.6	H-1	1 ^{e, g}	NA						NA	NA	NA	NA
Flammable gas	Gaseous												
	<u>1A and 1B (High BV)^r</u>	H-2	NA	NA	NA	NA	NA	NA	NA	1,000 ^{d, e}	NA		
	<u>1B (Low BV)^r</u>									162,500 ^{d, e}	162,500 ^{d, e}		
	Liquefied												
<u>1A and 1B (High BV)^r</u>	H-2	NA	(150) ^{d, e}	NA	NA	(150) ^{d, e}	NA	NA	NA	NA			

	<u>1B (Low BV)^f</u>			<u>(10,000)^{d,e}</u>			<u>(10,000)^{d,e}</u>			
Flammable liquid ^e	IA	H-2 or H-3	NA	30 ^{d,e}	NA	NA	30 ^d	NA	NA	10 ^d
	IB and IC			120 ^{d,e}			120 ^d			30 ^d
Flammable liquid, combination (IA, IB, IC)	NA	H-2 or H-3	NA	120 ^{d,e,h}	NA	NA	120 ^{d,h}	NA	NA	30 ^{d,h}
Flammable solid	NA	H-3	125 ^{d,e}	NA	NA	125 ^d	NA	NA	25 ^d	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	UD	H-1	1 ^{e,g}	(1) ^{e,g}	NA	0.25 ^g	(0.25) ^g	NA	0.25 ^g	(0.25) ^g
	I	H-2	5 ^{d,e}	(5) ^{d,e}		1 ^d	(1) ^d		1 ^d	(1) ^d
	II	H-3	50 ^{d,e}	(50) ^{d,e}		50 ^d	(50) ^d		10 ^d	(10) ^d
	III	H-3	125 ^{d,e}	(125) ^{d,e}		125 ^d	(125) ^d		25 ^d	(25) ^d
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL

(continued)

TABLE 5003.1.1(1)—continued
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD^{a,i,m,n,p}

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE ^b			USE-CLOSED SYSTEMS ^b			USE-OPEN SYSTEMS ^b	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Oxidizer	4	H-1	1 ^g	(1) ^{e,g}	NA	0.25 ^g	(0.25) ^g	NA	0.25 ^g	(0.25) ^g
	3 ^k	H-2 or H-3	10 ^{d,e}	(10) ^{d,e}		2 ^d	(2) ^d		2 ^d	(2) ^d
	2	H-3	250 ^{d,e}	(250) ^{d,e}		250 ^d	(250) ^d		50 ^d	(50) ^d
	1	NA	4,000 ^{e,f}	(4,000) ^{e,f}		4,000 ^f	(4,000) ^f		1,000 ^f	(1,000) ^f
Oxidizing gas	Gaseous	H-3	NA	NA	1,500 ^{d,e}	NA	NA	1,500 ^{d,e}	NA	NA
	Liquefied			(150) ^{d,e}	NA		(150) ^{d,e}	NA		
Pyrophoric	NA	H-2	4 ^{e,g}	(4) ^{e,g}	50 ^{e,g}	1 ^g	(1) ^g	10 ^{e,g}	0	0
Unstable (reactive)	4	H-1	1 ^{e,g}	(1) ^{e,g}	10 ^{e,g}	0.25 ^g	(0.25) ^g	2 ^{e,g}	0.25 ^g	(0.25) ^g
	3	H-1 or H-2	5 ^{d,e}	(5) ^{d,e}	50 ^{d,e}	1 ^d	(1) ^d	10 ^{d,e}	1 ^d	(1) ^d
	2	H-3	50 ^{d,e}	(50) ^{d,e}	750 ^{d,e}	50 ^d	(50) ^d	750 ^{d,e}	10 ^d	(10) ^d
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5 ^{d,e}	(5) ^{d,e}	NA	5 ^d	(5) ^d	NA	1 ^d	(1) ^d
	2	H-3	50 ^{d,e}	(50) ^{d,e}		50 ^d	(50) ^d		10 ^d	(10) ^d
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.028 m³, 1 pound = 0.454 kg, 1 gallon = 3.785 L.
 NL = Not Limited; NA = Not Applicable; UD = Unclassified Detonable.

- a. For use of control areas, see Section 5003.8.3.
- b. The aggregate quantity in use and storage shall not exceed the quantity listed for storage.
- c. The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited providing the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuff or consumer products and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.
- d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e applies, the increase for both notes shall be applied accumulatively.
- e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, day boxes, gas cabinets, gas rooms, exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10. Where Note d applies, the increase for both notes shall be applied accumulatively.
- f. Quantities shall not be limited in a building equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.
- g. Allowed only in buildings equipped throughout with an approved automatic sprinkler system.
- h. Containing not more than the maximum allowable quantity per control area of Class IA, Class IB or Class IC flammable liquids.
- i. The maximum allowable quantity shall not apply to fuel oil storage complying with Section 605.4.2.
- j. Quantities in parenthesis indicate quantity units in parenthesis at the head of each column.
- k. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed where such materials are necessary for maintenance purposes, operation or sanitation of equipment where the storage containers and the manner of storage are approved.
- l. Net weight of pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks including packaging shall be used.
- m. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.
- n. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 5003.11, see Table 5003.11.1 and Table 5003.11.2.
- o. Densely-packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.
- p. The following shall not be included in determining the maximum allowable quantities:
 1. Liquid or gaseous fuel in fuel tanks on vehicles.
 2. Liquid or gaseous fuel in fuel tanks on motorized equipment operated in accordance with this code.
 3. Gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas Code*.
 4. Liquid fuels in piping systems and fixed appliances regulated by the *International Mechanical Code*.
 5. Alcohol-based hand rubs classified as Class I or II liquids in dispensers that are installed in accordance with Sections 5705.5 and 5705.5.1. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents.
- q. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.8.2.
- r. “High BV” Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). “Low BV” Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

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TABLE 5003.1.1(3)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD IN AN OUTDOOR CONTROL AREA^{a, b, c, d}

MATERIAL	CLASS	STORAGE ^b			USE-CLOSED SYSTEMS ^b			USE-OPEN SYSTEMS ^b	
		Solid pounds (cubic feet)	Liquid gallons (pounds) ^d	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds) ^d	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds) ^d
Flammable gas	Gaseous								
	<u>1A and 1B (High BV)^e</u>	Not Applicable	Not Applicable	3,000	Not Applicable	Not Applicable	1,500	Not Applicable	Not Applicable
	<u>1B (Low BV)^e</u>			<u>195,000</u>			<u>97,500</u>		
	Liquefied								
	<u>1A and 1B (High BV)^e</u>	<u>Not Applicable</u>	(300)	Not Applicable	<u>Not Applicable</u>	(150)	Not Applicable	<u>Not Applicable</u>	<u>Not Applicable</u>
	<u>1B (Low BV)^e</u>		<u>(20,000)</u>		<u>(10,000)</u>				

Flammable solid	Not Applicable	500	Not Applicable	Not Applicable	250	Not Applicable	Not Applicable	50	Not Applicable
Inert Gas	Gaseous	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Cryogenic inert	Liquefied	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
	Not Applicable	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
	Not Applicable	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Organic peroxide	Unclassified Detonable	1	(1)	Not Applicable	0.25	(0.25)	Not Applicable	0.25	(0.25)
Organic peroxide	I	20	(20)	Not Applicable	10	(10)	Not Applicable	2	(2)
	II	200	(200)		100	(100)		20	(20)
	III	500	(500)		250	(250)		50	(50)
	IV	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
	V	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
Oxidizer	4	2	(2)	Not Applicable	1	(1)	Not Applicable	0.25	(0.25)
	3	40	(40)		20	(20)		4	(4)
	2	1,000	(1,000)		500	(500)		100	(100)
	1	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
Oxidizing gas	Gaseous	Not Applicable	Not Applicable	6,000	Not Applicable	Not Applicable	1,500	Not Applicable	Not Applicable
	Liquefied	Not Applicable	(600)	Not Applicable	Not Applicable	(300)	Not Applicable	Not Applicable	Not Applicable
Pyrophoric materials	Not Applicable	8	(8)	100	4	(4)	10	0	0
Unstable (reactive)	4	2	(2)	20	1	(1)	2	0.25	(0.25)
	3	20	(20)	200	10	(10)	10	1	(1)
	2	200	(200)	1,000	100	(100)	250	10	(10)
	1	Not Limited	Not Limited	1,500	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited
Water reactive	3	20	(20)	Not Applicable	10	(10)	Not Applicable	1	(1)
	2	200	(200)		100	(100)		10	(10)
	1	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 cubic foot = 0.02832 m³.

- For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.
- The aggregate quantities in storage and use shall not exceed the quantity listed for storage.
- The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is allowed to exceed the maximum allowable quantity per control area where such storage is in accordance with Section 5003.11.
- Quantities in parentheses indicate quantity units in parentheses at the head of each column.
- “High BV” Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). “Low BV” Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

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5003.8.3.5 Hazardous materials in Group M display and storage areas and in Group S storage areas. Hazardous materials located in Group M and Group S occupancies shall be in accordance with Sections 5003.8.3.5.1 through ~~5003.8.3.5.3~~5003.8.3.5.4.

....

5003.8.3.5.4 Flammable gas. The aggregate quantity of Category 1B flammable gas having a burning velocity of 3.9 in/s (10 cm/s) or less stored and displayed within a single *control area* of a Group M occupancy, or in an outdoor *control area*, or stored in a single *control area* of a Group S occupancy, is allowed to exceed the maximum allowable quantities per *control area* specified in Table 5003.1.1(1) without classifying the building or use as a Group H occupancy, provided the materials are stored and displayed in accordance with Section 5003.11.2.

....

5003.11 Maximum allowable quantity for Group M storage and display and Group S storage. The aggregate quantity of ~~nonflammable solid and nonflammable or noncombustible liquid~~ hazardous materials stored and displayed within a single *control area* of a Group M occupancy, or an outdoor *control area*, or stored in a single *control area* of a Group S occupancy, is allowed to exceed the *maximum allowable quantity per control area* indicated in Section 5003.1 where in accordance with Sections 5003.11.1 and 5003.11.2 through ~~5003.11.3.11~~.

5003.11.1 Nonflammable solid and nonflammable or noncombustible liquid hazardous materials. Maximum allowable quantity per control area in Group M or S occupancies. The aggregate amount of nonflammable solid and nonflammable or noncombustible liquid hazardous materials stored and displayed within a single *control area* of a Group M occupancy, or an outdoor *control area*, or stored in a single *control area* of a Group S occupancy shall not exceed the amounts set forth in Table 5003.11.1.

~~**5003.11.2 Maximum allowable quantity per outdoor control area in Group M or S occupancies.** The aggregate amount of nonflammable solid and nonflammable or noncombustible liquid hazardous materials stored and displayed within a single *outdoor control area* of a Group M occupancy shall not exceed the amounts set forth in Table 5003.11.1.~~

~~**5003.11.3 5003.11.1.1 Storage and display.** Storage and display shall be in accordance with Sections 5003.11.3.1-5003.1.1.1 through 5003.11.3.11-5003.11.1.1.1.~~

~~**5003.11.3.1-5003.11.1.1.1 Density.** Storage and display of solids shall not exceed 200 pounds per square foot (976 kg/m²) of floor area actually occupied by solid merchandise. Storage and display of liquids shall not exceed 20 gallons per square foot (0.50 L/m²) of floor area actually occupied by liquid merchandise.~~

~~**5003.11.3.2-5003.11.1.1.2 Storage and display height.** Display height shall not exceed 6 feet (1829 mm) above the finished floor in display areas of Group M occupancies. Storage height shall not exceed 8 feet (2438 mm) above the finished floor in storage areas of Group M and Group S occupancies.~~

~~**5003.11.3.3-5003.11.1.1.3 Container location.** Individual containers less than 5 gallons (19 L) or less than 25 pounds (11 kg) shall be stored or displayed on pallets, racks or shelves.~~

~~**5003.11.3.4-5003.11.1.1.4 Racks and shelves.** Racks and shelves used for storage or display shall be in accordance with Section 5003.9.9.~~

~~**5003.11.3.5-5003.11.1.1.5 Container type.** Containers shall be *approved* for the intended use and identified as to their content.~~

~~**5003.11.3.6-5003.11.1.1.6 Container size.** Individual containers shall not exceed 100 pounds (45 kg) for solids or 10 gallons (38 L) for liquids in storage and display areas.~~

~~**5003.11.3.7-5003.11.1.1.7 Incompatible materials.** *Incompatible materials* shall be separated in accordance with Section 5003.9.8.~~

~~**5003.11.3.8-5003.11.1.1.8 Floors.** Floors shall be in accordance with Section 5004.12.~~

~~**5003.11.3.9-5003.11.1.1.9 Aisles.** Aisles 4 feet (1219 mm) in width shall be maintained on three sides of the storage or display area.~~

~~**5003.11.3.10-5003.11.1.1.10 Signs.** Hazard identification signs shall be provided in accordance with Section 5003.5.~~

~~**5003.11.3.11-5003.11.1.1.11 Storage plan.** A storage plan illustrating the intended storage arrangement, including the location and dimensions of aisles, and storage racks shall be provided.~~

5003.11.2 Category 1B flammable gas with low burning velocity. The aggregate quantity of Category 1B flammable gas having a burning velocity of 3.9 in/s (10 cm/s) or less stored and displayed within a single *control area* of a Group M occupancy, or an outdoor *control area*, or stored in a single *control area* of a Group S occupancy, shall not exceed the amounts set forth in Table 5003.11.2.

**TABLE 5003.11.2
 MAXIMUM ALLOWABLE QUANTITY OF LOW BURNING VELOCITY CATEGORY 1B FLAMMABLE GAS IN GROUP M AND S
 OCCUPANCIES PER CONTROL AREA^a**

FLAMMABLE GAS CATEGORY	MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	
	Sprinklered in accordance with Note b	Nonsprinklered
Category 1B (Low BV) ^d		
Gaseous	390,000 cu. ft.	195,000 cu. ft.
Liquified	40,000 lbs. ^c	20,000 lbs.

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.02832 m³, 1 square foot = 0.093 m², 1 inch/second = 2.5641 cm/s.

- a. Control areas shall be separated from each other by not less than a 1-hour *fire barrier*.
- b. The building shall be equipped throughout with an approved automatic sprinkler system with minimum sprinkler design density of Ordinary Hazard Group 2 in the area where flammable gases are stored or displayed.
- c. Where storage areas exceed 50,000 square feet in area, the maximum allowable quantities are allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 50,000 square feet, up to not more than 100 percent of the table amounts. Separation of control areas is not required. The aggregate amount shall not exceed 80,000 pounds.
- d. "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

5003.11.2.1 Fire protection and storage arrangements. Fire protection and container storage arrangements for quantities of Category 1B flammable gases permitted by Table 5003.11.2 shall be in accordance with all of the following:

1. Storage of the Category 1B flammable gases on shelves shall not exceed 6 feet (1829 mm) in height, and shelving shall be metal.
2. Rack storage, pallet storage or piles of the Category 1B flammable gas greater than 6 feet 6 inches (1981 mm) in height shall be provided with an automatic sprinkler system with a minimum design of Extra Hazard Group 1.
3. Combustible commodities shall not be stored above the Category 1B flammable gases.
4. Flammable liquids shall be separated from the Category 1B flammable gases by a 20 foot distance (6096 mm). The separation is permitted to be reduced to 10 feet (3048 mm) where secondary containment or diking is provided to retain a flammable liquid spill at a distance of 10 feet (3048 mm) from the Category 1B flammable gas storage.

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CHAPTER 80 REFERENCED STANDARDS

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ASHRAE

ASHRAE
 1791 Tullie Circle NE
 Atlanta, GA 30329

15—2019/2022

Safety Standard for Refrigeration Systems
 608.1.1, 608.18.2