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STATE FIRE MARSHAL

## MEMORANDUM

**To:** Heads of Fire Departments  
**From:** Peter J. Ostroskey, State Fire Marshal  
**Date:** October 9, 2019  
**Re:** **Revisions to 527 CMR 1.00: Massachusetts Comprehensive Fire Safety Code (Effective October 18, 2019) and related training opportunities and new code materials**

The Board of Fire Prevention Regulations recently promulgated revisions to 527 CMR 1.00, the Massachusetts Comprehensive Fire Safety Code which is largely based upon the 2015 Edition of NFPA-1. This amendment package supplements the current code, bridging the gap between the current 2015 NFPA 1 base code and the recently published 2018 NFPA 1 edition. The amendment package revises some items for clarity and adopts new chapters from the 2018 edition of NFPA 1. The revisions will go into effect on October 18, 2019.

This memorandum is a brief summary of the key changes between the current 527 CMR 1.00 (based on the 2015 Edition of NFPA 1) and the revised code which, in part, is based on certain provisions within the 2018 Edition of NFPA 1, and provides information related to code update training. Attached for your convenience and review is an unofficial copy of the amendments. The key revisions are as follows:

### **Authority Having Jurisdiction (AHJ) [527 CMR 1.00: 3.2]**

The board decided to remove Massachusetts-specific language for authority having jurisdiction and revert to the base language in 2015 NFPA 1. This change simplifies how the code is used but requires code users and enforcers to determine who the AHJ is, depending on the situation. Additional annex material provides clear guidance and examples about when:

- the fire department has authority (maintenance of building systems, hazardous materials use and processing, blasting and hot work, etc.)
- the building department has authority (setting minimum clear egress widths, determining the need for sprinklers in new construction, mandating fire resistance rated walls for hazardous materials control areas, etc.)

With a better understanding of who the AHJ is in each scenario, and working with your local counterpart, the code can be applied properly.

**Fire Department Vehicle Access Roads [527 CMR 1.00: 18.2]**

The trend in urban areas is to use every available space for building. The current edition of the fire code requires fire department vehicle access to large residential and commercial structures, but exempts one- and two-family dwellings. When these one- or two-family homes are located behind an existing building, the delay of responding fire apparatus ability to deliver water to the building to protect the property and exposures can be detrimental. Provisions in the code note this situation and require access for fire department vehicles when one- or two-family dwellings are located behind another structure.

**Cannabis Growing, Processing, and Extraction [527 CMR 1.00: 38]**

The proliferation of cannabis growing and processing operations across the Commonwealth created the need for statewide standards for these occupancies. While the building code applies to construction of Use Group F-1 (moderate-hazard factory/industrial) occupancies, facility operations were not specifically addressed in either the building or fire codes. The board voted to adopt the most recently published national standard, 2018 NFPA 1, Chapter 38, to establish a minimum criteria for fire and life safety in these buildings. Requirements include gas detection and notification for cannabis extraction processes, as well as equipment and ventilation requirements.

**Tank Vehicle Inspections [527 CMR 1.00: 1 & 42]**

In previous versions of the state fire code, fire departments were required to inspect and issue permit stickers for tank vehicles used for the transportation of combustible liquids. The safety requirements within the fire code have not changed; however, fire departments will no longer be issuing permit stickers for these vehicles. Fire departments will continue to issue FP-6 permits for the storage of fuel within these tank vehicles where they are parked during non-business hours.

**On-Demand Mobile Vehicle Fueling [527 CMR 1.00: 42.10]**

Fuel delivery to your vehicle at home, or at work, is a new trend in customer service. Companies want to offer this service in Massachusetts, so the board voted to adopt provisions from 2018 NFPA 1 for mobile fueling. In addition to complying with the code, mobile fueling companies must obtain general approval from the State Fire Marshal's Office and then apply to each jurisdiction where they intend to operate. The purpose of the state application is to create consistency and to streamline the approval process for businesses.

**Energy Storage Systems [527 CMR 1.00: 52]**

The current edition of 527 CMR 1.00 includes a chapter on battery storage systems, but the board voted to adopt the recently published 2018 NFPA 1, Chapter 52. The new language expands the scope of the chapter to address new energy storage technology and is based on recent testing conducted by NFPA's Fire Protection Research Foundation. The increased scope addresses energy storage system equipment installation, configuration, and protection schemes.

**Training**

The Massachusetts Firefighting Academy will host training for fire prevention officers on the amendment package. The training will familiarize fire prevention officers with these code changes, their implications, and application in local communities. Training times and locations will be posted soon on the DFS Learning Management System (LMS). The plan for this training will begin with offerings in Stow, Springfield and at the November meeting of the Fire Prevention Association of Massachusetts. Additional classes will be scheduled throughout the Commonwealth this fall and winter. For amendment package training classes and additional fire prevention course offerings, please visit the MFA class registry at <https://www.mass.gov/massachusetts-firefighting-academy-mfa>.

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**Add:**

**1.12.5.1.1** The installation or use, in any building, of any device or object that reasonably appears to be a smoke detector, sprinkler head, carbon monoxide alarm, heat detector, or any similar device, used for life safety or fire protection, that is in fact, neither designed nor capable of performing such life safety or fire protection function, shall be prohibited.

**Delete and Replace:**

**1.12.8\* General Requirements.** A permit and an application for permit shall be required as prescribed in *1.12.8*. No work or activities described in this Section shall commence without first complying with *Section 1.12* and the applicable Table in *1.12.8*.

**Delete and Replace:**

**1.12.8.1** *Table 1.12.8.1* shall apply to Chapter 10, entitled General Safety Requirement. A permit shall be used, completed, required and issued as a precondition before conducting any work/activity described by *Table 1.12.8.1*.

**Table 1.12.8.1\* Permits Required.**

Chapters 10	General Requirements	
Work/ Activity	Issuing Authority	Code Section
*Open Air Burning, <i>see Annex</i>	Forest Warden	10.10.1
*Ceremonial Bonfires, <i>see Annex</i>	Head of Fire Department	10.10.4.1.1
Open Flame (heat producing) devices		10.10.1 10.10.9.1
Storage of combustible materials		10.15.1.2 10.15.2.1 10.18.2
Fumigation and insecticidal fogging		10.20.1
*Use of canine guards, <i>see Annex</i>		10.21.1

**Delete and Replace:**

**1.12.8.2** *Table 1.12.8.2* shall apply to Chapter 11, entitled Building Services. Except as permitted by *1.12.8.2.1*, and by *Table 1.12.8.50 for heating appliances*, on a form approved by the State Fire Marshal, a permit shall be used, completed, required and issued as a precondition before conducting any work/activity by *Table 1.12.8.2*.

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## 1.12.8.2.1 Heating Appliances.

- (1) A permit shall not be required for routine maintenance, such as the replacement of nozzles, ignition electrodes, or filters
- (2) If an installation is made under emergency conditions, an application for a permit shall be required within 24 hours thereafter, excluding Saturdays, Sundays and legal holidays.

## 1.12.8.2.1.2 Inspection

1.12.8.2.1.2.1 If after 30 days, an inspection is not conducted, the delivery of fuel oil shall not be prohibited for lack of a permit to store.

### Delete and Replace:

**Table 1.12.8.2\* Permits Required.**

Chapter 11	Oil Burners and Fuel-Oil.	
Work/ Activity	Issuing Authority	Code Section
*Installation or alteration of any fuel oil burning equipment.	Head of Fire Department	11.5.1.8
<ul style="list-style-type: none"> <li>• Oil-line upgrade</li> </ul>		11.5.1.10
Storage of acceptable liquid fuel		11.5.1.10
*Installation, removal, or replacement of a fuel storage tank unless provided otherwise in Chapter 66		

### Add:

1.12.8.21 Table 1.12.8.21 shall apply to Chapter 38 entitled Cannabis Growing, Processing, or Extraction Facilities. A permit shall be used, completed, required and issued as a precondition before conducting any work/activity described by Table 1.12.8.21.

**Table 1.12.8.21\* Permits Required.**

Work/ Activity	Issuing Authority	Code Section
Processing or extraction of cannabis involving hazardous materials, see 38.1.	Head of Fire Department	38.2
		60.8

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**Delete:**

**~~1.12.8.25.3.6 Transportation of Combustible Liquids.~~**

~~1.12.8.25.3.6.1 To transport combustible liquids, a decal shall be affixed to the upper left quadrant of the transport vehicle.~~

**Delete and Replace:**

**Table 1.12.8.25\* Permits Required**

Chapter 42	Refueling [Cargo Tanks, Portable Tanks or Transfer Tanks]	
Work/ Activity	Issuing Authority	Code Section
*To store flammable and combustible liquids.	Head of Fire Department	Section 42.2.2.1
For dispensing motor fuel from a tank vehicle.		
Alternate fuels		Section 42.8

**Add:**

**1.12.8.32. Energy Storage Systems. [Chapter 52] Reserved**

**Table 1.12.8.32 Permits Required**

Chapter 52	Energy Storage Systems	
Work/ Activity	Issuing Authority	Code Section
To install and operate energy storage systems having a capacity greater than the quantities listed in Table 52.3.1	Head of Fire Department	52.1.2
To install and <del>or</del> operate stationary battery systems having an electrolyte capacity more than 100 gal (378.5 L) in sprinklered buildings or 50 gal (189.3 L) in non-sprinklered buildings		52.2

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### Delete and Replace:

**Table 1.12.8.50**

Materials	Quantities	Permit	License
Class I liquids  <i>Note 1: No permit needed for storing less than 7 gallons of gasoline in one or more approved containers when stored in any building not used for habitation nor frequented by the public. Gasoline may be used, kept, or stored in any building not used for habitation nor frequented by the public, ≤ 7 gallons and provided the gasoline is stored in one or more approved containers without permit.</i>  <i>Note 2: See alcohol based hand rub Table 1.12.8.1</i>  <i>Note 3: No permit or license needed when stored in containers of 60 gallons capacity or less or</i>  <i>Note 4: no permit or license needed when stored in portable tanks over 60 gallons capacity not intended for fixed use, including intermediate bulk containers (IBCs) designed for mechanical handling.</i>	<793 gallons*	yes	no
	≥793 gallons	yes	yes

### Delete:

**Table 1.12.8.50**

Materials	Quantities	Permit	License
Small arms ammunition primers [commercial use]	<10,000 caps or small arms primers	yes	no
	≥10,000 caps or other small arms primers	no	yes
	<10,000 caps or small arms primers	yes	no

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### Delete and Replace:

**Table 1.12.8.50**

Materials	Quantities	Permit	License
Smokeless propellants [ <del>private and commercial</del> ] Note 1: Persons under 18 years of age may not keep or store smokeless propellants Note 2: Not more than two pounds of such propellant shall be in a multifamily dwelling or a building of public access	<16 lbs	no	no
Smokeless propellants [private]	≥16 lbs through 47 lbs	yes	no
	≥48 lbs	no	yes
Smokeless propellants [commercial]	≥16 lbs to ≤ 99 lbs	yes	no
	≥100 lbs	no	yes
Black powder [ <del>private and commercial</del> ]	<2 lbs	no	no
	≤5 lbs	yes	no
	>5 lbs	no	yes
Black powder [commercial] See Section 1.12.8.39.2.5.1 for permit exemption individual	<50 lbs	yes	no
	≥50 lbs	no	yes

### Add:

**1.13.7 Certificates required by Chapter 11.** In addition to the requirements set forth in *1.13* the specific provisions shall apply to the types of certificates as provided by *1.13.7 (1) (a)* through *(c)*.

- (1) Oil Burner Technician and Apprentice
  - (a) Certificate of Competency
  - (b) Certificate of Completion
  - (c) Certificate of Compliance

**1.13.7.1\* Oil Burner Technician and Apprentice.** A certificate of competency shall be required as a precondition before any oil burning equipment or any of the appurtenances thereto, can be altered, repaired or installed.

**1.13.7.1.1** A certificate of competency issued as an oil burner technician or as an apprentice shall be issued to the individual.

**1.13.7.1.2** The holder of a certificate of competency as an oil burner apprentice shall be permitted only to assist via supervision of a licensed oil burner technician.



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**1.13.7.1.3** A certificate of competency, issued to a technician and apprentice, shall be carried on that person at all times and when requested shall display such certificate of competency on request.

**1.13.7.1.4 Application.** See application provisions in *1.13.3*.

**1.13.7.1.4.1 Renewal.** License renewal application forms must be submitted no less than 30 days prior to the license expiration date.

**1.13.7.1.5\* Examination.** Except as provided by *1.13.7.1.5.1* the examination provisions in *1.13.3.4* shall be required as a prerequisite to licensure.

**1.13.7.1.5.1** The examination provisions shall not be applicable as a prerequisite to licensure as an apprentice.

**1.13.7.2 Certificate of Completion.** Except as otherwise provided by *1.12.8.2.1*, a certificate of completion, as it applies to Chapter 11, entitled Building Services, shall be used, completed, required and submitted to the Head of the Fire Department as a precondition before a permit shall be issued:

(1) For the delivery of and storage of fuel oil

(2) For the operation of an oil fuel burner.

**1.13.7.2.1** The burner technician shall be responsible for the submittal of a certificate of completion to the Head of the Fire Department within 72 hours (excluding Saturday, Sunday and holidays), regarding one or more of the activities listed in *1.13.7.2.1 (1)* and (2).

(1) Requesting a permit to store fuel oil

(2) Inspection;

(a) Installation work is completed

(b) Tank replacement is completed

(c) Oil line protection is completed

(d) Combustion performance test is completed.

Exception to 1.13.7.2.1(2) (d): A combustion performance test shall not be required when other permitted work such as the, upgrading oil fuel lines, or the replacement or removal of an oil fuel tank or, for the repair or replacement of zone-valves and circulators and the like are performed.

**1.13.7.2.1.1** When the applicable work described in *1.13.7.2.1(2)* is approved, a permit shall be issued for the storage of fuel oil and for the use of the oil fuel boiler.

**1.13.7.3 \* Certificate of Compliance.** A Certificate of Compliance is a standard *form FP-056* prescribed by the State Fire Marshal and used to document by inspection, compliance with oil line upgrades.

**1.13.7.3.1** A Certificate of Compliance shall be completed and signed by a licensed technician.

(1) Such signature certifies that the subject installation is in compliance and no other work activity is necessary to meet this provision.

(a) Upon completion, a copy of such certificate shall be given to the owner and Head of the Fire Department.

(2) When an oil line needs upgrading as required by Massachusetts General Law a permit using *form FP-056A* shall be used, completed, required and issued as prescribed in *1.12.8.2.1.1* thereafter, a certificate of compliance shall be completed and submitted as provided in *1.13.7.3.1*.

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**1.13.7.3.2** The owner shall receive a copy and submit the certification (certificate of completion) to the Head of the Fire Department.

**1.13.7.3.3** The Fire Department Official shall maintain such certificate of completion in accordance with the records requirements in *1.11*.

**1.13.7.4 Fuel Oil Deliveries- Responsibility.**

**1.13.7.4.1** Fuel oil deliveries shall not commence unless the deliverer has verification that a permit has been obtained. Such verification may be considered to consist of any of the following:

- (1) Verification by the Head of the Fire Department that such a permit is in effect.
- (2) Written verification from the owner or customer that the permit is either in his possession or is posted on the premises.
- (3) Observation that such a permit is in the possession of the owner or customer, or is posted on the premises.

**1.13.7.4.2** Fuel oil shall not be delivered to a storage tank by means of a pump or under pressure in any case where a tight connection is made between the discharge line and the tank inlet, unless such storage tank is designed to withstand the additional stress to which it may be subjected or unless the vent pipe for such tank is of sufficient size to relieve the tank of any undue pressure in excess of five psi. The delivery truck operator shall remain at the fill point during the entire operation.

**Add:**

**1.13.12 Certificate of Registration for On-Demand Fueling**

**1.13.12.1** An applicant requesting a Certificate of Registration (CR) shall submit a completed application in accordance with *Section 1.13.3* to conduct On-Demand Fueling operations to the State Fire Marshal’s Office in accordance with the following:

- (1) Provide evidence of valid liability insurance coverage in the form of a certificate issued by the insurance agency to the State Fire Marshal’s Office listing the name and claims representative, providing general liability in the amount of \$1,000,000 per occurrence, and \$5,000,000 aggregate coverage. A 30 day cancellation notice to the State Fire Marshal shall be a condition of the policy.
- (2) Provide a notarized statement attesting that fueling operations shall meet the requirements of Chapter 42.
- (3) Provide a notarized statement attesting that the applicant understands the contents of this *Code* and M.G.L. c. 148.
- (4) Provide a copy of the general safety and emergency response plan.

**Table 1.13.12 Certificates Required**

Chapter 42	On-Demand Mobile Fueling
Certificate of Registration	
Activity	Description
Companies to conduct the fueling of motor vehicles to the general public.	Mobile fueling of vehicles

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**Renumber:**

**1.13.123 Renewal of Certificates.** The following certificates shall be renewed as provided in *Table 1.13.13* and *Section 1.13*.

**Add:**

**Table 1.13.13 Renewal of Certificates.**

Chapter	Type of Certificate	Description	Expiration Date [See Note 1 and 2]	Exam Required for Renewal	Acronym*
11	Competency Technician	To alter, repair or install any oil burning equipment or any of the appurtenances thereto	Initial licensure 12 months from DOB Every 24 months after based on DOB	No unless failed to renew within 2yrs. of expiration	BU
11	Competency Apprentice	Can only work under the direct supervision of a technician regrading oil burning equipment or any of the appurtenances thereto	Initial licensure 12 months from DOB Every 24 months after based on DOB	No	OA
42	Registration	On-Demand Fueling	2 yrs from date of issue	No	ODF

**Note 3:** Renewals unless otherwise provided are submitted on an application prescribed by the State Fire Marshal.

**Add:**

**2.1 General.**

(3) Where the requirements of a reference code or standard, called for within a Chapter of this *Code* is deleted, replaced, or revised, the source reference code or standard shall be deemed deleted, replaced or revised as such.

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## Add:

### 2.3.1 ANSI Publications

ANSI Z49, Safety in Welding, Cutting, and Allied Processes, 2012

### 2.3.17 UL Publications

UL 1564, *Standard for Industrial Battery Chargers*, 2015

ANSI/UL 1973, *Standard for Batteries for Use in Light Electrical Rail (LER) Applications and Stationary Applications*, 2013.

UL 9540, *Outline of Investigation for Energy Storage Systems and Equipment*, 2014.

### 2.3.20 U. S. Government Publications

29 CFR 1910.252 Subpart Q-Welding, cutting and brazing

## Delete and Replace:

**3.2.2\* Authority Having Jurisdiction (AHJ)** An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure. (*See Enforcement, 1.6, 1.7.1 Administration, 1.7.1 and Official Interpretations, 1.7.3.1*)

## Delete and Replace:

### Table 10.10.6 Appliance Cooking/Heating

<b>Balcony</b> See <sup>E</sup> 10.10.36.2(2)	<b>Deck, Porch. Patio.</b> See 10.10.6.2(3)
*NOT Permitted under overhangs, roofs or enclosed in by walls or within 10' of a building <sup>1</sup> ; unless sprinklered pursuant to the <i>Building Code</i> .	

## Replace:

### 11.5.1\* General.

## Add:

**13.1.1.1.2\*** No person shall shut off, disconnect, obstruct, remove, and/or impair a fire protection system or carbon monoxide protection system without first obtaining a written permit pursuant to *Section 1.12* as required by the AHJ. [13.1.8 and 13.7.2.2]

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### Delete and Replace:

**18.1 General Scope.** Fire department access and water supplies shall comply with this chapter. The provisions of this chapter shall not apply to any city, or town which has accepted the provisions of M.G.L. Chapter 41, Section 81 *et. seq.* or similar laws which provide local jurisdiction over fire department access and water supply. In the absence of any such laws, fire department access and water supply shall comply with this chapter.

### Delete and Replace:

**18.1.1.3** This chapter shall apply to new one- or two-family dwellings, not provided with adequate frontage and located behind an existing building that has frontage. For purposes of this section, adequate frontage shall mean at least 20 feet or more abutting a public way.

### Add:

**18.1.1.3.1** Existing and new one- and two-family detached dwellings, not located behind a building with adequate frontage, and their accessory structures such as garages, carports, and sheds shall be exempt from the provisions of 18.2.3.

### Renumber:

**18.2.3.1.4 5** When fire department access roads cannot be installed due to location on property, topography, waterways, nonnegotiable grades, or other similar conditions, the AHJ shall be ~~authorized to require additional fire protection features.~~ permitted to accept alternatives proposed by the owner of the building to allow additional fire protection features, up to and including the installation of an approved fire sprinkler system installed in accordance with the *Building Code*, cistern(s), additional fire hydrant(s), or similar devices or systems.

### Add:

**18.2.3.2.1.1** Where a new building, not provided with adequate frontage, is to be located behind an existing building that has frontage, a fire department access road shall extend to within 25 feet of at least one exterior door that can be opened from the outside and that provides access to the interior of the building.

### Renumber:

**18.2.3.2.1.1 2** Where a ~~one- or two-family dwelling,~~ or townhouse as defined in the *Building Code*, is protected with an approved automatic sprinkler system that is installed in accordance with NFPA 13D or NFPA 13R, as applicable, the distance in 18.2.3.2.1 shall be permitted to be increased to 150 ft (46 m).

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### Add:

**18.2.3.2.2.2** Except new one- or two-family dwellings, and townhouses, not provided with adequate frontage and located behind an existing building that has frontage.

### Add:

#### **18.5.7 Clear Space Around Hydrants.**

**18.5.7.1** A 36 in. (914 mm) clear space shall be maintained around the circumference of fire hydrants except as otherwise required or approved.

**18.5.7.2** A clear space of not less than 60 in. (1524 mm) shall be provided in front of each hydrant connection having a diameter greater than 2 1/2 in. (64 mm).

### Delete and Replace:

~~20.8.2.6. Replace with the following:~~

**20.8.2.6 Unvented Fuel-Fired Heaters.** Unvented fuel-fired heaters, other than gas space heaters in compliance with NFPA 54/ANSI Z223.2, *National Fuel Gas Code*, shall be prohibited. ~~not be used in accordance with the following:~~

~~(1) **Prohibited Installations.** Unvented room heaters shall not be installed in bathrooms or bedrooms.~~

~~(2) **Listing and Installation.** Unvented room heaters shall be listed in accordance with ANSI Z21.11.2, *Gas Fired Room Heaters Volume II, Unvented Room Heaters*, and shall be installed in accordance with the manufacturer's installation instructions.~~

### Delete:

~~20.8.2.6.1 **Permit.** Permits, where required, shall comply with *Section 1.12*.~~

### Delete and Replace:

**20.9.2.2 Fuel-Fired Heaters.** Unvented fuel-fired heaters, other than gas space heaters in compliance with NFPA 54, shall not be used.

### Delete:

~~20.9.2.2.1. Add~~

~~20.9.2.2.1 **Permit.** Permits, where required, shall comply with *Section 1.12*.~~

### Delete and Replace:

**20.10.2 Fuel-Fired Heaters.** Unvented fuel-fired heaters, other than gas space heaters in compliance with NFPA 54, shall not be used.

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### Delete:

#### ~~20.10.2.1, Add~~

~~20.10.2.1 Permit.~~ Permits, where required, shall comply with *Section 1.12*.

### Delete and Replace:

**20.11.2 Fuel-Fired Heaters.** Unvented fuel-fired heaters shall not be used, unless they are listed and approved.

### Delete:

#### ~~20.11.2.1, Add~~

~~20.11.2.1 Permit.~~ Permits, where required, shall comply with *Section 1.12*.

### Add:

**26.4** Installations made in accordance with the applicable requirements of the following standards shall be deemed to be in compliance with this Code except that the maximum allowable quantities of hazardous materials are limited to the quantities listed in the Building Code and Table 60.4.2.1.1.3 of this Code.

### Add:

#### **Chapter 38 Cannabis Growing, Processing or Extraction Facilities**

*For purposes of this chapter, cannabis shall be defined as the plant or any product derived from the plant of the family *cammanaceae*; also known as marijuana or hemp*

#### **38.1\* Application.**

**38.1.1\*** Chapter 38 shall apply to the growing and processing of cannabis within new and existing buildings.

**38.1.2** The use, storage, transfilling, and handling of hazardous materials shall comply with this chapter, and other applicable provisions of this Code.

**38.1.3** Chapter 38 shall not apply to the retail sale of cannabis where growing and processing does not occur.

**38.1.4** Where a material, its use, or associated process poses multiple hazards, all hazards shall be addressed in accordance with applicable requirements of this Code.

**38.1.5\*** The occupancy of buildings or portions of buildings where the growing or processing of cannabis occurs shall be in accordance with Chapter 6 and the applicable building code.

**38.2 Permits.** Permits, where required, shall comply with Section 1.12.

**38.3 Fire Protection Systems.** Fire protection systems shall be provided in accordance with Chapter 13.

**38.4\* Means of Egress.** Means of egress shall be in accordance with Chapter 14.

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### **38.5 Growing or Production of Cannabis.**

**38.5.1 Ventilation for Light Fixtures.** Light fixture ductwork shall be installed in accordance with the manufacturer and NFPA 90A and the mechanical code.

**38.5.2 Odor Control.** The use of ozone generators used for odor control shall comply with Chapter 54.

### **38.5.3 Interior Finish, Contents, and Furnishings.**

**38.5.3.1** Interior finish, including the use of any plastic, mylar, or other thin film sheeting to enclose rooms or cover any walls or ceilings shall be in accordance with ~~Sections 12.5 and 12.6~~ the building code.

**38.5.3.2** Hanging of plastic from ceiling or from suspended overhead structures to create wall dividers shall not be permitted.

### **38.5.4 Fumigation.**

**38.5.4.1\* General.** Any cannabis growing facility that is fumigated shall comply with 38.5.4.

**38.5.4.2\* Sources of Ignition.** Sources of ignition shall be shut off during the fumigation activity and remain shut off until the required ventilation is completed.

### **38.5.4.3 Notification.**

**38.5.4.3.1** The AHJ and fire department shall be notified in writing not less than 48 hours before the building, structure, or space is to be closed in connection with the utilization of any toxic or flammable fumigant.

**38.5.4.3.2** Notification, as required by 38.5.4.3.1, shall include the following:

- (1) The location of the enclosed space to be fumigated or fogged
- (2) The occupancy
- (3) The fumigants or insecticides to be utilized
- (4) The person or persons responsible for the operation
- (5) The date and time at which the operation will begin

**38.5.4.3.3** Written notice of any fumigation or insecticidal fogging operation shall be given to all affected occupants of the building, structure, or space in which such operations are to be conducted with sufficient advance notice to allow the occupants to evacuate the building, structure, or space.

**38.5.4.3.4** Written notice, as required by 38.5.4.3.3, shall inform the occupants as to the purposes, anticipated duration, and hazards associated with the fumigation or insecticidal fogging operation.

### **38.5.4.4 Signage.**

**38.5.4.4.1** Approved warning signs indicating the danger, type of chemical involved, and necessary precautions shall be posted on all doors and entrances to the premises, including interior rooms and areas.

**38.5.4.4.2** Signage shall be located at the exterior main entry and at the entries to those areas being fumigated indicating the duration of the fumigation.

### **38.5.4.5 Watch Personnel.**

**38.5.4.5.1** During the period fumigation is in progress a watchperson shall remain on duty at the entrance or entrances to the enclosed fumigated space until after the fumigation is completed and the building, structure, or space is properly ventilated and safe for occupancy.



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**38.5.4.5.2** Sufficient watchpersons shall be provided to prevent any person from entering the enclosed space under fumigation unobserved.

**38.5.4.6 Occupancy During Fumigation.** Occupants of the building, structure, or space to be fumigated, except the personnel conducting the fumigation, shall be evacuated from such building, structure, or space prior to commencing fumigation operations.

**38.5.4.7 Sealing of Building Structure, or Space.** Paper, and other similar materials, used to wrap or cover a building, structure, or space in excess of that required for the sealing of cracks, casements, and similar openings shall meet the flame propagation performance criteria of Test Method 1 or Test Method 2 of NFPA 701.

**38.5.4.8 Maintenance of Openings.** All openings to the building, structure, or space to be fumigated or fogged shall be kept securely closed during such operation.

**38.5.4.9 Venting and Cleanup.** At the end of the exposure period the following procedures shall be followed:

- (1) Fumigators shall safely and properly ventilate the premises and contents.
- (2) Fumigant containers, residues, debris, and other materials used for such fumigation shall be properly disposed.
- (3) Obstructions shall be cleared from gas-fired appliance vents.

### **38.5.5 Pesticide Application.**

**38.5.5.1** A warning sign shall be provided to indicate that pesticides have been applied.

**38.5.5.2** A record of pesticide application shall be provided and shall include the following:

- (1) The pesticide product or chemical used
- (2) The date and time the pesticide was applied
- (3) When the room or area is safe to reoccupy

### **38.6\* Processing or Extraction.**

#### **38.6.1 General.**

##### **38.6.1.1 Extraction Room.**

**38.6.1.1.1** Extraction rooms in a cannabis extraction facility shall be constructed in accordance with the building code and this Code.

**38.6.1.1.2\*** For other than CO<sub>2</sub> and nonhazardous extraction process, the cannabis extraction equipment and process shall be located in a room of noncombustible construction dedicated to the extraction process and the room shall not be used for any other purpose.

**38.6.1.1.3** Cannabis extraction shall not be located in any building containing assembly, educational, day care, health care, ambulatory health care, residential board and care, residential, or detention and correctional facilities.

**38.6.1.1.4\* Means of Egress.** For extraction rooms using hazardous materials, each room shall be provided with at least one exit access door complying with the following:

- (1) The door shall swing in the direction of egress travel.
- (2) The door shall be provided with a self-closing or automatic closing device.
- (3) The door shall be equipped with panic or fire exit hardware.

##### **38.6.1.2 Staffing.**

**38.6.1.2.1\*** For other than approved, unattended processes, the extraction process shall be continuously staffed.

**38.6.1.2.2\*** Staff monitoring the extraction process shall be trained in the following:

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- (1) The extraction process
- (2)\* The transfer of solvents, where applicable
- (3) All emergency procedures

**38.6.1.2.3** All staff training records shall be maintained on-site and made available to the AHJ upon request.

### **38.6.1.3 Operator Training.**

**38.6.1.3.1** In addition to the provisions of 38.6.1.2, the operator of the cannabis extraction equipment shall also receive training in safe operation of the equipment.

**38.6.1.3.2\*** Documentation of training required by 38.6.1.3.1 shall be maintained on-site and made available to the AHJ upon request.

### **38.6.1.4 Signage.**

**38.6.1.4.1** All applicable safety data sheets (SDS) shall be posted in the extraction room.

**38.6.1.4.2** The NFPA 704 hazard rating diamond sign and no smoking signs shall be posted on the exterior of the extraction room door.

**38.6.1.4.3** Applicable hazard warning signage shall be posted throughout the facility as applicable for emergency equipment.

### **38.6.1.5 Systems, Equipment, and Processes.**

#### **38.6.1.5.1 General.**

**38.6.1.5.1.1** Systems, equipment, and processes shall be in accordance with 38.6.1.5.1 through 38.6.1.5.6.3.

**38.6.1.5.1.2** Systems, equipment, and processes shall include, but are not limited to, vessels, chambers, containers, cylinders, tanks, piping, tubing, valves, fittings, and pumps.

**38.6.1.5.1.3** In addition to the requirements in 38.6.1.5, systems, equipment, and processes shall also comply with 60.5.1.6, other applicable provisions of this Code, the building code, and NFPA 90A.

**38.6.1.5.1.4** Systems or equipment used for the extraction of cannabis oils and products from plant material shall be performed using equipment that has been listed or approved.

#### **38.6.1.5.2 Equipment.**

**38.6.1.5.2.1\*** Where an explosion condition exists, heating equipment such as vacuum ovens, heating mantels, heat guns, or other equipment shall not be used to heat flammable or combustible liquids or oils containing liquefied petroleum gasses.

**38.6.1.5.2.2** Refrigerators, freezers, and other cooling equipment used to store or cool flammable liquids shall be listed for the storage of flammable/combustible liquids or be listed for Class I, Division 1 locations, as described in Article 501 of NFPA 70.

**38.6.1.5.2.3\*** LPG tanks shall comply with 69.2.1.

#### **38.6.1.5.3 Approval for Systems and Equipment with No Listing.**

**38.6.1.5.3.1** Where the system used for extraction of cannabis oils and products from plant material is not listed, the system shall have a designer of record.

**38.6.1.5.3.2** The designer of record shall be a registered design professional.

**38.6.1.5.4\* Documentation for Equipment with No Listing.** For systems and equipment not listed for the specific use, a technical report in accordance with Section 1.15 documenting the design or peer review of the equipment shall be prepared and submitted to the AHJ for review and approval.

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### **38.6.1.5.5 Change of Extraction Medium.**

**38.6.1.5.5.1** Where the medium of extraction or solvent is changed from the material indicated in the technical report or as required by the manufacturer, the technical report shall be revised at the cost of the facility owner and submitted for review and approval by the AHJ prior to the use of the equipment with the new medium or solvent.

**38.6.1.5.5.2** If the original designer of record is not available, then the new designer of record shall comply with 38.6.1.5.3.1.

### **38.6.1.5.6 Equipment Field Verification.**

**38.6.1.5.6.1** Prior to operation of the extraction equipment, the designer of record for the equipment shall inspect the site of the extraction process once equipment has been installed for compliance with the technical report and the building analysis.

**38.6.1.5.6.2** The designer of record performing the field verification shall provide a report of findings and observations of the site inspection to the AHJ for review and approval prior to the approval of the extraction process.

**38.6.1.5.6.3** The field inspection report authored by designer of record shall include the serial number of the equipment used in the process and shall confirm the equipment installed is the same model and type of equipment identified in the technical report.

### **38.6.2 Liquefied Petroleum Gas (LPG) Extraction.**

**38.6.2.1 General.** Cannabis extraction facilities using liquefied petroleum gas solvents shall comply with 38.6.1 and 38.6.2.

#### **38.6.2.2 Exhaust.**

**38.6.2.2.1** An approved exhaust system shall be provided for LPG extractions.

**38.6.2.2.2** The exhaust systems shall be installed and maintained accordance with NFPA 91 or the mechanical code.

**38.6.2.2.3** All LPG extraction operations, including processes for off-gassing spent plant material and oil retrieval, shall be conducted within a chemical fume hood or enclosure in compliance with NFPA 91 or the mechanical code.

#### **38.6.2.3 Electrical.**

**38.6.2.3.1** All conductive equipment and conductive objects within the exhaust room shall be bonded and grounded with a resistance of less than  $1.0 \times 10^6$  ohms in accordance with NFPA 70.

**38.6.2.3.2** The area within a hood or enclosure used for LPG extractions shall be classified as a Class I, Division 1 hazardous location in accordance with NFPA 70.

**38.6.2.3.3** Areas adjacent to Class I, Division 1 locations shall be classified in accordance with NFPA 70.

**38.6.2.3.4** All electrical components within the extraction room shall be interlocked with the hazardous exhaust system such that room lighting and other extraction room electrical equipment will only operate when the exhaust system is in operation.

**38.6.2.3.5** An automatic emergency power system shall be provided for the following items, when installed:

- (1) Extraction room lighting
- (2) Extraction room ventilation system
- (3) Solvent gas detection system

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### **38.6.2.4 Extraction Room Gas Detection System.**

**38.6.2.4.1** An approved continuous gas detection system shall be provided.

**38.6.2.4.2\*** The gas detection system shall alert the extraction operator in an approved manner at a gas detection threshold no greater than 25 percent of the gas LEL/LFL.

**38.6.2.4.3** Gas detection systems shall be provided with constant non-interlocked power.

**38.6.2.5 Protection.** An automatic suppression system shall be provided within hoods or enclosures, including ductwork, in accordance with the following:

- (1) An automatic water sprinkler system that meets all applicable requirements of NFPA 13
- (2) A carbon dioxide extinguishing system that meets all applicable requirements of NFPA 12
- (3) A dry chemical extinguishing system that meets all applicable requirements of NFPA 17
- (4) A gaseous agent extinguishing system that meets all applicable requirements of NFPA 2001

**38.6.2.6 Storage.** LPG containers not in use shall not be stored within extraction rooms.

**38.6.2.7 Facility Piping Systems.** LPG liquid piping systems shall be in compliance with NFPA 58.

### **38.6.3 Flammable and Combustible Liquid Extraction.**

**38.6.3.1 General.** Cannabis extraction facilities using flammable and combustible liquid solvents shall comply with 38.6.1 and 38.6.3.

#### **38.6.3.2 Exhaust.**

**38.6.3.2.1\*** Extraction and post oil processing operations, including dispensing of flammable liquids between containers, shall be performed in one of the following locations:

- (1) A chemical fume hood in accordance with Chapter 7 of NFPA 45
- (2) An approved exhaust system installed in accordance with NFPA 91 or the mechanical code

**38.6.3.2.2** Unheated processes at atmospheric pressure using less than 16 oz (473 ml) of flammable liquids shall not be required to comply with 38.6.3.2.1.

**38.6.3.2.3** Classified electrical systems shall be in accordance with NFPA 70.

**38.6.3.2.4** All electrical components within the chemical fume hood or exhausted enclosure shall be interlocked such that the exhaust system shall be in operation for lighting and components to be used.

**38.6.3.3 Storage and Handling.** The storage, use, and handling of flammable liquids shall be in compliance with this chapter and Chapter 66.

**38.6.3.4** Heating of flammable or combustible liquids over an open flame shall be prohibited.

### **38.6.4 Carbon Dioxide Extraction.**

**38.6.4.1 General.** Cannabis extraction facilities using carbon dioxide solvents shall comply with 38.6.1 and 38.6.4.

**38.6.4.2 Storage and Handling.** All CO<sub>2</sub> compressed gas cylinders shall be secured to a fixed object to prevent falling.

#### **38.6.4.3 CO<sub>2</sub> Gas Detection.**

**38.6.4.3.1** An approved, listed CO<sub>2</sub> detector shall be installed in the CO<sub>2</sub> extraction room.

**38.6.4.3.2** Auto calibrating and self-zeroing devices or detectors shall be prohibited.

**38.6.4.3.3** The detector shall be set to alarm at 5000 ppm of CO<sub>2</sub>.

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**38.6.4.4\* CO<sub>2</sub> Discharges.** The extraction equipment pressure relief devices and blow-off valves shall be piped to the exterior of the building.

**38.7\* Transfilling.** Filling LPG extraction equipment supply containers shall be in compliance with 69.3.5, 69.4.2, and NFPA 58.

### Delete and Replace:

**41.1.1.1(3) Qualified Person.** A person who has ~~met~~ successfully completed the training criteria pursuant to 41.7.

### Delete and Replace:

**41.2.5.1 Certificates.** A hot work training certificate shall be carried on person at all times, and shall be produced upon request.

### Delete and Replace:

#### **41.4 Sole Proprietors and Individual Operators.**

**41.4.1** All hot work operations shall require a permit ~~carried out by~~ qualified from the Head of the Fire Department unless specifically otherwise allowed by 41.4.1 (1) through (3):

**(1) Hot Work Operations Conducted By Persons Licensed By Other Jurisdictions.** Pursuant to Section 1.1.2, a hot work permit shall not be required from the fire department when the hot work activity is performed by a person, or under the direct supervision of a person, licensed and permitted pursuant to a specialized code as defined in M.G.L. c. 143, §96. Any licensed person performing hot work must have obtained training for hot works safety either:

(a) by obtaining training approved by the authority issuing them a license to perform specialized code work; or

(b) by meeting the requirements of 41.7 of Chapter 41.

**(2) Hot Work Operations Conducted By Persons On Their Own Equipment on Their Own Premises.** A permit from the Head of the Fire Department for hot works shall not be required by individuals who conduct hot work operations on their own equipment on their own premises. Any person performing such hot work shall be trained as provided by 41.7 of Chapter 41.

**(3) Homeowners and Hobbyists.** Homeowners and hobbyists are exempt from the permit requirements as provided by 1.12, and the training requirements required in 41.7 of Chapter 41. *See exhibitions 41.5.*

### Delete and Replace:

**41.4.2 Assignment of PAI and Fire Watch.** Sole proprietors and individual operators as provided in 41.4.1 (1) and (2) ~~and (3)~~ shall be permitted to serve as PAI, fire watch and operator.

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### Renumber:

**41.4.23 Written Hot Work Permit.** A checklist shall be permitted to serve as the written hot work permit.

### Delete:

**41.7 Qualifications.** An individual to be qualified as a designated ~~to be a~~ PAI, to perform fire watches, to perform hot work activity, to supervise or delegate any activities of hot work as defined in this chapter shall first successfully complete training approved by the State Fire Marshal in the following areas:

- (1) Massachusetts Comprehensive Fire Safety Code, 527 CMR: 1.00 Chapter 41, Hot Work Operations
- (2) 29 CFR 1910.252 Subpart Q-Welding, cutting and brazing
- (3) NFPA 51B Standard for Fire Prevention During Welding, Cutting, and Other Hot Work; ~~2014 edition~~
- (4) NFPA 251, Standard for Safeguarding Construction, Alteration, and Demolition operations; ~~2015 edition~~
- (5) ANSI Z49, Safety in Welding, Cutting, and Allied Processes; ~~2012 edition~~

### Add:

**41.7.1** Successfully completed as used here means training successfully completed on the currently adopted standard as provided in 41.7(1) through (5).

**41.7.2** A certificate of completion shall be issued to the individual with the date of completion on the certificate and a providers/instructors signature acknowledging such individual attended and completed the training as provided in 41.7(1) through (5).

### Delete:

~~42.9.9.8 through 42.9.9.8(4).~~ Add

~~42.9.9.8~~ Vehicles, other than approved tank vehicles, shall be permitted to transport combustible liquids in transfer tanks, provided that an application has been made and a permit to transport has been issued. The vehicle shall be approved for the transportation of the combustible liquid provided that:

- ~~(1) The tank shall be constructed of not less than 14 USS gauge standard open hearth steel tank plate or 1/8 inch aluminum and otherwise constructed to withstand any stress to which it may reasonably be subjected.~~
- ~~(2) The liquid is drawn only from the top of the tank by means of a suitable pump to which is attached a durable hose equipped with a self-closing nozzle.~~
- ~~(3) All openings in the tank are secured by plugs or caps maintained wrench tight while the vehicle is in transit.~~

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~~(4) The tank is securely mounted to the vehicle body or truck bed and its capacity does not exceed 110 gallons.~~

### Delete and Replace:

~~42.15.1 Vehicles other than approved tank vehicles shall be permitted to transport combustible liquids in transfer tanks, provided that an application has been made and a permit to transport has been issued in accordance with this *Code*.~~

### Add:

42.15.2 The vehicle shall be approved for the transportation of the combustible liquid provided that:

(1) The tank is securely mounted to the vehicle body or truck bed and its capacity does not exceed ~~110~~ 119 gallons.

### Add:

#### 42.16 On-Demand Mobile Fueling.

42.16.1\* **Scope.** Section 42.16 shall apply to the retail practice of fueling motor vehicles of the general public while the owner's vehicle is parked and might be unattended.

42.16.1.1 Section 42.16 shall not apply to the following:

(1) Refueling from tank vehicles at commercial, industrial, governmental, or manufacturing establishments in accordance with 42.7.6

(2) Fueling from portable containers in cases of an emergency or for personal use

42.16.1.2 The dispensing of Class I and Class II liquids from a mobile fueling vehicle or metal safety cans into the fuel tank of a motor vehicle shall be permitted only if all of the requirements of Sections 14.2 through 14.4 of NFPA 30A have been met.

42.16.1.3 **Permits.** Permits, where required, shall comply with *Section 1.12*.

42.16.1.4 **Certificates.** Certificates, where required, shall comply with *Section 1.13*.

#### 42.16.2 Approvals and Mobile Fueling Locations.

42.16.2.1 Mobile fueling operations shall not be conducted unless approved by the AHJ and the owner of the property on which the fueling will occur. Mobile fueling operations shall occur only at approved locations.

42.16.2.2\* The AHJ shall be permitted to require a site specific safety and emergency response plan for locations where mobile fueling is authorized. Where required, the safety and emergency response plan shall be available on each mobile fueling vehicle.

42.16.2.3\* Mobile fueling vehicle operators shall possess evidence of training on proper fueling procedures and the safety and emergency response plan.

42.16.2.3.1 The mobile fueling vehicle operator training shall be approved by the State Fire Marshal.

42.16.2.4 Mobile fueling shall not take place within 7.6 m (25 ft) of buildings, property lines, or combustible storage. The authority having jurisdiction is authorized to decrease separation distances for mobile fueling from metal safety cans.

42.16.2.5 An approved storm drain cover or equivalent method that will prevent any fuel from

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reaching the drain shall be used when mobile fueling occurs within 7.6 m (25 ft) of a storm drain.

**42.16.2.6** Mobile fueling operations and delivery vehicle parking shall be prohibited in buildings, in covered parking structures, on public streets, and on public ways.

### **42.16.3 Mobile Fueling Vehicles and Equipment.**

**42.16.3.1\*** Mobile fueling vehicles shall comply with all applicable local, state, and federal requirements and shall be one of the following:

- (1) A tank vehicle complying with NFPA 385 with chassis-mounted tanks that do not exceed an aggregate capacity of 4542 L (1200 gal).
- (2) A vehicle with chassis-mounted tanks, each of which does not exceed 415 L (110 gal), that does not exceed an aggregate capacity of 4542 L (1200 gal).
- (3) A vehicle that carries a maximum of 227 L (60 gal) of motor fuel in listed metal safety cans not to exceed 20 L (5.3 gal) in capacity.

**42.16.3.2** Dispensing hose assemblies shall be listed and the hose shall not exceed 15 m (50 ft) in length. [30A:14.3.2]

**42.16.3.3** A listed breakaway device shall be provided at the nozzle.

**42.16.3.4** Dispensing nozzles shall be a listed, automatic closing-type with a latch-open device.

**42.16.3.5** A listed fuel shutoff switch and a listed shutoff valve assembly shall be provided on the delivery vehicle.

**42.16.3.6** The pump shall be listed to UL 79, *Standard for Power Operated Pumps for Petroleum Dispensing Products*.

**42.16.3.7** The meter shall be listed to UL 25, *Standard for Meters for Flammable and Combustible Liquids and LP-Gas*.

**42.16.3.8** Mobile fueling vehicles shall be provided with a fire extinguisher installed, inspected, and maintained as required by NFPA 10, with a minimum rating of 4A-80 B:C.

**42.16.3.9** Mobile fueling vehicles shall be provided with a minimum 18.9 L (5 gal) spill kit designed to promptly and safely mitigate and dispose of leakage or spills.

**42.16.3.10** NO SMOKING signs shall be prominently displayed on the mobile fueling vehicle.

### **42.16.4 Operations.**

**42.16.4.1** Nighttime deliveries shall only be made in areas deemed adequately lighted by the AHJ.

**42.16.4.2** The mobile fueling vehicle flasher lights shall be in operation while dispensing operations are in progress.

**42.16.4.3** Safety cones or barriers shall be employed to protect the vehicle fueling area.

**42.16.4.4** Expansion space shall be left in each motor vehicle fuel tank to prevent overflow in the event of temperature increase.

**42.16.4.5\*** A means for bonding the mobile fueling vehicle to the motor vehicle shall be provided. Such bonding means shall be employed during fueling operations.

**42.16.4.6** Sources of ignition shall be controlled in accordance with 42.7.2.6.1.

**42.16.4.7** Mobile fueling vehicles shall be constantly attended during fueling operations.

**42.16.4.8** Mobile fueling vehicles shall not obstruct emergency vehicle access roads.

**42.16.4.9** Mobile fueling vehicles shall be positioned in a manner to preclude traffic from driving over the dispensing hose.

### **42.16.4.10 Operations Using Metal Safety Cans.**

**42.16.4.10.1** All metal safety cans shall be listed.

**42.16.4.10.2** Metal safety cans shall be secured to the mobile fueling vehicle except when in use.

**42.16.4.10.3** The AHJ shall be permitted to require additional measures in the handling of approved metal safety cans for refueling.



## Add:

### **Chapter 52 Stationary Storage Battery Systems.**

#### **52.1\* General.**

**52.1.1** Energy storage systems shall comply with Chapter 52.

#### **52.1.2 Permits.**

**52.1.2.1** Permits, where required, shall comply with Section 1.12.

**52.1.2.2** Prior to installation, plans shall be submitted and approved by the AHJ.

#### **52.2\* Lead-Acid and Nickel-Cadmium Batteries.**

**52.2.1 General.** Stationary storage battery systems having an electrolyte capacity of more than 100 gal (378.5 L) in sprinklered buildings or 50 gal (189.3 L) in unsprinklered buildings for flooded lead-acid, nickel-cadmium, and valve-regulated lead-acid (VRLA) batteries used for facility standby power, emergency power, or uninterrupted power supplies shall be in accordance with Section 52.2 and Table 52.2.1.

#### **52.2.2 Safety Features.**

**52.2.2.1 Safety Venting.** Batteries shall be provided with safety venting caps per 52.2.2.1.1 and 52.2.2.1.2.

**52.2.2.1.1 Nonrecombinant Batteries.** Vented lead-acid and nickel-cadmium shall be provided with safety venting caps.

**52.2.2.1.2 Recombinant Batteries.** VRLA shall be equipped with self-resealing flame-arresting safety vents.

**52.2.2.2 Thermal Runaway.** VRLA systems shall be provided with a listed device or other approved method to preclude, detect, and control thermal runaway.

#### **52.2.2.3 Location and Occupancy Separation.**

**52.2.2.3.1** Battery systems shall be permitted in the same room as the equipment that they support.

**52.2.2.3.2** Battery systems shall be housed in a noncombustible, locked cabinet or other enclosure to prevent access by unauthorized personnel unless located in a separate equipment room accessible only to authorized personnel.

**52.2.2.3.3** In other than assembly, educational, detention, and correction facilities; health care, ambulatory health care, and day care centers; and residential board and care and residential occupancies, battery systems shall be located in a room separated from other portions of the building by a minimum of a 1-hour fire barrier.

**52.2.2.3.4** In assembly, educational, detention and correction facilities; health care, ambulatory health care, and day care centers; and, residential board and care and residential occupancies, battery systems shall be located in a room separated from other portions of the building by a minimum of a 2-hour fire barrier.

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**Table 52.2.1 Battery Requirements**

Requirement	Nonrecombinant Batteries		Recombinant Batteries
	Flooded Lead-Acid	Flooded Nickel-Cadmium (Ni-Cd)	Valve-Regulated Lead-Acid (VRLA)
Safety caps	Venting caps	Venting caps	Self-resealing flame-arresting caps
Thermal runaway management	Not required	Not required	Required
Spill control	Required	Required	Not required
Neutralization	Required	Required	Required
Ventilation	Required	Required	Required
Signage	Required	Required	Required
Seismic control	Required	Required	Required
Fire detection	Required	Required	Required

### 52.2.2.4 Spill Control.

**52.2.2.4.1** Rooms, buildings, or areas containing free-flowing liquid electrolyte in individual vessels having a capacity of more than 55 gal (208 L) or multiple vessels having an aggregate capacity exceeding 1000 gal (3785 L) shall be provided with spill control to prevent the flow of liquids to adjoining areas.

**52.2.2.4.2\*** An approved method and materials for the control of a spill of electrolyte shall be provided that will be capable of controlling a spill from the single largest vessel.

**52.2.2.4.3** VRLA batteries with immobilized electrolyte shall not require spill control.

### 52.2.2.5 Neutralization.

**52.2.2.5.1\*** An approved method to neutralize spilled electrolyte shall be provided.

**52.2.2.5.2** For VRLA batteries, the method shall be capable of neutralizing a spill from the largest battery to a pH between 7.0 and 9.0.

**52.2.2.6\* Ventilation.** For flooded lead-acid, flooded nickel-cadmium, and VRLA batteries, ventilation shall be provided for rooms and cabinets in accordance with the mechanical code and one of the following:

- (1) The ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the room during the worst-case event of

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simultaneous “boost” charging of all the batteries, in accordance with nationally recognized standards.

(2) Continuous ventilation shall be provided at a rate of not less than 1 ft<sup>3</sup>/min/ft<sup>2</sup> (5.1 L/sec/m<sup>2</sup>) of floor area of the room or cabinet.

**52.2.2.7 Environment.** The battery environment shall be controlled or analyzed to maintain temperature in a safe operating range for the specific battery technology used.

### **52.2.2.8 Signs.**

**52.2.2.8.1** Doors or accesses into the following shall be provided with approved signs:

- (1) Battery storage buildings
- (2) Rooms containing stationary storage battery systems
- (3) Other areas containing stationary storage battery systems

**52.2.2.8.2** For rooms that contain VRLA batteries, the signs required by 52.2.2.8.1 shall state the following:

This room contains:

- (1) Stationary storage battery systems
- (2) Energized electrical circuits

**52.2.2.8.3** For rooms that contain flooded lead-acid or flooded Ni-Cd batteries, the signs required by 52.2.2.8.1 shall state the following:

This room contains:

- (1) Stationary storage battery systems
- (2) Energized electrical circuits
- (3) Corrosive battery electrolyte

**52.2.2.8.4** Battery cabinets shall be provided with exterior labels that identify the manufacturer and model number of the system and electrical rating (i.e., voltage and current) of the contained battery system.

**52.2.2.8.5** Signs shall be provided within battery cabinets to indicate the relevant electrical, chemical, and fire hazard.

**52.2.2.9 Seismic Protection.** Battery systems shall be seismically braced in accordance with the building code.

**52.2.2.10 Smoke Detection.** An approved automatic smoke detection system shall be installed in rooms containing stationary battery storage systems in accordance with NFPA 72.

**52.2.2.10.1** The required automatic smoke detection system shall be supervised by an approved central, proprietary, or remote station service or a local alarm that will give an audible signal at a constantly attended location.

**52.2.2.10.2** Normally unoccupied, stand-alone telecommunications structures with a gross floor area of less than 1,500 ft<sup>2</sup> (140 m<sup>2</sup>) shall not be required to have the detection as indicated in 52.2.2.10.

### **52.3\* Additional Battery Technologies.**

**52.3.1 General.** Energy storage systems having a capacity greater than the quantities listed in Table 52.3.1 shall be in accordance with Section 52.3 and where used as a legally required emergency or standby power system, shall also comply with 11.7.3.

#### **52.3.2\* Stationary Storage Battery Systems.**

**52.3.2.1 Location and Occupancy Separation.** Stationary storage battery systems shall be

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located and constructed in accordance with this section.

**52.3.2.1.1** Stationary storage battery systems shall be housed in a noncombustible, locked cabinet or other enclosure to prevent access by unauthorized personnel unless located in a separate equipment room accessible only to authorized personnel.

**52.3.2.1.2 Location.**

**52.3.2.1.2.1** Stationary storage battery systems shall not be located in areas where the floor is located more than 75 ft (22,860 mm) above the lowest level of fire department vehicle access, or where the floor level is more than 30 ft (9144 mm) below the finished floor of the lowest level of exit discharge, unless otherwise permitted by 52.3.2.1.2.

**52.3.2.1.2.2** Installations on noncombustible rooftops of buildings exceeding 75 ft (22,860 mm) in height that do not obstruct fire department rooftop operations shall be permitted when approved by the AHJ.

**Table 52.3.1 Energy Storage System Threshold Quantities**

Type	Capacity <sup>a</sup>
Lithium batteries, all types	20 KWh (18.0 Mega joules)
Sodium batteries, all types	20 KWh (18.0 Mega joules) <sup>c</sup>
Flow batteries <sup>b</sup>	20 KWh (18.0 Mega joules)
Other battery technologies	10 KWh (10.8 Mega joules)
Capacitors	70 KWh (25.2 Mega joules)

Notes:

<sup>a</sup>For batteries and capacitors rated in Amp-Hours, KWh should equal rated voltage times amp-hour rating divided by 1000.

<sup>b</sup>Includes vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte-type technologies.

<sup>c</sup>Or 70 KWh (25.2 Mega joules) for sodium-ion technologies.

**52.3.2.1.3 Separation.** Rooms containing stationary storage battery systems shall be located in high-hazard occupancies, or shall be separated from other areas of the building as stated in 52.3.2.1.3.1 and 52.3.2.1.3.2. Stationary storage battery systems shall be allowed to be in the same room with the equipment they support.

**52.3.2.1.3.1** In other than assembly, educational, detention, and correction facilities; health care, ambulatory health care, and day care centers; and residential board and care and residential occupancies, stationary storage battery systems shall be located in a room separated from other portions of the building by a minimum of a 1-hour fire barrier.

**52.3.2.1.3.2** In assembly, educational, detention, and correction facilities; health care, ambulatory health care, and day care centers; and residential board and care and residential

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occupancies, stationary storage battery systems shall be located in a room separated from other portions of the building by a minimum of a 2-hour fire barrier.

**52.3.2.1.4 Outdoor Installations.** Stationary storage battery systems located outdoors shall comply with this paragraph, in addition to all applicable requirements of Section 52.3.

**52.3.2.1.4.1** Installations in outdoor enclosures or containers that are occupied for servicing, testing, maintenance, and other functions shall be treated as stationary storage battery system rooms.

**52.3.2.1.4.2** Battery arrays in noncombustible containers shall not be required to be spaced 3 ft (914 mm) from the container walls.

**52.3.2.1.4.3** Stationary storage battery systems located outdoors shall be separated by a minimum 5 ft (1524 mm) from the following:

- (1) Lot lines
- (2) Public ways
- (3) Buildings
- (4) Stored combustible materials
- (5) Hazardous materials
- (6) High-piled stock
- (7) Other exposure hazards

**52.3.2.1.4.4** The AHJ shall be permitted to authorize smaller separation distances if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress from adjacent buildings, or adversely impact adjacent stored materials or structures.

**52.3.2.1.4.5 Means of Egress.**

**52.3.2.1.4.5.1** Stationary storage battery systems located outdoors shall be separated from any means of egress as required by the AHJ to ensure safe egress under fire conditions, but in no case less than 10 ft (3048 mm).

**52.3.2.1.4.5.2** The AHJ shall be permitted to authorize smaller separation distances if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress.

**52.3.2.1.4.6 Security of Areas.** Outdoor areas in which stationary storage battery systems are located shall be secured against unauthorized entry in an approved manner.

**52.3.2.2 Maximum Allowable Quantities.**

**52.3.2.2.1** Fire areas within buildings containing stationary storage battery systems exceeding the maximum allowable quantities in Table 52.3.2.2.1 shall comply with all applicable ordinary-hazard and high-hazard requirements as identified in 6.2.2 of NFPA 101 and the building code.

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**Table 52.3.2.2.1**

Type	Maximum Allowable Quantities <sup>a</sup>	Hazard Classification
Lithium batteries, all types	600 KWh	High hazard <sup>c</sup>
Sodium batteries, all types	600 KWh	High hazard <sup>c</sup>
Flow batteries <sup>b</sup>	600 KWh	High hazard <sup>c</sup>
Other battery technologies	200 KWh	High hazard <sup>c</sup>

Notes:

<sup>a</sup>For batteries and capacitors rated in Amp-Hours, KWh should equal rated voltage times amp-hour rating divided by 1000.

<sup>b</sup>Includes vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte-type technologies.

<sup>c</sup>Can be permitted to be ordinary hazard classification if approved by the AHJ based on (1) a hazard mitigation analysis conducted in accordance with 52.3.2.4 and (2) large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory that shows that a fire involving the stationary storage battery system is contained within the room for a duration equal to the fire resistance rating of the room separation required in 52.3.2.1.3.1 or 52.3.2.1.3.2, as applicable.

**52.3.2.2.2** Where approved by the AHJ, areas containing stationary storage battery systems that exceed the amounts in Table 52.3.2.2.1 shall be permitted to be treated as an ordinary-hazard and not a high-hazard classification based on a hazardous mitigation analysis in accordance with 52.3.2.4 and large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory.

**52.3.2.2.3** Where areas within buildings contain a combination of energy system technologies, the total aggregate quantities shall be determined based on the sum of percentages of each type divided by the maximum allowable quantity of each type. If the sum of the percentages exceeds 100 percent, the area shall be treated as a high-hazard classification in accordance with Table 52.3.2.2.1.

**52.3.2.3\* Battery Arrays.**

**52.3.2.3.1** Battery arrays shall comply with 52.3.2.3.2 and 52.3.2.3.3 unless otherwise permitted by 52.3.2.3.4 or 52.3.2.3.5.

**52.3.2.3.2** Storage batteries, prepackaged stationary storage battery systems, and pre-engineered stationary storage battery systems shall be segregated into arrays not exceeding 50 KWh (180 Mega joules) each.

**52.3.2.3.3** Each array shall be spaced a minimum 3 ft (914 mm) from other arrays and from walls in the storage room or area. The storage arrangements shall comply with the egress provisions in NFPA 101.

**52.3.2.3.4** Listed pre-engineered stationary storage battery systems and prepackaged stationary storage battery systems shall not exceed 250 KWh (900 Mega joules) each.

**52.3.2.3.5** The AHJ shall be permitted to approve listed pre-engineered and prepackaged

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battery arrays with larger capacities or smaller battery array spacing if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving one array will not propagate to an adjacent array, and be contained within the room for a duration equal to the fire resistance rating of the room separation required by 52.3.2.1.3.

**52.3.2.4 Hazard Mitigation Analysis.** A failure mode and effects analysis (FMEA) or other approved hazard mitigation analysis shall be provided to the AHJ when any of the following conditions are present:

- (1) Battery technologies not specifically identified in Table 52.3.1 are provided.
- (2) More than one stationary storage battery technology is provided in a room or indoor area where there is a potential for adverse interaction between technologies.
- (3) When allowed as a basis for increasing maximum allowable quantities as specified in Table 52.3.2.2.1.

**52.3.2.4.1** The analysis shall evaluate the consequences of the following failure modes, and others deemed necessary by the AHJ. Only single failure modes shall be considered for each mode:

- (1) Thermal runaway condition in a single module or array
- (2) Failure of a battery management system
- (3) Failure of a required ventilation system
- (4) Voltage surges on the primary electric supply
- (5) Short circuits on the load side of the stationary battery storage system
- (6) Failure of the smoke detection, fire suppression, or gas detection system

**52.3.2.4.2** The AHJ shall be permitted to approve the hazardous mitigation analysis provided the consequences of the FMEA demonstrate the following:

- (1) Fires or explosions will be contained within unoccupied stationary storage battery system rooms for the minimum duration of the fire resistance rating specified in 52.3.2.1.3.1 or 52.3.2.1.3.2, as applicable
- (2) Fires and explosions in stationary storage battery system cabinets in occupied work centers allow occupants to safely evacuate
- (3) Toxic and highly toxic gases released during charging, discharging, and normal operation shall not exceed the permissible exposure limit (PEL)
- (4) Toxic and highly toxic gases released during fires and other fault conditions shall not reach concentrations in excess of IDLH level in the building or adjacent means of egress routes during the time deemed necessary to evacuate from that area
- (5) Flammable gases released from batteries during charging, discharging, and normal operation shall not exceed 25 percent of the lower flammable limit (LFL)

**52.3.2.4.3** Construction, equipment, and systems that are required for the stationary storage battery system to comply with the hazardous mitigation analysis shall be installed, maintained, and tested in accordance with nationally recognized standards and specified design parameters.

**52.3.2.5 Listings.** Storage batteries shall be listed in accordance with UL 1973, Standard for Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications. Prepackaged and pre-engineered stationary storage battery systems shall be listed in accordance

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with UL 9540, Outline of Investigation for Energy Storage Systems and Equipment.

**52.3.2.5.1\* Prepackaged and Pre-engineered Systems.** Prepackaged and pre-engineered stationary storage battery systems shall be installed in accordance with their listing and the manufacturer's instructions.

**52.3.2.5.2 Environment.** The storage battery environment shall be controlled to maintain temperatures and conditions within the battery manufacturer's specifications.

### **52.3.2.6 Installation.**

**52.3.2.6.1 Battery Management System.** An approved battery management system shall be provided for battery technologies for monitoring and balancing cell voltages, currents, and temperatures within the manufacturer's specifications. The system shall transmit an alarm signal to an approved location if potentially hazardous temperatures or other conditions including short circuits, overvoltage (i.e., overcharge) or under voltage (i.e., over discharge) are detected.

**52.3.2.6.2 Battery Chargers.** Battery chargers shall be compatible with the battery manufacturer's electrical ratings and charging specifications. Battery chargers shall be listed in accordance with the UL 1564, Standard for Industrial Battery Chargers, or provided as part of a listed pre-engineered or prepackaged stationary storage battery system.

**52.3.2.6.3 Vehicle Impact Protection.** Vehicle impact protection shall be provided where stationary storage battery systems are subject to impact by motor vehicles.

### **52.3.2.6.4 Combustible Storage.**

**52.3.2.6.4.1** Combustible materials not related to the stationary storage battery system shall not be stored in battery rooms, cabinets, or enclosures.

**52.3.2.6.4.2** Combustible materials in occupied work centers shall comply with Section 10.18 and shall not be stored within 3 ft (915 mm) of battery cabinets.

### **52.3.2.6.5 Signage.**

**52.3.2.6.5.1** Approved signage shall be provided on doors or in approved locations near entrances to stationary battery storage system rooms.

**52.3.2.6.5.2** New signage installations shall require the following items:

- (1) Hazard identification markings in accordance with NFPA 704.
- (2) "This room contains energized battery systems," or the equivalent.
- (3) Identification of the type(s) of batteries present
- (4) AUTHORIZED PERSONNEL ONLY
- (5) Technology-specific markings, if required in 52.3.2.11

**52.3.2.6.5.3** Where the battery storage system disconnecting means is not within sight of the main service disconnect, placards or directories shall be installed at the locations of the main service disconnect to indicate the location of all battery storage disconnecting means in accordance with NFPA 70.

**52.3.2.6.5.4** Existing stationary storage battery systems shall be permitted to include the signage required at the time it was installed.

**52.3.2.6.5.5** Battery cabinets shall be provided with exterior labels that identify the manufacturer and model number of the system and electrical rating (i.e., voltage and current) of the contained battery system.

**52.3.2.6.5.6** Signs shall be provided within battery cabinets to indicate the relevant electrical, chemical, and fire hazard.



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**52.3.2.6.5.7** Fire command centers in buildings containing stationary storage battery systems shall include signage or readily available documentation that describes the location of stationary storage battery systems, the types of batteries present, operating voltages, and location of electrical disconnects.

**52.3.2.6.6 Seismic Protection.** Battery systems shall be seismically braced in accordance with the building code.

**52.3.2.6.7 Safety Caps.** Vented batteries shall be provided with flame-arresting safety caps.

**52.3.2.6.8\* Mixed Battery Systems.** Different types of batteries shall not be installed in the same room or cabinet if there is a potential for unsafe interaction between them, as determined by the AHJ.

**52.3.2.7 Suppression and Detection.**

**52.3.2.7.1** Fire suppression. Rooms containing stationary storage battery systems shall be protected by an automatic sprinkler system installed in accordance with Section 13.3.

**52.3.2.7.1.1** Commodity classifications for specific technologies of storage batteries shall be in accordance with Chapter 5 of NFPA 13.

**52.3.2.7.1.2** If the storage battery types are not specifically addressed in Chapter 5 of NFPA 13, the AHJ shall be permitted to approve the fire suppression system based on full-scale fire and fault condition testing conducted or witnessed and reported by an approved laboratory.

**52.3.2.7.2 Smoke Detection.** An approved automatic smoke detection system shall be installed in rooms containing stationary battery storage systems in accordance with NFPA 72 and the required automatic smoke detection system shall be supervised by an approved central, proprietary, or remote station service or a local alarm that will give an audible signal at a constantly attended location.

**52.3.2.8\* Ventilation.** Where required by 52.3.2.11, ventilation shall be provided for rooms and cabinets in accordance with the mechanical code and one of the following:

(1) The ventilation system shall be designed to limit the maximum concentration of flammable gas to 25 percent of the lower flammable limit (LFL) of the total volume of the room during the worst-case event of simultaneous “boost” charging of all the batteries, in accordance with nationally recognized standards.

(2) Mechanical ventilation shall be provided at a rate of not less than 1 ft<sup>3</sup>/min/ft<sup>2</sup> (5.1 L/sec/m<sup>2</sup>) of floor area of the room or cabinet. The ventilation can be either continuous, or activated by a gas detection system in accordance with 52.3.2.8.2.

**52.3.2.8.1** Required mechanical ventilation systems for rooms and cabinets containing storage batteries shall be supervised by an approved central, proprietary, or remote station service or shall initiate an audible and visual signal at an approved constantly attended on-site location.

**52.3.2.8.2** Where required by 52.3.2.8(2), rooms containing stationary storage battery systems shall be protected by an approved continuous gas detection system.

**52.3.2.8.2.1** The gas detection system shall be designed to activate when the level of flammable gas exceeds 25 percent of the lower flammable limit (LFL)

**52.3.2.8.2.2** Activation of the gas detection system shall result in activation of the mechanical ventilation system, which shall remain on until the flammable gas detected is less than 25 percent of the LFL.

**52.3.2.8.2.3** The gas detection system shall include a minimum two hours of standby power.

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**52.3.2.8.2.4** Failure of the gas detection system shall annunciate a trouble signal at an approved central, proprietary, or remote station service, or when approved at a constantly attended onsite location.

**52.3.2.9\* Spill Control and Neutralization.** Where required by 52.3.2.11, approved methods and materials shall be provided for the control and neutralization of spills of electrolyte or other hazardous materials in rooms containing stationary storage batteries as follows:

- (1) For batteries with free-flowing electrolyte, the method and materials shall be capable of neutralizing a spill of the total capacity from the largest cell or block to a pH between 5.0 and 9.0.
- (2) For batteries with immobilized electrolyte, the method and materials shall be capable of neutralizing a spill of 3.0 percent of the capacity of the largest cell or block in the room to a pH between 5.0 and 9.0.

**52.3.2.10 Thermal Runaway.** Where required by 52.3.2.11, a listed device or other approved method shall be provided to preclude, detect, and control thermal runaway.

**52.3.2.11 Battery Specific Protection.** Stationary storage battery systems shall comply with 52.3.2 through 52.3.2.10 and this section, as applicable.

**52.3.2.11.1 Lithium Batteries.** Stationary storage battery systems utilizing lithium batteries shall be provided with thermal runaway protection in accordance with 52.3.2.10.

**52.3.2.11.2 Sodium Batteries.** Stationary storage battery systems utilizing sodium batteries shall comply with the following:

- (1) Ventilation shall be provided in accordance with 52.3.2.8.
- (2) Spill control and neutralization shall be in accordance with 52.3.2.9.
- (3) Thermal runaway protection shall be provided for in accordance with 52.3.2.10.
- (4) A hazard mitigation analysis shall be provided for systems that utilize sodium sulfur batteries, or other sulfur-type battery systems that operate above ambient temperatures.
- (5) The signage required in 52.3.2.6.5 shall include, where applicable, “Water Reactive Hazard — Apply No Water.”

**52.3.2.11.3 Flow Batteries.** Stationary storage battery systems utilizing flow batteries shall comply with the following:

- (1) Ventilation shall be provided in accordance with 52.3.2.8.
- (2) Spill control and neutralization shall be in accordance with 52.3.2.9.

**52.3.2.11.4 Other Battery Types.** Stationary storage battery systems utilizing battery technologies other than those described in 52.3.2.11.1 through 52.3.2.11.3 shall comply with the following:

- (1) Ventilation shall be provided in accordance with 52.3.2.8 where flammable, toxic or highly toxic gases could be present during charging, discharging, and normal system use.
- (2) Spill control and neutralization shall be in accordance with 52.3.2.9 where the batteries contain electrolytes that could be released from the batteries.
- (3) Thermal runaway protection shall be provided in accordance with 52.3.2.10.
- (4) The signage required in 52.3.2.6.5 shall also identify any potential hazards associated with the batteries.

**52.3.2.12 Testing, Maintenance, and Repairs.**

**52.3.2.12.1** Stationary storage batteries and associated equipment and systems shall be tested and

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maintained in accordance with the manufacturer's instructions.

**52.3.2.12.2** Any storage batteries or system components used to replace existing units shall be compatible with the battery charger, battery management systems, other storage batteries, and other safety systems.

### **52.3.3 Capacitor Energy Storage Systems.**

**52.3.3.1 Capacity.** Stationary capacitor energy storage systems having capacities greater than those described in Table 52.3.1 shall comply with 52.3.3.

**52.3.3.2 Location and Occupancy Separation.** Stationary capacitor energy storage systems shall be located and constructed as required for stationary storage battery system in accordance with 52.3.2.1 through 52.3.2.1.4.3.

**52.3.3.3 Maximum Allowable Quantities.** Fire areas within buildings containing capacitor energy storage systems exceeding 600 KWh (2160 MJ) shall comply with all applicable ordinary-hazard and high-hazard requirements as identified in 6.2.2 of NFPA 101 and the building code.

### **52.3.3.4 Capacitor Arrays.**

**52.3.3.4.1** Capacitors, prepackaged stationary capacitor energy storage systems, and pre-engineered capacitor energy storage systems shall be segregated into arrays not exceeding 50 KWh (180 Mega joules) each.

**52.3.3.4.2** Each array shall be spaced a minimum 3 ft (914 mm) from other arrays and from walls in the storage room or area. The storage arrangements shall comply with the egress provisions in NFPA 101.

**52.3.3.5 Listings.** Capacitors shall be listed in accordance with UL 1973, Standard for Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications. Prepackaged and pre-engineered capacitor energy systems shall be listed in accordance with UL 9540, Outline of Investigation for Energy Storage Systems and Equipment.

**52.3.3.5.1\*** Prepackaged and Pre-engineered Systems. Prepackaged and pre-engineered capacitor energy storage systems shall be installed in accordance with their listing and the manufacturer's instructions.

**52.3.3.5.2 Environment.** The environment surrounding the capacitors shall be controlled to maintain temperatures and conditions within the manufacturer's specifications.

**52.3.3.6 Chargers.** Capacitor chargers shall be compatible with the capacitor manufacturer's electrical ratings and charging specifications, and shall be listed in accordance with the UL 1564, Standard for Industrial Battery Chargers, or provided as part of a listed pre-engineered or prepackaged capacitor energy storage system.

**52.3.3.7 Vehicle Impact Protection.** Vehicle impact protection shall be provided where capacitor energy storage systems are subject to impact by motor vehicles.

### **52.3.3.8 Combustible Storage.**

**52.3.3.8.1** Combustible materials not related to the capacitor energy storage system shall not be stored in capacitor rooms, cabinets, or enclosures.

**52.3.3.8.2** Combustible materials in occupied work centers shall comply with Section 10.18 and shall not be stored within 3 ft (915 mm) of capacitor cabinets.

**52.3.3.9 Signage.** Approved signage shall be provided on doors or in approved locations near entrances to capacitor energy storage systems, and shall include the following:

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- (1) Hazard identification markings in accordance with NFPA 704.
- (2) “This room contains energized capacitor systems,” or the equivalent
- (3) Identification of the type(s) of capacitors present
- (4) AUTHORIZED PERSONNEL ONLY

**52.3.3.9.1** Where the capacitor energy storage system disconnecting means is not within sight of the main service disconnect, placards or directories shall be installed at the locations of the main service disconnect to indicate the location of all capacitor energy storage system disconnecting means in accordance with NFPA 70.

**52.3.3.9.2** Capacitor cabinets shall be provided with exterior labels that identify the manufacturer and model number of the system and electrical rating (i.e., voltage and current) of the contained battery system.

**52.3.3.9.3** Signs shall be provided within capacitor cabinets to indicate the relevant electrical, chemical, and fire hazard.

**52.3.3.9.4** Fire command centers in buildings containing capacitor energy storage systems shall include signage or readily available documentation that describes the location of the systems, the types of capacitors present, operating voltages, and location of electrical disconnects.

**52.3.3.10 Seismic Protection.** Capacitor energy storage systems shall be seismically braced in accordance with the building code.

**52.3.3.11 Testing, Maintenance, and Repairs.**

**52.3.3.11.1** Capacitor energy storage systems and associated equipment and systems shall be tested and maintained in accordance with the manufacturer’s instructions.

**52.3.3.11.2** Capacitors or system components used to replace existing units shall be compatible with the capacitor charger, other capacitors, and other safety systems.

**Delete:**

~~**65.9.14.3** Seismic instruments shall be capable of reading and recording the acceptable level limits specified in this section and shall be maintained and calibrated in accordance with the instructions of the instrument manufacturer.~~

**Delete and Replace:**

**65.9.14.4 Seismograph Placement.** The seismograph shall be placed at the nearest inhabited building or structure adjacent to the blast area that is not owned, leased, or controlled by the blasting operation.

**Delete:**

~~**65.9.14.4.1** The seismograph shall also be placed on or in the ground on the side of the structure directly facing the blast site and shall be placed within ten feet of the structure or less than 10% of the distance from the blast, whichever is less.~~

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### **Add:**

**A.1.12.8** See M.G.L. c. 148 § 10A regarding heads of fire departments, permits, inspections, and § 23 regarding the keeping and use of flammable fluids, permit, and § 24 regarding keeping and handling of fire menace material.

**A.Table 1.12.8.1(1)** See M.G.L. c. 48, § 13, regarding open fires granted by the forest warden or chief of the fire department in cities, towns and districts.

**A.Table 1.12.8.1(2)** See M.G.L. c. 111, § 142 G, regarding the burning of Christmas trees and; §142 H regarding, ceremonial bonfires; permits and §142 I regarding, bonfires from July 2 to July 6.

**A.Table 1.12.8.1(6)** See M.G.L. c. 148 § 28B regarding, buildings with canine guards.

**A.Table 1.12.8.2(1)** See M.G.L. c.148 § 10A regarding, heads of fire departments; permits; inspections and; §10C regarding the alteration, repair or installation of oil burners; necessity of certificate; exceptions and; § 38J regarding, residential property utilizing heating oil tanks; safety requirements; inspection; certification.

**A.Table 1.12.8.2(2)** See M.G.L. c.148 § 10A regarding, heads of fire departments; permits; inspections and; 10C regarding, the alteration, repair or installation of oil burners; necessity of certificate; exceptions.

**A.Table 1.12.8.2(3)** See M.G.L. c. 148 § 10A regarding, heads of fire departments; permits; inspections and; §23 regarding the keeping and use of inflammable fluids; permit and; §24 regarding, the keeping and handling of fire menace material; See c. 148 § 37 regarding, tanks more than 10,000 gallons used to store fluids other than water; permits; violation of statue or regulation and; annual inspections and Chapter 66 of NFPA 1.

**A.Table 1.12.8.21.** A permit is required for processes involving hazardous materials in accordance with Section 60.8. Chapter 38 provides specific requirements for operations and equipment utilized in the processing and extraction activities commonly associated with cannabis processing facilities. It is generally accepted that processes involving hazardous materials will meet industry best practices. In the case of cannabis processing and extraction, compliance with the published regulations of Chapter 38 are the minimum industry standard.

**A.Table 1.12.8.25 Permits Required.** Used here, “to store” includes the parking location of Cargo Tanks, Portable Tanks, or Transfer Tanks during non-business hours. As a condition of the flammable/combustible storage permit, the tank vehicle should comply with NFPA 385 as referenced in 42.7.2.2.1 and 42.7.6.2, the conditions of 42.15, and 49 CFR. Each tank vehicle should be specifically identified on the storage permit.

**A.1.13.7.1** See M.G.L. c. 148 §§ 10C through 10H regarding, certificates oil burner installations.

**A.1.13.7.1.5** See the following references:

(1) M.G.L. Chapter 148 section 10C Alteration, repair or installation of oil burners; necessity of certificate; exceptions

(2) M.G.L. Chapter 148 section 10D Certificate as oil burner technician; minimum age; application; fee; examination; duration of certificate; electrical work

(3) M.G.L. Chapter 148 section 10E, governing apprentice certificates; fee; duration; expiration; renewal

**A.3.2.2 Authority Having Jurisdiction (AHJ).**

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The phrase “authority having jurisdiction,” or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the AHJ may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the AHJ. In many circumstances, the property owner or his or her designated agent assumes the role of the AHJ; at government installations, the commanding officer or departmental official may be the AHJ.

In Massachusetts, the AHJ is based on an applicable code. Pursuant to M.G.L c. 143 §96, the Massachusetts State Building Code shall incorporate, without change, specialized construction codes, rules or regulations pertaining to building construction, reconstruction, alteration, repair or demolition promulgated by and under the authority of such specialized boards. Specialized codes include, but are not limited to, the state plumbing code, electrical code, architectural barriers regulations, fire safety code, fire prevention regulations, sheet metal regulations and elevator regulations. The AHJ who enforces this Code is the Fire Official. There will be situations where the Fire Official may have to enforce this Code with other officials such as a Building Official or other specialized code official(s),

Several examples of who is the AHJ, based on work activity, are provided below:

Example #1 In new construction and renovation of a building or structure the Building Official is the AHJ and the applicable code is the Building Code.

Example #2 Once a building or structure has a certificate of occupancy, the maintenance of the building code provisions, and the duties to maintain the building systems are enforceable through this Code therefore the AHJ is the Fire Official. Although, this delineation between pre- and post-certificate of occupancy is a general guideline, it is important to note that the AHJ follows the scope of the presiding specialized code which is not necessarily indicated by the issuance of a certificate of occupancy. In some instances, two or more AHJs may have jurisdiction over a code provision. In this case, the AHJ would comprise of multiple individuals, such as a Building Official, Fire Official, a Plumbing and Gas Inspector or an Inspector of Wires.

Examples of such situations are provided below:

Example # 3 Hazardous material storage and use is regulated by both the Building Code and this Code. The AHJ for the applicable provisions are both the Building Official and the Fire Official.

Example #4 Except for sale and transfer, the installation/maintenance of a smoke alarms or detectors is regulated by the Building Code, therefore the AHJ is the Building Official, and the minimum wiring requirements are obtained using the Massachusetts Electrical Code, with the AHJ being the Inspector of Wires.

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Examples #3 and #4 above that require more than one AHJ:

In circumstances involving compliance with two or more Massachusetts codes, the AHJ, while enforcing this Code should, to the extent as reasonably practicable, coordinate inspections so that owners and occupants of a building or structure are not subjected to visits by numerous inspectors nor multiple or conflicting orders. Whenever the AHJ observes an apparent or actual violation of some provision of law, ordinance, code or bylaw not within the AHJ's authority, the AHJ should report the findings to the appropriate code official having jurisdiction to enforce said law, ordinance, code or bylaw.

**A.11.5.1** All fuel oil burners and all equipment in connection therewith shall be installed and maintained in accordance with the manufacturer's installation and operation manual. Chimneys, connectors, direct vent systems and power-venters shall also be installed in accordance with the Building Code.

**A.13.1.1.1.2** See M.G.L. c.148 § 27A Section 27A. Except as hereinafter provided, no person shall shut off, disconnect, obstruct, remove or destroy, or cause or permit to be shut off, disconnected, obstructed, removed or destroyed, any part of any sprinkler system, water main, hydrant or other device used for fire protection or carbon monoxide detection and alarm in any building owned, leased or occupied by such person or under his control or supervision, without first procuring a written permit so to do from the head of the fire department of the city or town wherein such building is situated, which permit such head is hereby authorized to issue subject to such terms and conditions as, in his judgment, protection against fire and the preservation of the public safety may require. This section shall not prevent the temporary shutting off or disconnection or partial removal of such a system, main, hydrant or other device for the purpose of making necessary repairs or preventing freezing or other property damage; provided, however, that the head of the fire department is notified immediately of such emergency action. The head of the fire department shall also be notified when the system, main, hydrant or other device is placed back in service. Violation of this section shall be punished by imprisonment for not more than one year or by a fine of not more than one thousand dollars, or both. The supreme judicial and superior courts shall have jurisdiction in equity to enforce compliance with the provisions of this section.

**A.38.1** Chapter 38 specifically applies to the occupancy of cannabis growing, processing, and extraction. As is the case with other chapters of the code, some requirements for building construction and building systems fall under the jurisdiction of the building code. The authority to regulate cannabis growing falls under the Cannabis Control Commission or the Department of Agricultural Resources, as applicable. The fire department has jurisdiction and enforcement ability where the requirements of this chapter pertain to the operation of the facility (after the certificate of occupancy is issued), maintenance of the facility, potential creation of hazardous environments (such as through the use of carbon dioxide or fumigation chemicals), and processing using hazardous materials.

**A.38.1.1** Processing of other agricultural products not addressed by this chapter should comply with other applicable sections of this Code.

**A.38.1.5** Occupancy classification should take into consideration the hazards associated with the process occurring in the facility and the quantities of high-hazard contents.

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**A.38.4** Due to security of growing and processing operation, access control, electromagnetic locks, and other locking arrangement are used. Chapter 14 addresses the installation of specialized locking devices.

**A.38.5.4.1** Fumigation for marijuana growing, processing, or extraction facility includes the production or use of sulfur dioxide.

**A.38.5.4.2** Fire, open flames, and similar sources of ignition should be eliminated from the space under fumigation or insecticidal fogging. Electricity in any part of the building, structure, or space where operation of switches or electrical devices, equipment, or systems could serve as a source of ignition should be shut off. In addition, electronic devices, including portable equipment and cellular phones, should be shut off and telephone lines should be disconnected from telephones.

**A.38.6** Flammable or combustible liquids, flammable gases, liquefied petroleum gases, or nonflammable gases used in extraction processing of oils and fats are hereinafter referred to as “solvents” The extraction process includes extracting the oils and fats by use of a solvent, desolventizing the raw material and producing the miscella, distilling the solvent from the miscella, and recovering the solvent.

**A.38.6.1.1.2** The dedicated room should not be used for any other purpose, including storage. Materials that might interfere with the operation of exhaust systems should be prohibited, such as acoustical ceiling tiles.

**A.38.6.1.1.4** Examples of rooms using hazardous materials for extraction are those using flammable and combustible liquids and CO<sub>2</sub>.

**A.38.6.1.2.1** Nonhazardous processes might not warrant constant attendance by trained personnel.

**A.38.6.1.2.2** Staff monitoring the extraction process do not need to meet the training requirements of 38.6.1.3.

**A.38.6.1.2.2 (2)** The transfer of solvent includes LPG liquid transfilling.

**A.38.6.1.3.2** Examples of these programs include, but are not limited to, the following:

- (1) Training programs developed by extraction equipment manufacturers
- (2) Compressed Gas Association CGA P-1, Safe Handling of Compressed Cases in Containers, for operators of CO<sub>2</sub> equipment
- (3) Programs by governmental organizations

**A.38.6.1.5.2.1** An “explosion condition” is considered a condition in which the potential for an explosion or deflagration could occur. If a failure of the containment method for flammable liquids or gases could result in vapors being released in the quantities that may reach the LFL or LEL, an explosion condition could exist. For example, if a flammable liquid or gas is used for a process within a piece of equipment, it is likely that an explosion condition would exist if the equipment was improperly closed, or if there is a pressure relief valve. It is the intention of this section to eliminate known sources of ignition from the vicinity of equipment which use flammable liquids or gases.

**A.38.6.1.5.2.3** The provisions for container (i.e., tank) construction are applicable to the working tank or the supply tank that is connected to the extraction equipment.

**A.38.6.1.5.4** The technical report documenting the design or peer review should be submitted for review and approval to the AHJ prior to the equipment being located or installed at the facility.



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Where a technical report is required to be submitted for review and approval by the AHJ, the following should occur:

- (1) Prior to the submittal of the technical report, the engineer should submit to the AHJ any educational background and professional experience specific to the review and approval of the system, equipment, and processes with like hazards of those associated with the marijuana extraction system.
- (2) Once the proof of qualifications are found acceptable by the AHJ, the engineer of record should produce the technical report and the report should be signed and sealed in accordance with respective state requirements.

All of, but not limited to, the following items should be included in the technical report:

- (1) Manufacturer information
- (2) Engineer of record information
- (3) Date of review and report revision history
- (4) Signature page, which should include the following
  - a. Author of the report
  - b. Date of the report
  - c. Seal, date, and signature of the engineer of record performing the design or peer review
  - d. Date and signature of the engineer performing the engineering check of the report (which cannot be performed by the authoring engineer though it can be the same firm as the authoring engineer)
- (5) Model number of the item evaluated. If the equipment is provided with a serial number, the serial number should be included for verification at the time of the site inspection.
- (6) Methodology of the design or peer review process used to determine minimum safety requirements. Methodology should consider the basis of design, and should include a code analysis and code path to demonstrate the reason as to why specific code or standards are applicable or not.
- (7) Equipment description. A list of all components and subassemblies of the system or equipment, indicating the materials, solvent compatibility, maximum temperature, and pressure limits
- (8) A general flow schematic or general process flow diagram (PFD) of the process. All primary components of the process equipment should be identified and match the aforementioned list. Operating temperatures, pressures, and solvent state of matter should be identified in each primary step or component. A piping and instrumentation diagram (PID or PI&D) might be provided but is not required.
- (9) Analysis of the vessel(s) if pressurized beyond standard atmospheric pressure. Analysis should include purchased and fabricated components.
- (10) Structural analysis for the frame system supporting the equipment.
- (11) Process safety analysis of the extraction equipment, from the introduction of raw product to the end of the extraction process
- (12) Comprehensive process hazard analysis considering failure modes and points of failure throughout the process. The portion of the review should include review of emergency

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procedure information provided by the manufacturer of the equipment or process and not that of the facility, building, or room.

- (13) Review of the assembly instructions, and operational and maintenance manuals provided by the manufacturer.
- (14) Findings and observations of the analysis.
- (15) List of references used in the analysis.

If the technical report or manufacturer's literature indicate specific requirements for the location, room, space, or building where the extraction process is to occur, the engineer of record, as approved, should review the construction documents of such location, room, space, or building and provide a report of their findings and observations to the AHJ.

The findings and observations should include the following:

- (1) Process safety analysis of the entire process from raw material to finished product.
- (2) Comprehensive process hazard analysis considering failure modes and points throughout the process and a review of emergency procedures as related to the equipment or process and the facility.

**A.38.6.2.4.2** The purpose of altering the extraction operator is to provide notification that the operator is in a flammable environment because the LP gas used is not odorized. This could be in a form of visual warning, local alarm, or other approved means. However, it is not intended for evacuation or to dispatch the fire department.

**A.38.6.3.2.1** The intent of this section is to require an exhaust system utilization to capture velocities across the work area. Standard laboratory capture velocity is between 80 and 100 ft/min (24 and 30 m/min).

Most flammable liquid extractions and post oil processing are bench-top process that can be conducted in a chemical fume hood. Larger operations might need larger hoods or special full-room exhaust systems in compliance with NFPA 91. Or the mechanical code. The exception is intended for small unheated processes where plant material might be soaked in flammable liquid and directly transferred to a food product.

**A.38.6.4.4** Exhaust piping can be of the flexible type as long as the piping or hose is capable of handling the force of the exhaust. Relief devices include spring-loaded pressure relief valves or rupture disks.

**A.38.7** The intent of this section is for filling the working container (i.e., tank) connected to the extraction equipment.

**A.42.16.1** This section addresses mobile refueling activities governed by NFPA 30A. Other local, state, and federal requirements might be applicable.

**A.42.16.2.2** The safety and emergency response plan is intended to be completed, maintained, and updated by the mobile fueling operator to help ensure that fueling operations are conducted in a safe manner that is acceptable to the AHJ. Such a plan might include some or all of the following elements:

- 1. Written safety and emergency response plan that establishes policies and procedures for fire safety, spill prevention and control, personnel training, and compliance with

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other applicable requirements of this Code.

2. Where required by the AHJ, a site plan for each location at which mobile fueling occurs. The site plan should be in sufficient detail to indicate all buildings, structures, lot lines, property lines, and appurtenances on site and their use or function; all uses adjacent to the lot lines of the site; fueling locations, the locations of all storm drain openings, and adjacent waterways or wetlands; information regarding slope, natural drainage, curbing, impounding, and how a spill will be retained upon the site property; and the scale of the site plan.
3. If the AHJ does not require site plans of approved fueling locations, the safety and emergency response plan should include guidelines for locations within the jurisdiction where mobile fueling can and cannot be provided, such as on residential streets, on school grounds, and so on.

**A.42.16.2.3** In addition to any other training, education, and certifications that might be required by federal regulations and HAZCOM, the operator should also be trained on the requirements of this Code.

**A.42.16.2.3.1** In addition to the requirements in **42.16.3.1**, mobile fueling vehicles should comply with all applicable local, state, and federal requirements, including DOT requirements for vehicles used to transport gasoline and diesel fuel.

**A.42.16.4.5** The listed hose and nozzle assembly provides for bonding. However, where there is a plastic insert that prohibits an electrical/metallic connection with the customer vehicle while filling, then a separate means of bonding is required.

**A.52.1** Chapter 52 applies to the installation of battery storage systems. These systems can be installed within new or existing buildings, or as a stand-alone application without a building structure. If the battery storage system is installed within a building or on a foundation, the fire department should work closely with the building department to ensure all applicable regulations of the building and fire codes are satisfied. Attention should be given to reviewing the risk analysis and considering means of responding to fire or other emergency incidents in battery storage system buildings or sites.

**A.52.2** The requirements in Section 52.2 supersede all the hazardous material designations, permits, and requirements in Chapter 60.

**A.52.2.2.4.2** Methods of achieving this protection can include, but are not limited to, the following:

- (1) Liquidtight sloped or recessed floors in indoor locations or similar areas in outdoor locations
- (2) Liquidtight floors in indoor locations or similar areas in outdoor locations provided with liquidtight raised or recessed sills or dikes
- (3) Sumps and collection systems
- (4) Spill containment systems such as that described in A.52.2.2.5.1.

**A.52.2.2.5.1** One method to determine compliance with the neutralization requirements of this subsection is found in Underwriters Laboratories Subject 2436, Outline of Investigation for Spill Containment for Stationary Lead Acid Battery Systems. Subject 2436 investigates the liquid tightness, level of electrolyte absorption, pH neutralization capability, and flame spread resistance of spill containment systems.

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**A.52.2.2.6** Information on battery room ventilation can be found in IEEE 1635/ASHRAE 21, Guide to Battery Room Ventilation and Thermal Management.

**A.52.3** The requirements in Section 52.3 supersede all the hazardous material designations, permits, and requirements in Chapter 60.

**A.52.3.2** This section covers stationary battery systems that are typically used for facility standby power, emergency power, uninterrupted power supplies, and load/shedding/load balancing applications.

Stationary storage battery systems that exceed the amounts specified in Table 52.3.1 pose potential hazards that are significant enough to require compliance with the requirements in Chapter 52. It is not the intent of Chapter 52 to regulate equipment with integral standby power systems below the amounts in Table 52.3.1, such as emergency lighting units, fire alarm control units, and other appliances and equipment.

**A.52.3.2.3** A stationary battery array is an arrangement of individual stationary storage batteries in close proximity to each other, mounted on storage racks or in modules, battery cabinets, or other enclosures.

**A.52.3.2.5.1** A prepackaged stationary storage battery system is designed and investigated as a single unit, assembled in a factory, and shipped to the site. A pre-engineered stationary storage battery system is designed and investigated as a single unit, but is shipped in modular form for assembly at the site.

**A.52.3.2.6.8** This section is intended to address unique situations where the installation of different types of batteries in the same room or cabinet could create a situation where there is unacceptable chemical, thermal, or other interaction between them, or where the surrounding environment is not within the battery manufacturers' specifications. The AHJ has the option to require a hazard mitigation analysis, conducted in accordance with 52.3.2.4, to identify hazards and potential solutions that will mitigate the hazards.

**A.52.3.2.8** Information on battery room ventilation can be found in IEEE1635/AHRAE 21, Guide to Battery Room Ventilation and Thermal Management.

**A.52.3.2.9** Methods of achieving this protection can include, but are not limited to, the following:

- (1) Liquidtight sloped or recessed floors in indoor locations or similar areas in outdoor locations
- (2) Liquidtight floors in indoor locations or similar areas in outdoor locations provided with liquidtight raised or recessed sills or dikes
- (3) Sumps and collection systems

**A.52.3.3.5.1** A prepackaged capacitor energy system is designed and investigated as a single unit, assembled in a factory, and shipped to the site. A pre-engineered capacitor energy system is designed and investigated as a single unit, but is shipped in modular form for assembly at the site.