**Chapter 60 Hazardous Materials**

60.1 General Requirements

60.1.1 Applicability

Occupancies containing high hazard contents shall comply with this chapter in addition to other applicable requirements of this Code. [5000:34.1.1.1]

60.1.2 Subjects Not Regulated

Buildings, and portions thereof, containing high-hazard contents limited to any of the following shall not be required to comply with this chapter:

Flammable and combustible (ignitible) liquids associated with application of flammable finishes and complying with Chapter 43.

Flammable and combustible (ignitible) liquids associated with wholesale and retail sales and storage in mercantile occupancies and complying with Chapter 66

Class IIIA and Class IIIB combustible liquid solvents in closed systems employing listed cleaning equipment complying with Chapter 24

Refrigerants and refrigerant oil contained within closed-cycle refrigeration systems complying with Chapter 53 and the building code

Flammable and combustible (ignitible) liquid beverages in liquor stores and distributors without bulk storage

High hazard contents stored or used in farm buildings or similar occupancies for on-premises agricultural use

Corrosive materials in stationary batteries utilized for facility emergency power, uninterrupted power supply, or similar purposes, provided that the batteries are provided with safety venting caps and ventilation is provided in accordance with Chapter 52

Corrosive materials displayed in original packaging in mercantile occupancies and intended for personal or household use or as building materials

Aerosol products in storage or mercantile occupancies and complying with Chapter 61

Flammable and combustible (ignitible) liquids storage tank buildings meeting the requirements of Chapter 24 of NFPA 30

Flammable and combustible (ignitible) liquids storage tank vaults meeting the requirements of Chapter 25 of NFPA 30

Installation of fuel gas distribution systems and associated equipment in accordance with Section 11.4 and Chapter 69

Flammable and combustible (ignitible) liquids process buildings meeting the requirements of Chapter 17 of NFPA 30

[5000:34.1.1.2]

60.1.3 Applicability of Sections

60.1.3.1 Quantities Not Exceeding the Maximum Allowable Quantities Per Control Area

Storage, use, and handling of hazardous materials in quantities not exceeding maximum allowable quantities permitted in control areas set forth in Section 60.1.3.1 shall be in accordance with Section 60.1 through Section 60.5.

60.1.3.2 Quantities Exceeding the Maximum Allowable Quantities Per Control Area

Storage, use, and handling of hazardous materials in quantities in excess of the maximum allowable quantities permitted in control areas set forth in 60.1.3.2 shall comply with Section 60.2 through Section 60.6.

60.1.3.3 Limited Applicability of This Chapter for Specific Material Classes

Chapter 60 shall apply in its entirety to all hazardous materials except where Chapters 61 through 73 of this Code specify that only certain sections of this chapter shall apply to a specific material classification category.

60.1.4 Facility Closure

60.1.4.1

Where required by the AHJ, no facility storing hazardous materials listed in 1.1.1 of NFPA 400 shall close or abandon an entire storage facility without notifying the AHJ at least 30 days prior to the scheduled closing. [400:1.9.1]

60.1.4.2

The AHJ shall be permitted to reduce the 30-day period specified in 60.1.4.1 when there are special circumstances requiring such reduction. [400:1.9.2]

60.1.4.3

Facilities out of service shall comply with NFPA 400.

60.1.4.4

Closure plans shall comply with NFPA 400.

60.1.4.5

Facilities shall have an emergency plan that complies with NFPA 400.

60.1.5 Hazardous Materials Management Plan (HMMP)

60.1.5.1\*

When required by the AHJ, new or existing facilities that store, use, or handle hazardous materials covered by this Code in amounts above the MAQ specified in 60.4.2.1.2 through 60.4.2.1.5 and 60.4.4.1.2 shall submit a hazardous materials management plan (HMMP) to the AHJ. [400:1.11.1]

60.1.5.2

The HMMP shall be reviewed and updated as follows:

Annually

When the facility is modified

When hazardous materials representing a new hazard category not previously addressed are stored, used, or handled in the facility

[400:1.11.2]

60.1.5.3

The HMMP shall comply with the requirements of Section Chapter 6 of NFPA 400. [400:1.11.3]

60.1.6\* Hazardous Materials Inventory Statement (HMIS)

When required by the AHJ, a hazardous materials inventory statement (HMIS) shall be completed and submitted to the AHJ. [400:1.12.1]

60.2 Special Definitions

60.2.1 Chemical Name

See 3.3.46.

60.2.2 Closed System Use

See 3.3.293.1.

60.2.3 Control Area

See 3.3.14.2.

60.2.4 Dispensing

See 3.3.92.

60.2.5 Flammable Solid

See 3.3.259.2.

60.2.6 Hazardous Material

See 3.3.187.4.

60.2.7 Health Hazard Material

See 3.3.187.6.

60.2.8 Highly Toxic Material

See 3.3.187.7.

60.2.9 Incompatible Material

See 3.3.187.9.

60.2.10 Liquid

See 3.3.178.

60.2.11 Open System Use

See 3.3.293.2.

60.2.12 Organic Peroxide

See 3.3.205.

60.2.12.1 Organic Peroxide Formulation

See 3.3.205.1.

60.2.12.1.1 Class I

See 3.3.205.1.1.

60.2.12.1.2 Class II

See 3.3.205.1.2.

60.2.12.1.3 Class III

See 3.3.205.1.3.

60.2.12.1.4 Class IV

See 3.3.205.1.4.

60.2.12.1.5 Class V

See 3.3.205.1.5.

60.2.13 Oxidizer

See 3.3.208.

60.2.13.1 Class 1

See 3.3.208.1.

60.2.13.2 Class 2

See 3.3.208.2.

60.2.13.3 Class 3

See 3.3.208.3.

60.2.13.4 Class 4

See 3.3.208.4.

60.2.14 Physical Hazard Material

See 3.3.187.12.

60.2.15 Pyrophoric Material

See 3.3.187.13.

60.2.16 Solid Material

See 3.3.260.

60.2.17 Toxic Material

See 3.3.187.14.

60.2.18 Unstable (Reactive) Material

See 3.3.187.15.

60.2.19 Use

See 3.3.293.

60.2.20 Water-Reactive Material

See 3.3.187.16.

60.3 Classification of Materials, Wastes, and Hazard of Contents

60.3.1 Classification of High-Hazard Contents

60.3.1.1 General

60.3.1.1.1

High-hazard contents shall include materials defined as hazardous material in Chapter 3, whether stored, used, or handled. [400:4.2.1.1]

60.3.1.1.2

High-hazard contents shall include those materials defined as hazardous material solids, liquids, or gases limited to the hazard categories specified in 1.1.1 of NFPA 400 and classified in accordance with 60.3.1.1.2.1 through 60.3.1.1.2.4 whether stored, used, or handled. [400:4.2.1.2]

60.3.1.1.2.1 High-Hazard Level 1 Contents

High-hazard Level 1 contents shall include materials that present a detonation hazard, including, but not limited to, the following hazard categories:

Class 4 oxidizers

Detonable pyrophoric solids or liquids

Class 3 detonable and Class 4 unstable (reactive) solids, liquids, or gases

Detonable organic peroxides

[400:4.2.1.2.1]

60.3.1.1.2.2 High-Hazard Level 2 Contents

High-hazard Level 2 contents shall include materials that present a deflagration hazard or a hazard from accelerated burning, including, but not limited to, the following hazard categories:

Combustible dusts that are stored, used, or generated in a manner that creates a severe fire or explosion hazard

Class I organic peroxides

Class 3 solid or liquid oxidizers that are used or stored in normally open containers or systems or in closed containers or systems at gauge pressures of more than 15 psi (103.4 kPa)

Flammable gases

Flammable cryogenic fluids

Nondetonable pyrophoric solids, liquids, or gases

Class 3 nondetonable unstable (reactive) solids, liquids, or gases

Class 3 water-reactive solids and liquids

[400:4.2.1.2.2]

60.3.1.1.2.3 High-Hazard Level 3 Contents

High-hazard Level 3 contents shall include materials that readily support combustion or present a physical hazard, including, but not limited to, the following hazard categories:

Flammable solids, other than dusts classified as high-hazard Level 2, that are stored, used, or generated in a manner that creates a high fire hazard

Class II and Class III organic peroxides

Class 2 solid or liquid oxidizers

Class 3 solid or liquid oxidizers that are used or stored in normally closed containers or systems at gauge pressures of less than 15 psi (103.4 kPa)

Class 2 unstable (reactive) materials

Class 2 water-reactive solids, liquids, or gases

Oxidizing gases

Oxidizing cryogenic fluids

[400:4.2.1.2.3]

60.3.1.1.2.4 High-Hazard Level 4 Contents

High-hazard Level 4 contents shall include materials that are acute health hazards, including, but not limited to, the following hazard categories:

Corrosive solids, liquids, or gases

Highly toxic solids, liquids, or gases

Toxic solids, liquids, or gases

[400:4.2.1.2.4]

60.3.2 Mixtures

Mixtures shall be classified in accordance with the hazards of the mixture as a whole by an approved, qualified organization, individual, or testing laboratory. [400:4.3]

60.3.3\* Multiple Hazards

Hazardous materials that have multiple hazards shall conform to the code requirements for each applicable hazard category. [400:4.4]

60.3.4 Classification of Waste

Waste comprised of or containing hazardous materials shall be classified in accordance with 60.3.1 through 60.3.3 as applicable. [400:4.5]

60.4 Permissible Storage and Use Locations

60.4.1 General

60.4.1.1 Control Areas or Special Protection Required

Hazardous materials shall be stored and used in any of the following:

In control areas complying with 60.4.2

In occupancies complying with requirements for Protection Level 1, Protection Level 2, Protection Level 3, or Protection Level 4 in accordance with 60.4.3

In outdoor areas complying with 60.4.4

[400:5.1.1]

60.4.1.2 Weather Protection Structures

Weather protection, when provided, shall comply with 6.2.7.2 of NFPA 400. [400:5.1.2]

60.4.1.3 High-Hazard Contents

Occupancies in which high-hazard contents are stored, used, or handled shall also comply with Chapter 6 of NFPA 400. [400:5.1.3]

60.4.2 Control Areas

60.4.2.1

Hazardous materials shall be permitted to be stored and used in control areas in accordance with 60.4.2.1 and 60.4.2.2. [400:5.2.1]

60.4.2.1.1 General

60.4.2.1.1.1

All occupancies shall be permitted to have one or more control areas in accordance with 60.4.2. [400:5.2.1.1.1]

60.4.2.1.1.2

The quantity of hazardous materials in an individual control area shall not exceed the maximum allowable quantity (MAQ) set forth in Table 60.4.2.1.1.3, except as modified by 60.4.2.1.2 through 60.4.2.1.5, which establish additional quantity limits or increases based on occupancy. [400:5.2.1.1.2]

60.4.2.1.1.2.1

The quantity of hazardous materials in an individual control area in laboratories classified as business occupancies shall not exceed the MAQ set forth in Table 60.4.2.1.1.3. [400:5.2.1.1.2.1]

60.4.2.1.1.3

The MAQ of hazardous materials per control area shall be as specified in Table 60.4.2.1.1.3 except as modified by 60.4.2.1.2 through 60.4.2.1.5. Ammonium nitrate shall also comply with Chapter 11 of NFPA 400. [400:5.2.1.1.3]

Table 60.4.2.1.1.3 Maximum Allowable Quantities (MAQ) of Hazardous Materials per Control Area

High Hazard Protection Level

Storage

Use — Closed Systems

Use — Open Systems

Material

Class

Solid Pounds

Liquid Gallons (lb)

Gas (at NTP) ft3 (lb)

Solid Pounds

Liquid Gallons (lb)

Gas (at NTP) ft3 (lb)

Solid Pounds

Liquid Gallons (lb)

Physical Hazard Materials

Combustible liquidc

II

3

N/A

120a,b

N/A

N/A

See Note 1.

N/A

N/A

See Note 1.

IIIA

3

N/A

330a,b

N/A

N/A

See Note 1.

N/A

N/A

See Note 1.

IIIB

N/A

N/A

13,200a,d

N/A

N/A

See Note 1.

N/A

N/A

See Note 1.

Combustible metals

See Note 1.

See Note 1.

See Note 1.

See Note 1.

See Note 1.

See Note 1.

See Note 1.

See Note 1.

See Note 1.

See Note 1.

Cryogenic fluid [55:Table 6.3.1.1]

Flammable

2

N/A

45e,f

N/A

N/A

45e,f

N/A

N/A

45e,f

Oxidizing

3

N/A

45a,b

N/A

N/A

45a,b

N/A

N/A

45a,b

Inert

N/A

N/A

NL

N/A

N/A

NL

N/A

N/A

NL

Explosives

See Note 1.

See Note 1.

See Note 1.

See Note 1.

See Note 1.

See Note 1.

See Note 1.

See Note 1.

See Note 1.

See Note 1.

Flammable gasg [55:Table 6.3.1.1]

Gaseous

2

N/A

N/A

1000a,b

N/A

N/A

1000a,b

N/A

N/A

Liquified

2

N/A

N/A

(150)a,b

N/A

N/A

(150)a,b

N/A

N/A

Liquified Petroleum (LP)

2

N/A

N/A

(300)h,i,j

N/A

N/A

(300)i

N/A

N/A

Flammable liquidc

IA

3

N/A

30a,b

N/A

N/A

See Note 1.

N/A

N/A

See Note 1.

IB and IC

3

N/A

120a,b

N/A

N/A

See Note 1.

N/A

N/A

See Note 1.

Combination (IA, IB, IC)

3

N/A

120a,b,k

N/A

N/A

See Note 1.

N/A

N/A

See Note 1.

Flammable Solid

N/A

3

125a,b

N/A

N/A

125a,b

N/A

N/A

25a,b

N/A

Inert gas

Gaseous

N/A

N/A

N/A

NL

N/A

N/A

NL

N/A

N/A

Liquefied

N/A

N/A

N/A

NL

N/A

N/A

NL

N/A

N/A

Organic Peroxide

UD

1

1a,l

(1)a,l

N/A

1/4l

(1/4) l

N/A

1/4l

(1/4) l

I

2

16a,b

(16)a,b

N/A

8a,b

(8)a,b

N/A

8a,b

(8)a,b

IIA

3

100a,b

(100)a,b

N/A

50b

(50)b

N/A

100a,b

(100)a,b

IIB

3

400

(400)

N/A

200

(200)

N/A

400

(400)

III

3

840a,b

(840)a,b

N/A

840b

(840)b

N/A

840b

(840)b

IV

N/A

NL

NL

N/A

NL

NL

N/A

NL

NL

V

N/A

NL

NL

N/A

NL

NL

N/A

NL

NL

Oxidizer

4

1

1a,l

(1)a,l

N/A

1/4l

(1/4)I

N/A

1/4l

1/4l

3m

2 or 3

10a,b

(10)a,b

N/A

2b

(2)b

N/A

2b

(2)b

2

3

250a,b

(250)a,b

N/A

250b

(250)b

N/A

50b

(50)b

1

N/A

4000a,n

(4000)a,n

NA

4000n

(4000)n

N/A

1000n

(1000)n

Oxidizing gas [55: Table 6.3.1.1]

Gaseous

3

N/A

N/A

1500a,b

N/A

N/A

1500a,b

N/A

N/A

Liquefied

3

N/A

N/A

(150)a,b

N/A

N/A

(150)a,b

N/A

N/A

Pyrophoric

N/A

2

4a,l

(4)a,l

N/A

1l

(1)l

N/A

NP

NP

Pyrophoric gas [55:Table 6.3.1.1]

Gaseous

2

N/A

N/A

50a,l

N/A

N/A

50a,l

N/A

N/A

Liquefied

2

N/A

N/A

(4)a,l

N/A

N/A

(4)a,l

N/A

N/A

Unstable (reactive)

4

1

1a,l

(1)a,l

N/A

1/4l

(1/4)l

N/A

1/4l

(1/4)l

3

1 or 2

5a,b

(5)a,b

N/A

1b

(1)b

N/A

1b

(1)b

2

2

50a,b

(50)a,b

N/A

50b

(50)b

N/A

10b

(10)b

1

N/A

NL

NL

N/A

NL

NL

N/A

NL

NL

Unstable (reactive) gas [55:Table 6.3.1.1]

Gaseous

4 or 3 detonable

1

N/A

N/A

10a,l

N/A

N/A

10a,l

N/A

N/A

3 non-detonable

2

N/A

N/A

50a,b

N/A

N/A

50a,b

N/A

N/A

2

3

N/A

N/A

(750)a,b

N/A

N/A

(750)a,b

N/A

N/A

1

N/A

N/A

N/A

NL

N/A

N/A

NL

N/A

N/A

Unstable (reactive) gas [55:Table 6.3.1.1]

Liquified

4 or 3 detonable

1

N/A

N/A

(1)a,l

N/A

N/A

(1)a,l

N/A

N/A

3 non-detonable

2

N/A

N/A

(2)a,b

N/A

N/A

(2)a,b

N/A

N/A

2

3

N/A

N/A

(150)a,b

N/A

N/A

(150)a,b

N/A

N/A

1

N/A

N/A

N/A

NL

N/A

N/A

NL

N/A

N/A

Water-reactive

3

2

5a,b

(5)a,b

N/A

5b

(5)b

N/A

1b

(1)b

2

3

50a,b

(50)a,b

N/A

50b

(50)b

N/A

10b

(10)b

1

N/A

NL

NL

N/A

NL

NL

N/A

NL

NL

Health Hazard Materials

Corrosive

N/A

4

5000a,b

500a,b

N/A

5000b

500b

N/A

1000b

100b

Corrosive gas [55:Table 6.3.1.1]

Gaseous

4

N/A

N/A

810a,b

N/A

N/A

810a,b

N/A

N/A

Liquefied

4

N/A

N/A

(150)a,b

N/A

N/A

(150)a,b

N/A

N/A

Highly Toxic

N/A

4

10a,b

(10)a,b

N/A

10b

(10)b

N/A

3b

(3)b

Highly toxic gas [55:T able 6.3.1.1]

Gaseous

4

N/A

N/A

20b,o

N/A

N/A

20b,o

N/A

N/A

Liquified

4

N/A

N/A

(4)b,o

N/A

N/A

(4)b,o

N/A

N/A

Toxic

N/A

4

500a,b

(500)a,b

N/A

500b

(500)b

N/A

125b

(125)b

Toxic Gas

Gaseous

4

N/A

N/A

810a,b

N/A

N/A

810a,b

N/A

N/A

Liquefied

4

N/A

N/A

(150)a,b

N/A

N/A

(150)a,b

N/A

N/A

For SI units, 1 lb = 0.454 kg; 1 gal = 3.785 L; 1 ft3 = 0.0283 m3. Where quantities are indicated in pounds and when the weight per gallon of the liquid is not provided to the AHJ, a conversion factor of 10 lb/gal (1.2 kg/L) shall be used.

NTP: Measured at normal temperature and pressure [70°F (21°C) and 14.7 psi (101.3 kPa)].

N/A: Not applicable. NL: Not limited. NP: Not permitted. UD: Unclassified detonable.

Notes:

The hazardous material categories and MAQs that are shaded in this table are not regulated by Chapter 60 or NFPA 400 but are provided here for informational purposes. See Chapter 2 for the reference code or standard governing these materials and establishing the MAQs. In accordance with 1.1.1.2 of NFPA 400, materials having multiple hazards that fall within the scope of NFPA 400 shall comply with NFPA 400.

Table values in parentheses correspond to the unit name in parentheses at the top of the column. The aggregate quantity in use and storage is not permitted to exceed the quantity listed for storage.

The use of explosive materials required by federal, state, or municipal agencies while engaged in normal or emergency performance of duties is not required to be limited. The storage of explosive materials is required to be in accordance with the requirements of NFPA 495.

The storage and use of explosive materials in medicines and medicinal agents in the forms prescribed by the official United States Pharmacopeia or the National Formulary are not required to be limited.

The storage and use of propellant-actuated devices or propellant-actuated industrial tools manufactured, imported, or distributed for their intended purposes are required to be limited to 50 lb (23 kg) net explosive weight.

aQuantities are permitted to be increased 100 percent where stored or used in approved cabinets, gas cabinets, exhausted enclosures, gas rooms explosives magazines, or safety cans, as appropriate for the material stored, in accordance with this Code. Where footnote b also applies, the increase for both footnote a and footnote b is permitted to be applied accumulatively.

bMaximum quantities are permitted to be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with NFPA 13. Where footnote a also applies, the increase for both footnote a and footnote b is permitted to be applied accumulatively.

cMedicines, foodstuffs, cosmetics, and other consumer products that contain not more than 50 percent by volume of water-miscible flammable or combustible liquids, with the remainder of the product consisting of components that do not burn, are not limited where packaged in individual containers that do not exceed a 1.3 gal capacity. (See 9.1.4 of NFPA 30.)

dThe permitted quantities are not limited in a building equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13 and designed in accordance with the protection criteria contained in Chapter 16 of NFPA 30.

eNone allowed in unsprinklered buildings unless stored or used in gas rooms, approved gas cabinets, or exhausted enclosures, as specified in this Code.

fWith pressure-relief devices for stationary or portable containers vented directly outdoors or to an exhaust hood. [55:Table 6.3.1.1]

gFlammable gases in the fuel tanks of mobile equipment or vehicles are permitted to exceed the MAQ where the equipment is stored and operated in accordance with this Code.

hAdditional storage locations are required to be separated by a minimum of 300 ft (92 m).

iIn mercantile occupancies, storage of LP-Gas is limited to a maximum of 200 lb (91 kg) in nominal 1 lb (0.45 kg) LP-Gas containers.

jSee NFPA 58 for liquefied petroleum gas (LP-Gas) requirements. LP-Gas is not within the scope of NFPA 400.

kContaining not more than the MAQ of Class IA, Class IB, or Class IC flammable liquids, individually, per control area.

lPermitted only in buildings equipped throughout with an automatic sprinkler system in accordance with NFPA 13.

mA maximum quantity of 220 lb (99 kg) of solid or 22 gal (83 L) of liquid Class 3 oxidizer is permitted where such materials are necessary for maintenance purposes, operation, or sanitation of equipment. Storage containers and the manner of storage are required to be approved.

nThe permitted quantities are not limited in a building equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13.

oAllowed only where stored or used in gas rooms, approved gas cabinets, or exhausted enclosures, as specified in this Code.

[400:Table 5.2.1.1.3]

60.4.2.1.2 Quantity Limits for Occupancies Other Mercantile, Storage, or Industrial Occupancies

60.4.2.1.2.1

The MAQ of hazardous materials per control area in occupancies other than mercantile, storage, or industrial occupancies shall be as specified in Table 60.4.2.1.2.1. [400:5.2.1.2.1]

Table 60.4.2.1.2.1 Maximum Allowable Quantities (MAQ) of Hazardous Materials per Control Area in Occupancies Other Than Mercantile, Storage, or Industrial Occupancies

Material

Class

Solid Pounds

Liquid Gallons (lb)

Gas (at NTP) ft3 (lb)

Flammable and combustible liquida,b,c

I and II

N/A

10

N/A

IIIA

N/A

60

N/A

IIIB

N/A

120d

N/A

Cryogenic fluid

Flammable

N/A

10

N/A

Oxidizing

N/A

10

N/A

Explosivese,f,g,h

See Note 1.

See Note 1.

See Note 1.

See Note 1.

Flammable gasb

Gaseous

N/A

N/A

NPi

Liquefied

N/A

N/A

NPi,j

Liquefied petroleum (LP)

N/A

N/A

(20)k

Flammable solid

N/A

5

N/A

N/A

Oxidizers

4

NP

NP

NA

3

10l

1l

NA

2

250

25

NA

1

4000m

400m

NA

Oxidizing gas

Gaseous

N/A

N/A

NPi

Liquefied

N/A

N/A

NPi

Organic peroxides

I

NP

NP

N/A

IIA

NP

NP

N/A

IIB

NP

NP

NA

III

25

(25)

N/A

IV

NL

NL

N/A

V

NL

NL

N/A

Pyrophoric materials

N/A

1n

(1)n

NP

Unstable (reactive)

4

1/4

(1/4)

NP

3

1

(1)

NP

2

10

(10)

NPi

1

NL

NL

NP

Water-reactive

3

1

(1)

N/A

2

10

(10)

N/A

1

NL

NL

N/A

Corrosives

N/A

1,000

100

NP

Highly toxic

N/A

3

(3)

NPo

Toxic

N/A

125

(125)

NPo

For SI units, 1 lb = 0.454 kg; 1 gal = 3.785 L; 1 ft3 = 0.0283 m3. Where quantities are indicated in pounds and when the weight per gallon of the liquid is not provided to the AHJ, a conversion factor of 10 lb/gal (1.2 kg/L) shall be used.

NTP: Measured at normal temperature and pressure [70°F (21°C) and 14.7 psi (101 kPa)]. N/A; Not applicable. NP: Not permitted. NL: Not limited.

Notes:

The hazardous material categories and MAQs that are shaded in this table are not regulated by Chapter 60 or NFPA 400 but are provided here for informational purposes. See Chapter 2 of NFPA 400 for the reference code or standard governing these materials and establishing the MAQs. In accordance with 1.1.1.2 of NFPA 400, materials having multiple hazards that fall within the scope of NFPA 400 shall comply with NFPA 400.

Table values in parentheses correspond to the unit name in parentheses at the top of the column. The aggregate quantity in use and storage is not permitted to exceed the quantity listed for storage.

aStorage in excess of 10 gal (38 L) of Class I and Class II liquids combined or 60 gal (227 L) of Class IIIA liquids is permitted where stored in safety cabinets with an aggregate quantity not to exceed 180 gal (681 L).

bFuel in the tank of operating mobile equipment is permitted to exceed the specified quantity where the equipment is operated in accordance with this Code.

cMedicines, foodstuffs, cosmetics, and other consumer products that contain not more than 50 percent by volume of water-miscible flammable or combustible liquids, with the remainder of the product consisting of components that do not burn, are not limited where packaged in individual containers that do not exceed a 1.3 gal (5 L) capacity. (See 9.1.4 of NFPA 30.)

dStorage shall be permitted to be increased 100 percent in educational, day care, and health care occupancies if the building is protected throughout with an automatic sprinkler system installed in accordance with NFPA 13.

eThe use of explosive materials required by federal, state, or municipal agencies while engaged in normal or emergency performance of duties is not required to be limited. The storage of explosive materials is required to be in accordance with the requirements of NFPA 495.

fThe storage and use of explosive materials in medicines and medicinal agents in the forms prescribed by the official United States Pharmacopeia or the National Formulary are not required to be limited.

gThe storage and use of propellant-actuated devices or propellant-actuated industrial tools manufactured, imported, or distributed for their intended purposes are required to be limited to 50 lb (23 kg) net explosive weight.

hThe storage and use of small arms ammunition, and components thereof, are permitted where in accordance with NFPA 495.

iContainers, cylinders, or tanks not exceeding 250 ft3 (7.1 m3) content measured at NTP and used for maintenance purposes, patient care, or operation of equipment shall be permitted.

jIn residential occupancies consisting of lodging and rooming houses, hotels, dormitories, apartments, and residential board and care facilities, storage containers are not permitted to exceed 0.325 ft3 (0.0092 m3).

kIn educational occupancies, allowed in laboratories only; additional 20 lb (9 kg) units are permitted where minimum 20 ft (6.1 m) separation is provided.

lA maximum quantity of 220 lb (99 kg) of solid or 22 gal (83 L) of liquid Class 3 oxidizer is permitted where such materials are necessary for maintenance purposes, operation, or sanitation of equipment. Storage containers and the manner of storage are required to be approved.

mQuantities are not limited in educational, day care, and health care occupancies protected throughout by automatic sprinkler systems in accordance with NFPA 13.

nNot permitted in health care occupancies.

oGas containers or cylinders not exceeding 20 ft3 (0.57 m3) content measured at NTP are permitted to be stored or used within gas cabinets or exhausted enclosures of educational occupancies.

[400:Table 5.2.1.2.1]

60.4.2.1.2.2

The MAQ set forth in Table 60.4.2.1.2.1 shall be the maximum aggregate quantity allowed in storage and use. [400:5.2.1.2.2]

60.4.2.1.3 Industrial Occupancies

The MAQ of hazardous materials per control area in industrial occupancies shall be as specified in Table 60.4.2.1.1.3, with increased quantities permitted where storage areas comply with 60.4.2.1.5. [400:5.2.1.3]

60.4.2.1.4 Storage Occupancies

The MAQ of hazardous materials per control area in storage occupancies shall be as specified in Table 60.4.2.1.1.3, with increased quantities permitted where storage areas comply with 60.4.2.1.5. [400:5.2.1.4]

60.4.2.1.5 Special Quantity Limits for Mercantile, Industrial, and Storage Occupancies

60.4.2.1.5.1 General

Where storage in mercantile, industrial, and storage occupancies is in compliance with all of the special controls set forth in 60.4.2.1.5.2, the MAQ of selected hazardous materials shall be permitted to be increased in accordance with 60.4.2.1.5.3. [400:5.2.1.5.1]

60.4.2.1.5.2 Special Controls Required for Increased Quantities

Where quantities of hazardous materials are increased in accordance with 60.4.2.1.5.3, such materials shall be stored in accordance with the following limitations:

Storage and display of solids shall not exceed 200 lb/ft2 (976.4 kg/m2) of floor area actually occupied by solid merchandise.

Storage and display of liquids shall not exceed 20 gal/ft2 (76 L/m2) of floor area actually occupied by liquid merchandise.

Storage and display height shall not exceed 6 ft (1.8 m) above the finished floor.

Individual containers less than 5 gal (19 L) or less than 25 lb (11 kg) shall be stored or displayed on pallets, racks, or shelves.

Racks and shelves used for storage or display shall be in accordance with 60.5.1.13.

Containers shall be listed or approved for the intended use.

Individual containers shall not exceed 100 lb (45.4 kg) capacity for solids or a 10 gal (38 L) capacity for liquids.

Incompatible materials shall be separated in accordance with 60.5.1.12.

Except for surfacing, floors shall be of noncombustible construction.

Aisles 4 ft (1.2 m) in width shall be maintained on three sides of the storage or display area.

Hazard identification signs shall be provided in accordance with 60.5.1.8.

[400:5.2.1.5.2]

60.4.2.1.5.3 Special Maximum Allowable Quantity Increases for Storage in Mercantile, Storage, and Industrial Occupancies

The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials permitted within a single control area of a mercantile, storage, or industrial occupancy shall be permitted to exceed the MAQ specified in Table 60.4.2.1.1.3, without complying with Protection Level 2, Protection Level 3, or Protection Level 4, provided that the quantities comply with Table 60.4.2.1.5.3(a) and Table 60.4.2.1.5.3(b) and that materials are displayed and stored in accordance with the special limitations in 60.4.2.1.5.2. [400:5.2.1.5.3]

Table 60.4.2.1.5.3(a) Maximum Allowable Quantity (MAQ) per Indoor and Outdoor Control Area for Selected Hazard Categories in Mercantile, Storage, and Industrial Occupancies

Maximum Allowable Quantitya,b

Solids

Liquids

Hazard Category

lb

kg

gal

L

Physical Hazard Materials: Nonflammable and Noncombustible Solids and Liquids

Oxidizers

Class 3

1,350

616

135

511

Class 2

2,250

1,021

225

852

Class 1

18,000c

8,165c

1,800c

6,814c

Note: Maximum quantities for hazard categories not shown are required to be in accordance with Table 60.4.2.1.1.3.

aMaximum quantities are permitted to be increased 100 percent in buildings that are sprinklered in accordance with NFPA 13. Where footnote b also applies, the increase for both footnotes is permitted to be applied.

bMaximum quantities are permitted to be increased 100 percent where stored in approved storage cabinets in accordance with this Code. Where footnote a also applies, the increase for both footnotes is permitted to be applied.

cQuantities are not limited in buildings protected by an automatic sprinkler system complying with NFPA 13. [400: Table 5.2.1.5.3(a)]

Table 60.4.2.1.5.3(b) Maximum Allowable Quantity (MAQ) per Indoor and Outdoor Control Area for Selected Hazard Categories in Mercantile and Storage Occupancies

Maximum Allowable Quantitya,b

Solids

Liquids

Hazard Category

lb

kg

gal

L

Physical Hazard Materials: Nonflammable and Noncombustible Solids and Liquids

Unstable (reactive)

Class 3

550

250

55

208

Class 2

1,150

522

115

435

Water Reactive

Class 3

550

250

55

208

Class 2

1150

522

115

435

Health Hazard Materials: Nonflammable and Noncombustible Solids and Liquids

Corrosive

10,000

4,536

1,000

3,785

Highly Toxicc

20

9

2

8

Toxicc

1,000

454

100

378

Note: Maximum quantities for hazard categories not shown are required to be in accordance with Table 60.4.2.1.1.3.

aMaximum quantities are permitted to be increased 100 percent in buildings that are sprinklered in accordance with NFPA 13. This increase shall not apply to highly toxic solids and liquids. Where footnote b also applies, the increase for both footnotes is permitted to be applied.

bMaximum quantities are permitted to be increased 100 percent where stored in approved storage cabinets in accordance with this Code. This increase shall not apply to highly toxic solids and liquids. Where footnote a also applies, the increase for both footnotes is permitted to be applied.

cToxic or highly toxic solids or liquids displayed in original packaging in mercantile or storage occupancies and intended for maintenance, operation of equipment, or sanitation when contained in individual packaging not exceeding 100 lb (45.4 kg) shall be limited to an aggregate of 1200 lb (544.3 kg) or 120 gal (454.2 L). [400:5.2.1.5.3(b)]

60.4.2.2 Construction Requirements for Control Areas

60.4.2.2.1 Number of Control Areas

The maximum number of control areas within a building shall be in accordance with Table 60.4.2.2.1. [400:5.2.2.1]

Table 60.4.2.2.1 Design and Number of Control Areas

Floor Level

Maximum Allowable Quantity per Control Area (%)\*

Number of Control Areas per Floor

Fire Resistance Rating for Fire Barriers† (hr)

Above grade

>9

5.0

1

2

7-9

5.0

2

2

4-6

12.5

2

2

3

50.0

2

1

2

75.0

3

1

1

100.0

4

1

Below grade

1

75.0

3

1

2

50.0

2

1

Lower than 2

NP

NP

N/A

NP: Not permitted. N/A: Not applicable.

\*Percentages represent the applicable MAQ per control area shown in Table 60.4.2.1.1.3 or Table 60.4.2.1.2.1 with all the increases permitted in the footnotes of that table.

†Fire barriers are required to include floors and walls, as necessary, to provide a complete separation from other control areas.

[400:Table 5.2.2.1]

60.4.2.2.2

Where only one control area is present in a building, no special construction provisions shall be required. [400:5.2.2.2]

60.4.2.2.3

Where more than one control area is present in a building, control areas shall be separated from each other by fire barriers in accordance with Table 60.4.2.2.1. [400:5.2.2.3]

60.4.3 Protection Levels

60.4.3.1

Where the quantity of hazardous materials in storage or use exceeds the MAQ for indoor control areas as set forth in 60.4.2, the occupancy shall comply with the requirements for Protection Level 1, Protection Level 2, Protection Level 3, or Protection Level 4, as required for the material in storage or use as defined in 6.2.2 through 6.2.5 of NFPA 400. [400:5.3.1]

60.4.3.2

Protection Level 5 shall apply to semiconductor fabrication facilities where required by the building code. [400:5.3.2]

60.4.3.3 Protection Level 1

60.4.3.3.1

Buildings containing quantities of hazardous materials exceeding the MAQ of high-hazard level 1 contents permitted in control areas shall comply with applicable regulations for Protection Level 1, as set forth in the applicable sections of Chapter 6 and Chapters 11 through 21 of NFPA 400, and the building code. [400:5.3.3.1]

60.4.3.3.2

High-hazard level 1 contents shall include materials that present a detonation hazard as defined in 60.3.1.1.2.1. [400:5.3.3.2]

60.4.3.4 Protection Level 2

60.4.3.4.1

Buildings, and portions thereof, containing quantities of hazardous materials exceeding the MAQ of high-hazard level 2 contents permitted in control areas shall comply with applicable regulations for Protection Level 2, as set forth in the applicable sections of Chapter 6 and Chapters 11 through 21 of NFPA 400, and the building code. [400:5.3.4.1]

60.4.3.4.2

High-hazard level 2 contents shall include materials that present a deflagration hazard or a hazard from accelerated burning as defined in 60.3.1.1.2.2. [400:5.3.4.2]

60.4.3.5 Protection Level 3

60.4.3.5.1

Buildings, and portions thereof, containing quantities of hazardous materials exceeding the MAQ of high-hazard level 3 contents permitted in control areas shall comply with applicable regulations for Protection Level 3, as set forth in the applicable sections of Chapter 6 and Chapters 11 through 21 of NFPA 400, and the building code. [400:5.3.5.1]

60.4.3.5.2

High-hazard level 3 contents shall include materials that readily support combustion or present a physical hazard as defined in 60.3.1.1.2.3. [400:5.3.5.2]

60.4.3.6 Protection Level 4

60.4.3.6.1

Buildings, and portions thereof, containing quantities of hazardous materials exceeding the MAQ of high-hazard level 4 contents permitted in control areas shall comply with applicable regulations for Protection Level 4, as set forth in the applicable sections of Chapter 6 and Chapters 11 through 21 of NFPA 400, and the building code. [400:5.3.6.1]

60.4.3.6.2

High-hazard level 4 contents shall include materials that are acute health hazards as defined in 60.3.1.1.2.4. [400:5.3.6.2]

60.4.3.7 Detached Building Required for High-Hazard Level 2 and High-Hazard Level 3 Materials

Buildings required to comply with Protection Level 2 or Protection Level 3 and containing quantities of high-hazard contents exceeding the quantity limits set forth in Table 60.4.3.7 shall be in accordance with 6.2.3.4 or 6.2.4.4 of NFPA 400, as applicable. [400:5.3.7]

Table 60.4.3.7 Detached Buildings Required Where Quantity of Material Exceeds Amount Shown

Quantity of Material

Material

Class

Solids and Liquids (tons)

Gases ft3 (m3)\*

Individual bulk hydrogen compressed gas systems

N/A

N/A

15,000 (425)

Oxidizers

3

1,200

N/A

2

2,000

N/A

Organic peroxides

I, IIA, IIB, III, and IV

See note

N/A

Unstable (reactive) materials

3, nondetonable

1

2,000 (57)†

2

25

10,000(283)†

Water-reactive materials

3

1

N/A

2, deflagrating

25

N/A

Pyrophoric gases

N/A

2,000 (57)

For SI units, 1 ton = 0.9 met ton.

N/A: Not applicable.

Note: See MAQs of organic peroxide formulations in nonsprinklered and sprinklered buildings in Table 14.3.2.1(a) and Table 14.3.2.1(b) of NFPA 400, respectively.

\*See Table 21.2.5 of NFPA 400.

†Nondetonable.

[400:Table 5.3.7]

60.4.4\* Outdoor Areas

60.4.4.1 Outdoor Control Areas

60.4.4.1.1 General

60.4.4.1.1.1

Hazardous materials shall be permitted to be stored or used in outdoor control areas in accordance with 60.4.4.1.2 and 60.4.4.1.3. [400:5.4.1.1.1]

60.4.4.1.1.2

Where storage or use is in an outdoor control area, compliance with the outdoor storage and use requirements in Chapters 11 through 21 of NFPA 400 shall not be required. [400:5.4.1.1.2]

60.4.4.1.2 Maximum Allowable Quantity Per Outdoor Control Area

Maximum allowable quantities of hazardous materials in an outdoor control area shall be as specified in Table 60.4.2.1.5.3(a) and Table 60.4.2.1.5.3(b) or Table 60.4.4.1.2. [400:5.4.1.2]

Table 60.4.4.1.2 Maximum Allowable Quantities of Hazardous Materials per Outdoor Control Area

Storage

Use — Closed Systems

Use — Open Systems

Material Class

Solid Pounds

Liquid Gallons (lb)

Gas (at NTP) ft3 (lb)

Solid Pounds

Liquid Gallons (lb)

Gas (at NTP) ft3 (lb)

Solid Pounds

Liquid Gallons (lb)

Physical Hazard Materials

Flammable gas

Gaseous

N/A

N/A

3000

N/A

N/A

1500

N/A

N/A

Liquefied

N/A

N/A

(300)

N/A

N/A

(150)

N/A

N/A

Flammable solid

500

N/A

N/A

250

N/A

N/A

50

N/A

Organic Peroxide Detonable

1

(1)

N/A

1/4

(1/4)

N/A

1/4

(1/4)

Organic Peroxide

I

20

(20)

N/A

10

(10)

N/A

2

(2)

IIA

100

(200)

N/A

100

(100)

N/A

100

(100)

IIB

400

(400)

N/A

400

(400)

N/A

400

(400)

III

NL

NL

N/A

NL

NL

N/A

NL

NL

IV

NL

NL

N/A

NL

NL

N/A

NL

NL

V

NL

NL

N/A

NL

NL

N/A

NL

NL

Oxidizer

4

2

(2)

N/A

1

(1/4)

N/A

1/4

(1/4)

3

40

(40)

N/A

20

(2)

N/A

2

(2)

2

1000

(1000)

N/A

500

(250)

N/A

50

(50)

1

NL

NL

N/A

NL

NL

N/A

NL

NL

Oxidizing gas

Gaseous

N/A

N/A

6000

N/A

N/A

6000

N/A

N/A

Liquefied

N/A

N/A

(600)

N/A

N/A

(300)

N/A

N/A

Pyrophoric

8

(8)

100

4

(4)

10

0

0

Unstable (reactive)

4

2

(2)

20

1

(1)

2

1/4

(1/4)

3

20

(20)

200

10

(10)

10

1

(1)

2

200

(200)

1000

100

(100)

250

10

(10)

1

NL

NL

1500

NL

NL

NL

NL

NL

Water-reactive

3

20

(20)

N/A

10

(10)

N/A

1

(1)

2

200

(200)

N/A

100

(100)

N/A

10

(10)

1

NL

NL

N/A

NL

NL

N/A

NL

NL

Health Hazard Materials

Corrosive

20,000

2000

N/A

10,000

1000

N/A

1000

100

Corrosive gas

Gaseous

N/A

N/A

1620

N/A

N/A

810

N/A

N/A

Liquefied

N/A

N/A

(300)

N/A

N/A

(150)

N/A

N/A

Highly toxic

20

(20)

N/A

10

(10)

N/A

3

(3)

Highly toxic gas

Gaseous

N/A

N/A

40\*

N/A

N/A

20\*

N/A

N/A

Liquefied

N/A

N/A

(8)\*

N/A

N/A

(4)\*

N/A

N/A

Toxic

1000

(1000)

N/A

500

50

N/A

125

(125)

Toxic Gas

Gaseous

N/A

N/A

1620

N/A

N/A

810

N/A

N/A

Liquefied

N/A

N/A

(300)

N/A

N/A

(150)

N/A

N/A

For SI units, 1 lb = 0.454 kg; 1 gal = 3.785 L; 1 ft3 = 0.0283m3.

N/A: Not applicable. NL: Not limited.

NTP: Measured at normal temperature and pressure [70°F (21°C) and 14.7 psi (101 kPa)].

Notes:

Table values in parentheses correspond to the unit name in parentheses at the top of the column.

For gallons of liquids, divide the amount in pounds by 10.

The aggregate quantities in storage and use cannot exceed the quantity listed for storage.

The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is permitted to exceed the MAQ where such storage is in accordance with 60.4.2.1.5.3.

\*Permitted only where stored or used in approved exhausted gas cabinets, exhausted enclosures, or fume hoods. [400:Table 5.4.1.2]

60.4.4.1.3 Number of Outdoor Control Areas

60.4.4.1.3.1

A single outdoor control area shall be permitted on any property. [400:5.4.1.3.1]

60.4.4.1.3.2

Where a property exceeds 10,000 ft2 (929 m2), a group of two outdoor control areas shall be permitted where approved and where each control area is separated by a minimum distance of 50 ft (15 m). [400:5.4.1.3.2]

60.4.4.1.3.3

Where a property exceeds 35,000 ft2 (3252 m2), additional groups of outdoor control areas shall be permitted where approved, provided that each group is separated by a minimum distance of 300 ft (91 m). [400:5.4.1.3.3]

60.4.4.2 Outdoor Storage and Use Areas

Where the quantity of hazardous materials in outdoor storage or use exceeds the MAQ for outdoor control areas as set forth in Table 60.4.4.1.2, the outdoor area shall comply with the applicable outdoor requirements of Chapter 6 and Chapters 11 through 21 of NFPA 400. [400:5.4.2]

60.5 Fundamental Requirements

60.5.1 General Requirements

60.5.1.1 Applicability

Storage, use, and handling of hazardous materials in any quantity shall comply with 60.5.1. [400:6.1.1]

60.5.1.1.1\*

Storage of hazardous materials in quantities exceeding the MAQ set forth in Section 60.4 shall comply with Section 6.2 of NFPA 400 and the applicable material specific requirements in Chapters 11 through 21 of NFPA 400. [400:6.1.1.1]

60.5.1.1.2\*

The use, dispensing, and handling of hazardous materials in quantities exceeding the MAQ set forth in Section 60.4 shall comply with Section 6.3 of NFPA 400 and the applicable material specific requirements in Chapters 11 through 21 of NFPA 400. [400:6.1.1.2]

60.5.1.2\* Safety Data Sheets (SDS)

Safety data sheets (SDS) shall be available on the premises for hazardous materials regulated by this Code. When approved, SDSs shall be permitted to be retrievable by electronic access. [400:6.1.2]

60.5.1.3 Release of Hazardous Materials

60.5.1.3.1 Prohibited Releases

Hazardous materials shall not be released into a sewer, storm drain, ditch, drainage canal, lake, river, or tidal waterway; upon the ground, a sidewalk, a street, or a highway; or into the atmosphere, unless such release is permitted by the following:

Federal, state, or local governing regulations

Permits of the jurisdictional air quality management board

National Pollutant Discharge Elimination System permit

Waste discharge requirements established by the jurisdictional water quality control board

Sewer pretreatment requirements for publicly or privately owned treatment works

[400:6.1.3.1]

60.5.1.3.2 Control and Mitigation of Unauthorized Releases

Provisions shall be made for controlling and mitigating unauthorized releases. [400:6.1.3.2]

60.5.1.3.3 Records of Unauthorized Releases

Accurate records of the unauthorized release of hazardous materials shall be kept by the permittee. [400:6.1.3.3]

60.5.1.3.4\* Notification of Unauthorized Releases

The fire department shall be notified immediately or in accordance with approved emergency procedures when an unauthorized release becomes reportable under state, federal, or local regulations. [400:6.1.3.4]

60.5.1.3.5 Container Failure

When an unauthorized release due to primary container failure is discovered, the involved primary container shall be repaired or removed from service. [400:6.1.3.5]

60.5.1.3.6 Overpack Containers

Overpack containers shall be permitted to be used as a means to provide protection for primary containers to be transported for repair or removal from service. [400:6.1.3.6]

60.5.1.3.7 Responsibility for Cleanup of Unauthorized Releases

60.5.1.3.7.1

The person, firm, or corporation responsible for an unauthorized release shall institute and complete all actions necessary to remedy the effects of such unauthorized release, whether sudden or gradual, at no cost to the AHJ. [400:6.1.3.7.1]

60.5.1.3.7.2

When deemed necessary by the AHJ, cleanup of an unauthorized release shall be permitted to be initiated by the fire department or by an authorized individual or firm, and costs associated with such cleanup shall be borne by the owner, operator, or other person responsible for the unauthorized release. [400:6.1.3.7.2]

60.5.1.4\* Personnel Training

Persons in areas where hazardous materials are stored, dispensed, handled, or used shall be trained in the hazards of the materials employed and actions required by the emergency plan. The level of training to be conducted shall be consistent with the responsibilities of the persons to be trained in accordance with 60.5.1.4.1 through 60.5.1.4.5. [400:6.1.4]

60.5.1.4.1 Awareness

The training provided for persons designated in 60.5.1.4 shall include awareness training in accordance with 60.5.1.4.1.1 through 60.5.1.4.1.3. [400:6.1.4.1]

60.5.1.4.1.1 Completion

Initial training shall be completed prior to beginning work in the work area. [400:6.1.4.1.1]

60.5.1.4.1.2 Hazard Communications

Training shall be provided prior to beginning work in the work area to enable personnel to recognize and identify hazardous materials stored, dispensed, handled, or used on site and where to find safety information pertaining to the hazards of the materials employed. [400:6.1.4.1.2]

60.5.1.4.1.3 Emergency Plan

Training shall be provided prior to beginning work in the work area to enable personnel to implement the emergency plan. [400:6.1.4.1.3]

60.5.1.4.2 Operations Personnel

Persons engaged in storing, using, or handling hazardous materials shall be designated as operations personnel and shall be trained in accordance with 60.5.1.4.1 and 60.5.1.4.2.1 through 60.5.1.4.2.6. [400:6.1.4.2]

60.5.1.4.2.1 Physical and Health Hazard Properties

Operations personnel shall be trained in the chemical nature of the materials, including their physical hazards and the symptoms of acute or chronic exposure as provided by the safety data sheet (SDS) furnished by the manufacturer or other authoritative sources. [400:6.1.4.2.1]

60.5.1.4.2.2 Dispensing, Using, and Processing

Operations personnel shall be trained in the use of specific safeguards applicable to the dispensing, processing, or use of the materials and equipment employed. [400:6.1.4.2.2]

60.5.1.4.2.3 Storage

Operations personnel shall be trained in the application of storage arrangements and site-specific limitations on storage for the materials employed. [400:6.1.4.2.3]

60.5.1.4.2.4 Transport (Handling)

Operations personnel involved in materials handling shall be trained in the requirements for on-site transport of the materials employed. [400:6.1.4.2.4]

60.5.1.4.2.5 Actions in an Emergency

Operations personnel shall be trained in the necessary actions to take in the event of an emergency, including the operation and activation of emergency controls prior to evacuation. [400:6.1.4.2.5]

60.5.1.4.2.6 Changes

Training shall be provided whenever a new hazardous material is introduced into the work area that presents a new physical or health hazard, or when new information is obtained pertaining to physical or health hazards of an existing hazardous material that has not been included in previous training, and when there are changes in any of the following:

Equipment

Operations

Hazardous materials

[400:6.1.4.2.6]

60.5.1.4.3 Emergency Response Liaison

60.5.1.4.3.1

Responsible persons shall be designated and trained to be emergency response (ER) liaison personnel. [400:6.1.4.3.1]

60.5.1.4.3.2

Emergency response liaison personnel shall do the following:

Aid emergency responders in pre-planning responses to emergencies

Identify locations where hazardous materials are located

Have access to safety data sheets

Be knowledgeable in the site emergency response procedures

[400:6.1.4.3.2]

60.5.1.4.4 Emergency Responders

On-site emergency response teams shall be trained in accordance with NFPA 400.

60.5.1.4.5 Documentation

Training shall be documented and the documentation made available to the AHJ upon written request. [400:6.1.4.6]

60.5.1.5 Ignition Source Controls

60.5.1.5.1 Smoking

Smoking shall be prohibited in the following locations:

Within 25 ft (7.6 m) of outdoor storage areas, dispensing areas, or open use areas

In rooms or areas where hazardous materials are stored or dispensed or used in open systems in amounts requiring a permit in accordance with Section 1.8 of NFPA 400

[400:6.1.5.1]

60.5.1.5.2 Open Flames and High-Temperature Devices

Open flames and high-temperature devices shall not be used in a manner that creates a hazardous condition. [400:6.1.5.2]

60.5.1.5.3 Energy-Consuming Equipment

Energy-consuming equipment with the potential to serve as a source of ignition shall be listed or approved for use with the hazardous materials stored or used. [400:6.1.5.3]

60.5.1.5.3.1\* Powered Industrial Trucks

Powered industrial trucks shall be operated and maintained in accordance with NFPA 505 and Section 10.18.

60.5.1.6 Systems, Equipment, and Processes

Processes, methods, specifications, equipment testing and maintenance, design standards, performance, installation, equipment design and construction, and other pertinent criteria shall be in accordance with this section. [400:6.1.6]

60.5.1.6.1 Design and Construction of Containers and Tanks

Containers, cylinders, and tanks shall be designed and constructed in accordance with approved standards. Containers, cylinders, tanks, and other means used for containment of hazardous materials shall be of an approved type. [400:6.1.6.1]

60.5.1.6.2 Piping, Tubing, Valves, and Fittings

Piping, tubing, valves, fittings, and related components used for hazardous materials shall be in accordance with the following:

Piping, tubing, valves, fittings, and related components shall be designed and fabricated from materials compatible with the material to be contained and shall be of a strength and durability to withstand the pressure, structural and seismic stress, and exposure to which they are subject

Piping and tubing shall be identified in accordance with ASME A13.1, Scheme for the Identification of Piping Systems, to indicate the material conveyed.

Accessible manual valves, or fail-safe emergency shutoff valves operated by a remotely located manually or automatically activated shutdown control, shall be installed on supply piping and tubing at the following locations:

Point of use

Tank or bulk source

Manual emergency shutoff valves and remotely located manually activated shutdown controls for emergency shutoff valves shall be identified, and the location shall be clearly visible, accessible, and indicated by means of a sign.

Backflow prevention or check valves shall be provided when the backflow of hazardous materials could create a hazardous condition or cause the unauthorized discharge of hazardous materials.

Liquids classified in accordance with NFPA 704 shall be carried in pressurized piping above a gauge pressure of 15 psi (103 kPa) having a hazard ranking as follows:

Health hazard Class 3 or Class 4

Flammability Class 4

Instability Class 3 or Class 4

The pressurized piping specified in 60.5.1.6.2(6) shall be provided with an approved means of leak detection and emergency shutoff or excess flow control in accordance with the following:

Where the piping originates from within a hazardous material storage room or area, the excess flow control shall be located within the storage room or area.

Where the piping originates from a bulk source, the excess flow control shall be located at the bulk source.

Piping for inlet connections designed to prevent backflow shall not be required to be equipped with excess flow control.

[400:6.1.6.2]

60.5.1.6.3 Additional Regulations for Supply Piping for Health Hazard Materials

Supply piping and tubing for liquids or solids having a health hazard ranking of Class 3 or Class 4 in accordance with NFPA 704 shall be in accordance with ASME B31.3, Process Piping, and the following:

Piping and tubing utilized for the transmission of highly toxic, toxic, or highly volatile corrosive liquids shall have welded, threaded, or flanged connections throughout, except for connections located within a ventilated enclosure, or an approved method of drainage or containment.

Piping and tubing shall not be located within corridors, within any portion of a means of egress required to be enclosed in fire resistance-rated construction, or in concealed spaces in areas not classified as Protection Level 1 through Protection Level 4 occupancies.

[400:6.1.6.3]

60.5.1.6.4 Equipment, Machinery, and Alarms

Equipment, machinery, and required detection and alarm systems associated with the use, storage, or handling of hazardous materials shall be listed or approved. [400:6.1.6.4]

60.5.1.7 Empty Containers and Tanks

Empty containers and tanks previously used for the storage of hazardous materials shall be free from residual material and vapor as defined by DOT, the Resource Conservation and Recovery Act (RCRA), or other regulating authority or shall be maintained as specified for the storage of hazardous material. [400:6.1.7]

60.5.1.8 Signs

60.5.1.8.1 General

60.5.1.8.1.1 Design and Construction

Signs shall be durable, and the size, color, and lettering of signs shall be in accordance with nationally recognized standards. [400:6.1.8.1.1]

60.5.1.8.1.2 Language

Signs shall be in English as the primary language or in symbols permitted by this Code. [400:6.1.8.1.2]

60.5.1.8.1.3 Maintenance

Signs shall meet the following criteria:

They shall not be obscured.

They shall be maintained in a legible condition.

They shall not be removed, unless for replacement.

[400:6.1.8.1.3]

60.5.1.8.2 Hazard Materials Identification

60.5.1.8.2.1 NFPA 704 Placard

Visible hazard identification signs in accordance with NFPA 704 shall be placed at the following locations, except where the AHJ has received a hazardous materials management plan and a hazardous materials inventory statement in accordance with 60.1.5 and 60.1.6 and has determined that omission of such signs is consistent with safety:

On stationary aboveground tanks

On stationary aboveground containers

At entrances to locations where hazardous materials are stored, dispensed, used, or handled in quantities requiring a permit

At other entrances and locations designated by the AHJ

[400:6.1.8.2.1]

60.5.1.8.2.2 Identification of Containers, Cartons, and Packages

Individual containers, cartons, or packages shall be conspicuously marked or labeled in accordance with nationally recognized standards. [400:6.1.8.2.2]

60.5.1.8.3 No Smoking Signs

Where "no smoking" is not applicable to an entire site or building, signs shall be provided as follows:

In rooms or areas where hazardous materials are stored or dispensed or used in open systems in amounts requiring a permit in accordance with Section 1.8 of NFPA 400

Within 25 ft (7.6 m) of outdoor storage, dispensing, or open-use areas

[400:6.1.8.3]

60.5.1.9 Protection From Vehicles

60.5.1.9.1

Guard posts or other approved means shall be provided to protect the following where subject to vehicular damage:

Storage tanks and connected piping, valves, and fittings

Storage areas containing tanks or portable containers except where the exposing vehicles are powered industrial trucks used for transporting the hazardous materials

Use areas

[400:6.1.9.1]

60.5.1.9.2

Where guard posts are installed, the posts shall meet the following criteria:

They shall be constructed of steel not less than 4 in. (102 mm) in diameter and concrete filled.

They shall be spaced not more than 4 ft (1.2 m) between posts on center.

They shall be set not less than 3 ft (0.9 m) deep in a concrete footing of not less than a 15 in. (381 mm) diameter.

They shall be set with the top of the posts not less than 3 ft (0.9 m) above ground.

They shall be located not less than 3 ft (0.9 m) from the tank.

[400:6.1.9.2]

60.5.1.10 Electrical Wiring and Equipment

60.5.1.10.1 General

Electrical wiring and equipment shall be installed in accordance with Section 11.1. [400:6.1.10.1]

60.5.1.10.2 Static Accumulation

When processes or use conditions exist where flammable gases, dusts, or vapors can be ignited by static electricity, means shall be provided to prevent the accumulation of a static charge and to dissipate the static charge to ground. [400:6.1.10.2]

60.5.1.11 Protection From Light

Materials that are sensitive to light shall be stored in containers designed to protect them from such exposure. [400:6.1.11]

60.5.1.12 Separation of Incompatible Materials

60.5.1.12.1

Incompatible materials in storage and storage of materials incompatible with materials in use shall be separated when the stored materials are in containers having a capacity of more than 5 lb (2.268 kg) or 1/2 gal (1.89 L). [400:6.1.12.1]

60.5.1.12.2

Separation shall be accomplished by one of the following methods:

Segregating incompatible materials storage by a distance of not less than 20 ft (6.1 m)

Isolating incompatible materials storage by a noncombustible partition extending not less than 18 in. (457 mm) above and to the sides of the stored material or by a noncombustible partition that interrupts the line of sight between the incompatible materials

Storing liquid and solid materials in hazardous materials storage cabinets complying with 60.5.1.18

Storing compressed gases in gas cabinets or exhausted enclosures complying with Chapter 21 of NFPA 400

[400:6.1.12.2]

60.5.1.12.3

Materials that are incompatible shall not be stored within the same cabinet or enclosure. [400:6.1.12.3]

60.5.1.13 General Storage

60.5.1.13.1 Storage

The storage arrangement of materials shall be in accordance with this section and the material specific requirements of Chapters 11 through 21 of NFPA 400 as applicable. [400:6.1.13.1 ]

60.5.1.13.2 Shelf Storage

Shelving shall be constructed to carry the design loads and shall be braced and anchored in accordance with the seismic design requirements of the applicable building code. [400:6.1.13.2]

60.5.1.13.2.1 Shelf Construction

60.5.1.13.2.1.1

Shelving shall be treated, coated, or constructed of materials that are compatible with the hazardous materials stored. [400:6.1.13.2.1.1]

60.5.1.13.2.1.2

Shelves shall be provided with a lip or guard where used for the storage of individual containers, except under either of the following conditions:

Where storage is located in hazardous materials storage cabinets or laboratory furniture specifically designed for such use

Where amounts of hazardous materials in storage do not exceed the quantity threshold for requiring a permit in accordance with Section 1.8 of NFPA 400

[400:6.1.13.2.1.2]

60.5.1.13.2.2

Shelf storage of hazardous materials shall be maintained in an orderly manner. [400:6.1.13.2.2]

60.5.1.14 Seismic Protection

If seismic protection is provided it shall be maintained.

60.5.1.15 Outdoor Storage and Use Areas

Outdoor storage and use areas for hazardous materials shall comply with the following:

Outdoor storage and use areas shall be kept free of weeds, debris, and common combustible materials not necessary to the storage or use of hazardous materials.

The area surrounding an outdoor storage and use area shall be kept clear of weeds, debris, and common combustible materials not necessary to the storage or use of hazardous materials for a minimum distance of 15 ft (4.5 m).

Outdoor storage and use areas for hazardous materials shall be located not closer than 20 ft (6.1 m) from a property line that can be built upon, a street, an alley, or a public way, except that a 2-hour fire barrier wall, without openings and extending not less than 30 in. (762 mm) above and to the sides of the storage area, shall be permitted in lieu of such distance.

[400:6.1.15]

60.5.1.16 Maintenance Required

60.5.1.16.1

Equipment, machinery, and required detection and alarm systems associated with hazardous materials shall be maintained in an operable condition. [400:6.1.16.1]

60.5.1.16.2

Stationary tanks not used for a period of 90 days shall be safeguarded or removed in an approved manner. [400:6.1.16.2]

60.5.1.16.2.1

The tanks specified in 60.5.1.16.2 shall have the fill line, gauge opening, and pump connection secured against tampering. [400:6.1.16.2.1]

60.5.1.16.2.2

Vent lines shall be maintained. [400:6.1.16.2.2]

60.5.1.16.2.3\*

Tanks that are to be placed back in service shall be tested in an approved manner. [400:6.1.16.2.3]

60.5.1.16.3

The following shall apply to defective containers, cylinders, and tanks:

They shall be removed from service, repaired, or disposed of in an approved manner.

Overpack containers shall be permitted to be used as a means to provide protection for primary containers that are transported for repair or removal from service.

[400:6.1.16.3]

60.5.1.16.4

Defective equipment or machinery shall be removed from service and repaired or replaced. [400:6.1.16.4]

60.5.1.16.5

Required detection and alarm systems that are defective shall be replaced or repaired. [400:6.1.16.5]

60.5.1.17 Testing

60.5.1.17.1

The equipment, devices, and systems listed in 60.5.1.17.2.1 shall be tested at one of the intervals listed in 60.5.1.17.2.2. Written records of the tests conducted or maintenance performed shall be maintained. [400:6.1.17.1]

60.5.1.17.2

Testing shall not be required under the following conditions:

Where approved written documentation is provided that testing will damage the equipment, device, or system and the equipment, device, or system is maintained as specified by the manufacturer

Where equipment, devices, and systems fail in a fail-safe manner

Where equipment, devices, and systems self-diagnose and report trouble, with records of the self-diagnosis and trouble reporting made available to the AHJ

Where system activation occurs during the required test cycle for the components activated during the test cycle

Where approved maintenance in accordance with 60.5.1.16.1 is performed not less than annually or in accordance with an approved schedule, in which case the testing requirements set forth in 60.5.1.17.2.1 and 60.5.1.17.2.2 are permitted to apply.

[400:6.1.17.2]

60.5.1.17.2.1 Equipment, Devices, and Systems Requiring Testing

The following equipment, devices, and systems shall be tested in accordance with 60.5.1.17 and 60.5.1.17.2.2:

Limit control systems for liquid level, temperature, and pressure required by 6.2.1.7 and 6.3.1.2 of NFPA 400

Monitoring and supervisory systems required by 6.2.1.1 and 6.3.2.1.1 of NFPA 400

[400:6.1.17.2.1]

60.5.1.17.2.2 Testing Frequency

The equipment, systems, and devices listed in 60.5.1.17.2.1 shall be tested at one of the following frequencies:

Not less than annually

In accordance with the approved manufacturer's requirements

In accordance with approved recognized industry standards

In accordance with an approved schedule

[400:6.1.17.2.2]

60.5.1.18 Hazardous Materials Storage Cabinets

When storage cabinets are used to increase MAQ per control area or to otherwise comply with a specific provision in Section 60.5, such cabinets shall be in accordance with the following:

Cabinets shall be constructed of metal.

The interior of cabinets shall be treated, coated, or constructed of materials that are nonreactive with the hazardous material stored, and such treatment, coating, or construction shall include the entire interior of the cabinet

Cabinets shall be either listed as suitable for the intended storage or constructed in accordance with the following:

Cabinets shall be of steel having a thickness of not less than 0.044 in. (1.12 mm) (18 gauge).

The cabinet, including the door, shall be double-walled with 11/2 in. (38.1 mm) airspace between the walls.

Joints shall be riveted or welded and shall be tight-fitting.

Doors shall be well fitted, self-closing, and equipped with a self-latching device.

The bottoms of cabinets utilized for the storage of liquids shall be liquidtight to a minimum height of 2 in. (51 mm).

For requirements regarding electrical equipment and devices within cabinets used for the storage of hazardous liquids, compressed gases, or cryogenic fluids, see NFPA 70.

Cabinets shall be marked in conspicuous lettering that reads as follows: HAZARDOUS — KEEP FIRE AWAY

[400:6.1.18]

60.5.1.19 Installation of Tanks

Installation of tanks shall be in accordance with 60.5.1.19.1 through 60.5.1.19.2. [400:6.1.19]

60.5.1.19.1 Underground Tanks

Underground tanks used for the storage of liquid hazardous materials shall be provided with secondary containment. [400:6.1.19.1.1]

60.5.1.19.1.1

Underground tanks used for the storage of liquid hazardous materials shall be provided with secondary containment. [400:6.1.19.1.1]

60.5.1.19.1.2

In lieu of providing secondary containment for an underground tank, an aboveground tank in an underground vault complying with NFPA 30 shall be permitted.

[400:6.1.19.1.2]

60.5.1.19.2 Aboveground Tanks

Aboveground stationary tanks installed outdoors and used for the storage of hazardous materials shall be located and protected in accordance with the requirements for outdoor storage of the particular material involved and in accordance with the requirements of Chapters 11 through 21 of NFPA 400. [400:6.1.19.2]

60.5.1.19.2.1

Aboveground tanks that are installed in vaults complying with NFPA 30 shall not be required to comply with location and protection requirements for outdoor storage. [400:6.1.19.2.1]

60.5.1.19.2.2

Aboveground tanks that are installed inside buildings and used for the storage of hazardous materials shall be located and protected in accordance with the requirements for indoor storage of the particular material involved. [400:6.1.19.2.2]

60.5.1.19.2.3 Marking

Aboveground stationary tanks shall be marked as required by 60.5.1.8.2.1. [400:6.1.19.2.3]

60.5.1.20

When required, fire alarm systems and smoke detection systems shall be installed in accordance with NFPA 72. [400:6.1.20]

60.5.2

Where permitted by Chapters 11 through 43 of NFPA 101, alcohol-based hand-rub dispensers shall be permitted provided they meet all of the following criteria:

The maximum individual dispenser fluid capacity shall be as follows:

0.32 gal (1.2 L) for dispensers in corridors and areas open to corridors

0.53 gal (2.0 L) for dispensers in rooms or suites of rooms separated from corridors

Where aerosol containers are used, the maximum capacity of the aerosol dispenser shall be 18 oz. (0.51 kg) and shall be limited to Level 1 aerosols as defined in NFPA 30B.

Dispensers shall be separated from each other by horizontal spacing of not less than 48 in. (1220 mm).

Not more than an aggregate 10 gal (37.8 L) of alcohol-based hand-rub solution or 1135 oz (32.2 kg) of Level 1 aerosols, or a combination of liquids and Level 1 aerosols not to exceed, in total, the equivalent of 10 gal (37.8 L) or 1135 oz (32.2 kg), shall be in use outside of a storage cabinet in a single smoke compartment or fire compartment or story, whichever is less in area. One dispenser complying with 60.5.2(1) per room and located in that room shall not be included in the aggregated quantity.

Storage of quantities greater than 5 gal (18.9 L) in a single smoke compartment or fire compartment or story, whichever is less in area, shall meet the requirements of NFPA 30.

Dispensers shall not be installed in the following locations:

Above an ignition source for a horizontal distance of 1 in. (25 mm) to each side of the ignition source

To the side of an ignition source within a 1 in. (25 mm) horizontal distance from the ignition source

Beneath an ignition source within a 1 in. (25 mm) vertical distance from the ignition source

Dispensers installed directly over carpeted floors shall be permitted only in sprinklered areas of the building.

The alcohol-based hand-rub solution shall not exceed 95 percent alcohol content by volume.

Operation of the dispenser shall comply with the following criteria:

The dispenser shall not release its contents except when the dispenser is activated, either manually or automatically by touch-free activation

Any activation of the dispenser shall only occur when an object is placed within 4 in. (100 mm) of the sensing device.

An object placed within the activation zone and left in place shall not cause more than one activation.

The dispenser shall not dispense more solution than the amount required for hand hygiene consistent with label instructions.

The dispenser shall be designed, constructed, and operated in a manner that ensures accidental or malicious activation of the dispensing device is minimized.

The dispenser shall be tested in accordance with the manufacturer's care and use instructions each time a new refill is installed.

[101:8.7.3.3]

60.6 Emergency Action Planning, Fire Risk Control, and Chemical Hazard Requirements for Industrial Processes

Emergency planning, fire risk control, and chemical hazard requirements associated with industrial processes where the quantities of materials in use require compliance with Protection Level 1, Protection Level 2, Protection Level 3, or Protection Level 4 based on materials exceeding the maximum allowable quantities (MAQ) in the following categories shall comply with the requirements of Chapter 7 of NFPA 400:

Unpackaged organic peroxide formulations that are capable of explosive decomposition in their unpackaged state

Oxidizer Class 3 and Class 4: solids and liquids

and : , , and gases

Highly toxic solids, liquids, and gases

Water-reactive liquids, Class 3

60.7 Performance Alternative

In lieu of complying with Chapter 60 in its entirety, occupancies containing high hazard Level 1 to high hazard Level 5 contents shall be permitted to comply with Chapter 10 of NFPA 400.