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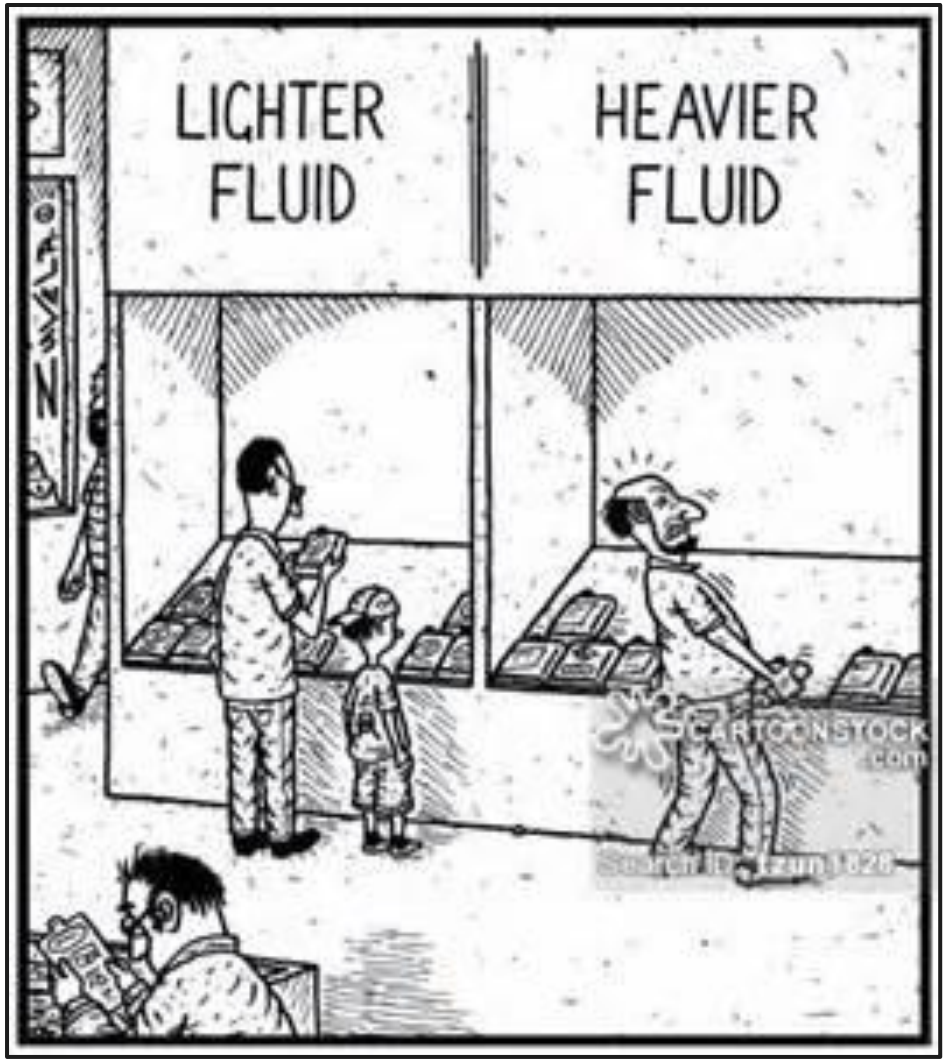
Pretty Simple – Huh?



Overview

This lecture will examine the requirements for hazardous materials and “H” Use Groups within Chapter 4 of the CSBC and as referenced by the CFSC

Hazardous Material

Definition

Chemicals or substances that are ***physical hazards*** or ***health hazards*** as defined and classified in this section and the Fire Code, whether the materials are in usable or waste condition.

Physical Hazard

Characteristics

Materials that present a detonation hazard, deflagration hazard or readily support combustion

Physical Hazard

Examples

- combustible liquid
- compressed gas
- cryogenic
- explosive
- flammable gases, liquids & solids
- organic peroxide
- oxidizer
- unstable (reactive) or water-reactive

Health Hazard

Characteristics

A chemical for which there is statistically significant evidence that acute or chronic health effects are capable of occurring in exposed persons.

Health Hazard

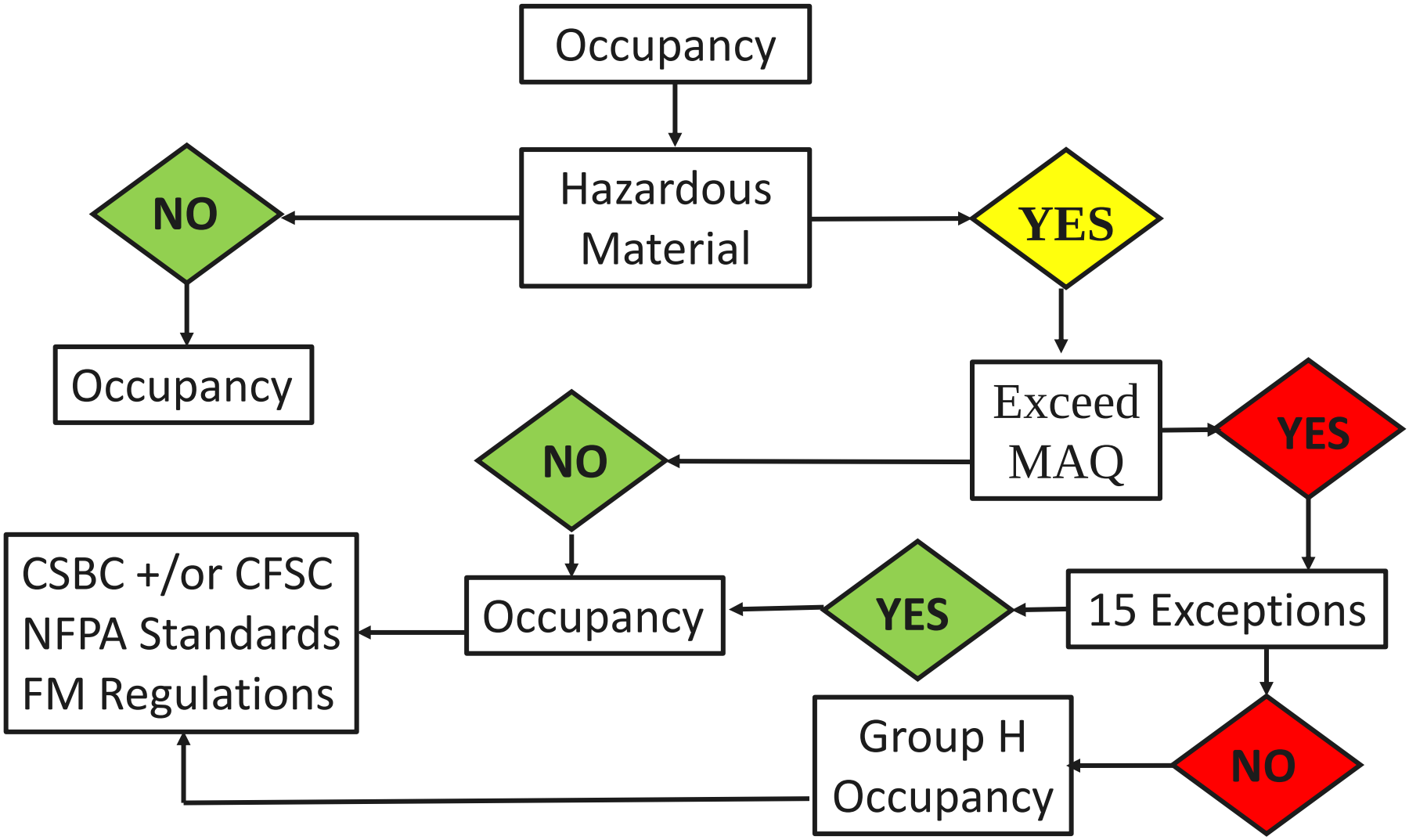
Examples

- toxic
- highly toxic
- corrosive

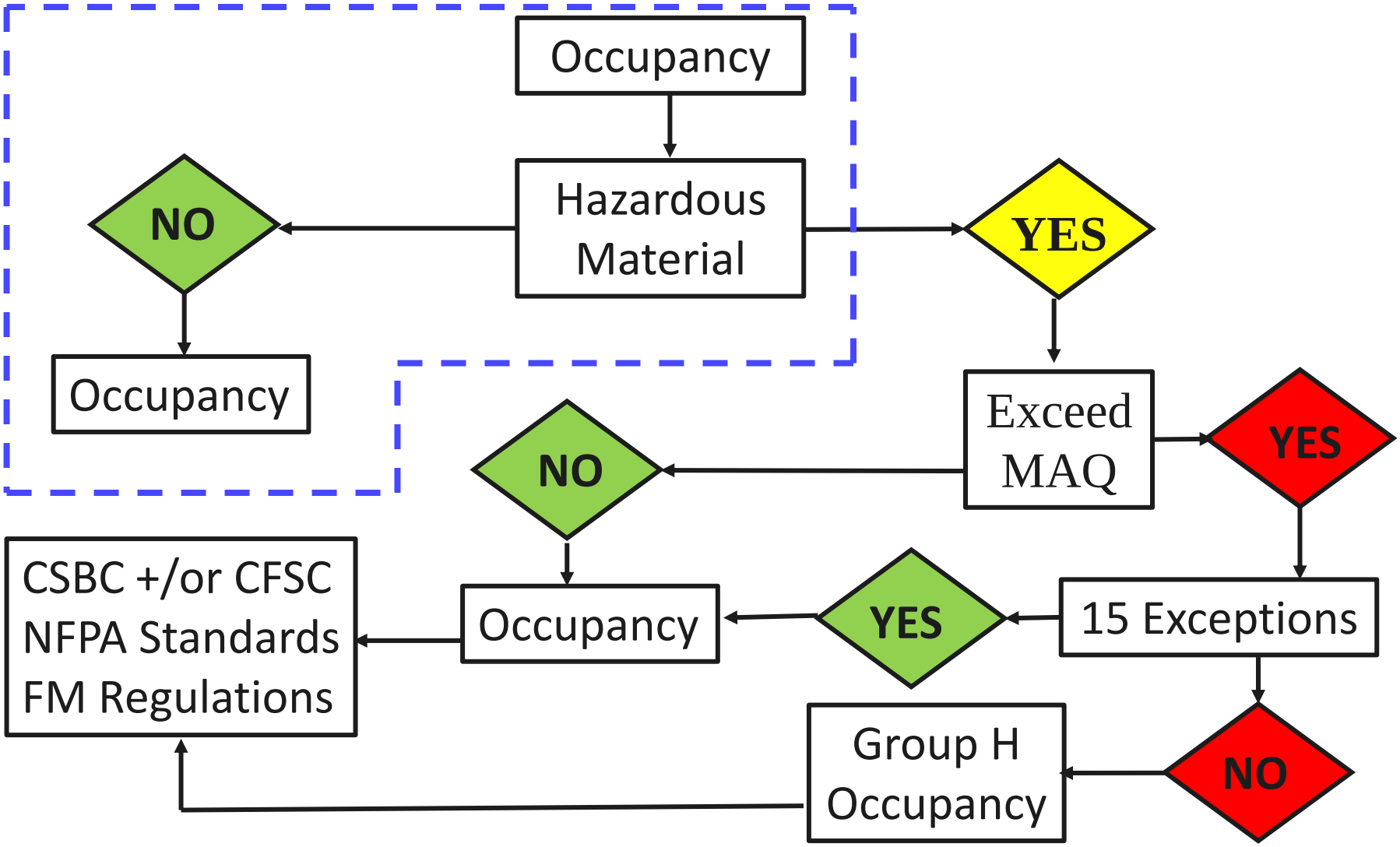
Biosafety Labs

Occupancy Classification

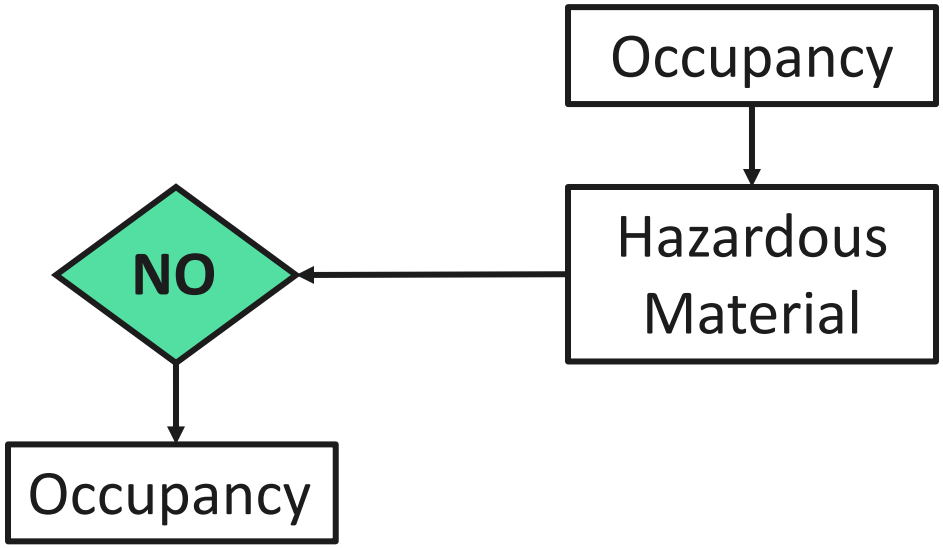
Application Flow Chart



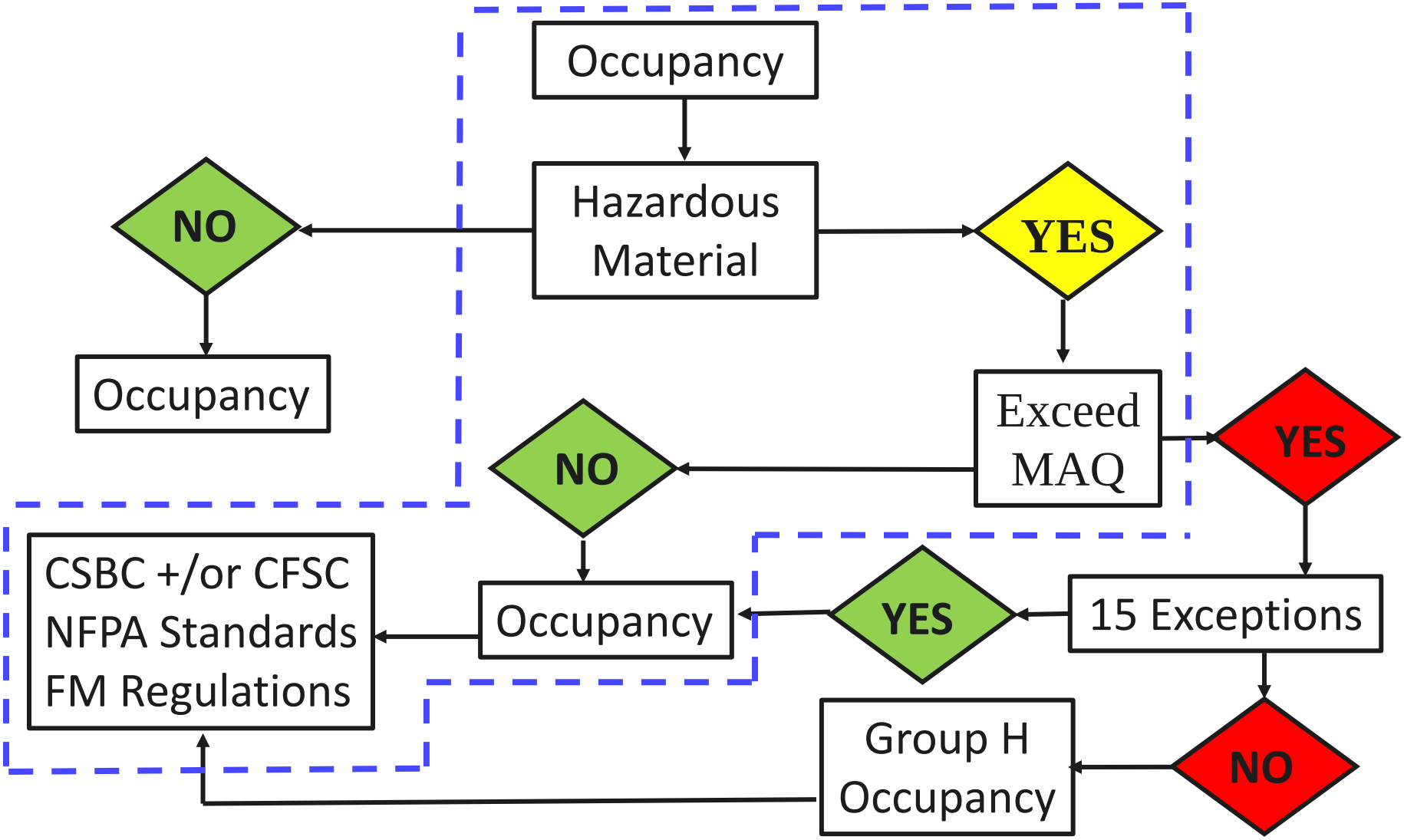
Application Flow Chart



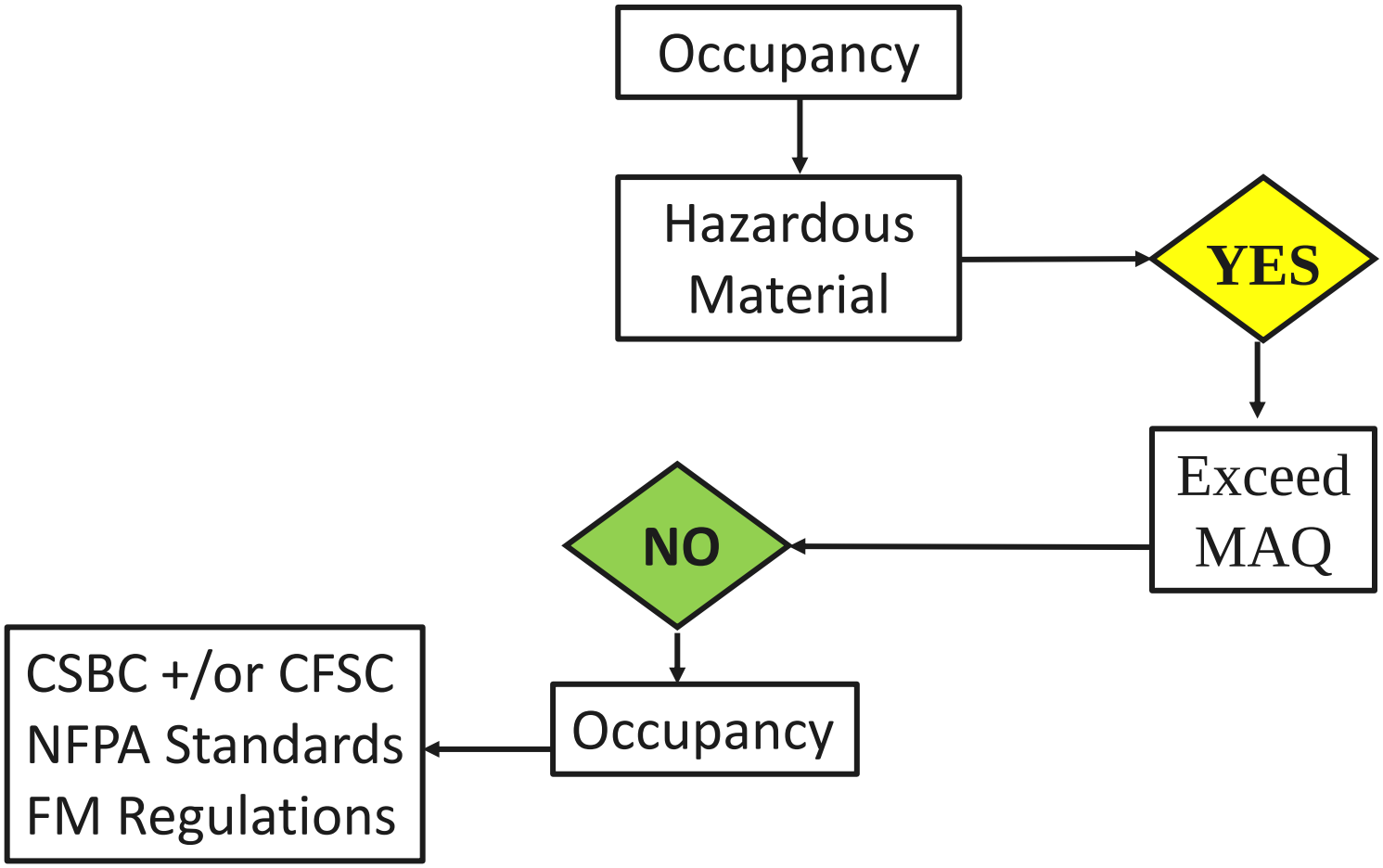
Application Flow Chart



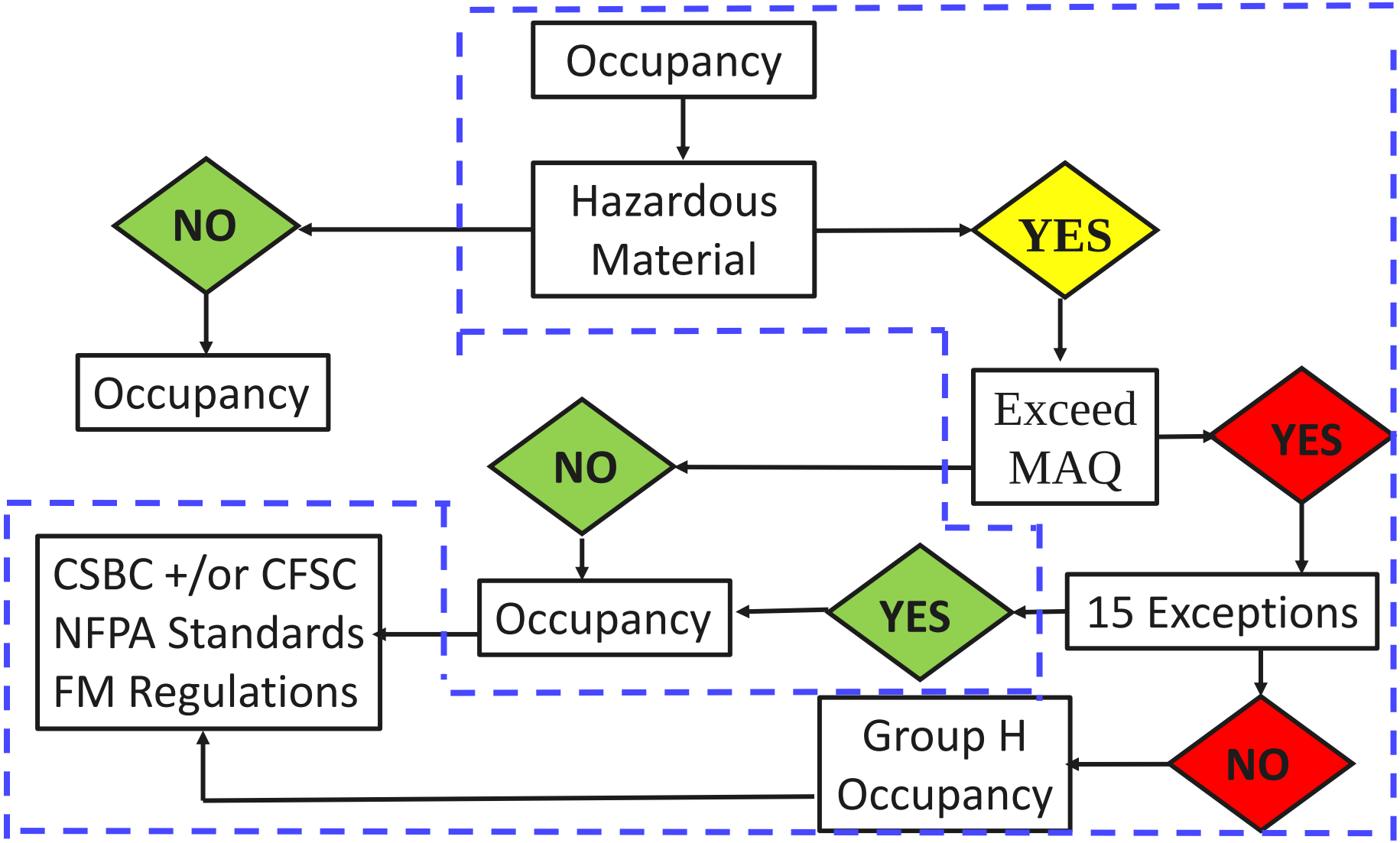
Application Flow Chart



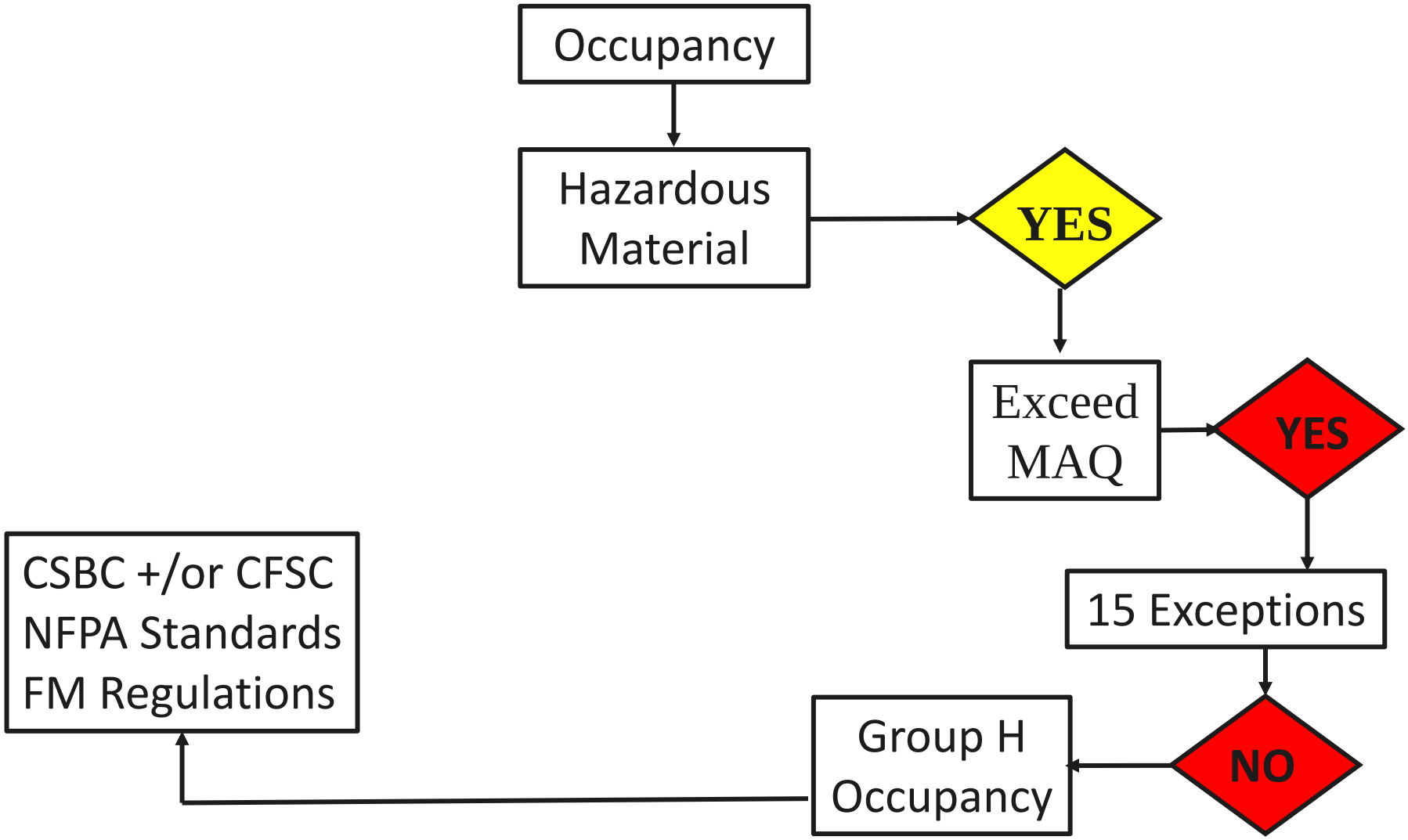
Application Flow Chart



Application Flow Chart



Application Flow Chart



MAQ's

Tables

307.7(1) HM's posing a *physical hazard*

307.7(2) HM's posing a *health hazard*

per *Control Area*

MAQ Tables

[F] TABLE 307.7(1)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, j, m, n]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible liquid[c, l]	II IIIA IIIB	H-2 or H-3 H-2 or H-3 N/A	N/A	120[d, e] 330[d, e] 13,200[e, f]	N/A	N/A	120[d] 330[d] 13,200[e, f]	N/A	N/A	30[d] 80[d] 3,300[f]
Combustible fiber	Loose Baled	H-3	(100) (1,000)	N/A	N/A	(100) (1,000)	N/A	N/A	(20) (200)	N/A
Consumer fireworks (Class C, Common)	1.4G	H-3	125[d, e, l]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cryogenics flammable	N/A	H-2	N/A	45[d]	N/A	N/A	45[d]	N/A	N/A	10[d]
Cryogenics, oxidizing	N/A	H-3	N/A	45[d]	N/A	N/A	45[d]	N/A	N/A	10[d]
Explosives	Division 1.1 Division 1.2 Division 1.3 Division 1.4 Division 1.4G Division 1.5 Division 1.6	H-1 H-1 H-1 or 2 H-3 H-3 H-1 H-1	1[e, g] 1[e, g] 5[e, g] 50[e, g] 125[d, e, l] 1[e, g] 1[d, e, g]	(1)[e, g] (1)[e, g] (5)[e, g] (50)[e, g] N/A (1)[e, g] N/A	N/A N/A N/A N/A N/A N/A N/A	0.25[g] 0.25[g] 1[g] 50[g] N/A 0.25[g] N/A	(0.25)[g] (0.25)[g] (1)[g] (50)[g] N/A (0.25)[g] N/A	N/A N/A N/A N/A N/A N/A N/A	0.25[g] 0.25[g] 1[g] N/A N/A 0.25[g] N/A	(0.25)[g] (0.25)[g] (1)[g] N/A N/A (0.25)[g] N/A
Flammable gas	Gaseous liquefied	H-2	N/A	N/A 30[d, e]	1,000[d, e] N/A	N/A	N/A 30[d, e]	1,000[d, e] N/A	N/A	N/A
Flammable liquid[c]	1A 1B and 1C	H-2 or H-3	N/A	30[d, e] 120[d, e]	N/A	N/A	30[d] 120[d]	N/A	N/A	10[d] 30[d]
Combination flammable liquid (1A, 1B, 1C)	N/A	H-2 or H-3	N/A	120[d, e, h]	N/A	N/A	120[d, h]	N/A	N/A	30[d, h]
Flammable solid	N/A	H-3	125[d, e]	N/A	N/A	125[d]	N/A	N/A	25[d]	N/A
Organic peroxide	UD I II III IV V	H-1 H-2 H-3 H-3 N/A N/A	1[e, g] 5[d, e] 50[d, e] 125[d, e] NL NL	(1)[e, g] (5)[d, e] (50)[d, e] (125)[d, e] NL NL	N/A N/A N/A N/A N/A N/A	0.25[g] 1[d] 50[d] 125[d] N/L N/L	(0.25)[g] (1) (50)[d] (125)[d] N/L N/L	N/A N/A N/A N/A N/A N/A	0.25[g] 1[d] 10[d] 25[d] NL NL	(0.25)[g] (1)[d] (10)[d] (25)[d] NL NL
Oxidizer	4 3[k] 2 1	H-1 H-2 H-3 H-3	1[e, g] 10[d, e] 250[d, e] 4,000[e, f]	(1)[e, g] (10)[d, e] (250)[d, e] (4,000)[e, f]	N/A N/A N/A N/A	0.25[g] 2[d] 250[d] 4,000[f]	(0.25)[g] (2)[d] (250)[d] (4,000)[f]	N/A N/A N/A N/A	0.25[g] 2[d] 50[d] 1,000[f]	(0.25)[g] (2)[d] (50)[d] (1,000)[f]
Oxidizing gas	Gaseous liquefied	H-3	N/A N/A	N/A 15[d, e]	1,500[d, e] N/A	N/A N/A	N/A 15[d, e]	1,500[d, e] N/A	N/A N/A	N/A N/A

MAQ Tables

[F] TABLE 307.7(2)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIAL POSING A HEALTH HAZARD[a, b, c]

MATERIAL	STORAGE[d]			USE-CLOSED SYSTEMS[d]			USE-OPEN SYSTEMS[d]	
	Solid pounds[e, f]	Liquid gallons (pounds)[e, f]	Gas (cubic feet at NTP)[e]	Solid pounds[e]	Liquid gallons (pounds)[e]	Gas (cubic feet at NTP)[e]	Solid pounds[e]	Liquid gallons (pounds)[e]
Corrosive	5,000	500	810[f, g]	5,000	500	810[f, g]	1,000	100
Highly toxic	10	(10)[i]	20[h]	10	(10)[i]	20[h]	3	(3)[i]
Toxic	500	(500)[i]	810[f]	500	(500)[i]	810[f]	125	(125)[i]

Footnotes

MAQ Tables

[F] TABLE 307.1(1)—(continued)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, j, m, n, p]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Flammable solid	N/A	H-3	125[d, e]	N/A	N/A	125[d]	N/A	N/A	25[d]	N/A

1 2 3 4 5

1 - Product or Material
2 - Group H subclass when MAQ is exceeded
3 - Amount in Storage
4 - Amount in a closed system
5 - Amount in an open system

MAQ Tables

[F] TABLE 307.1(1)—(continued)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, j, m, n, p]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Flammable solid	N/A	H-3	125[d, e]	N/A	N/A	125[d]	N/A	N/A	25[d]	N/A

125 d, e

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, gas cabinets, exhausted enclosures or safety cans as specified in the *International Fire Code*. Where Note d also applies, the increase for both notes shall be applied accumulatively.

MAQ Tables

[F] TABLE 307.1(1)—(continued)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, j, m, n, p]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Flammable solid	N/A	H-3	125[d, e]	N/A	N/A	125[d]	N/A	N/A	25[d]	N/A

Storage [b]

Use – Closed System [b]

Use – Open System [b]

b. The aggregate quantity in use and storage shall not exceed the quantity listed for storage.

Control Areas

Requirements

Construction

Number of

Separation

Group M – storage & display

Group S - storage

Control Areas

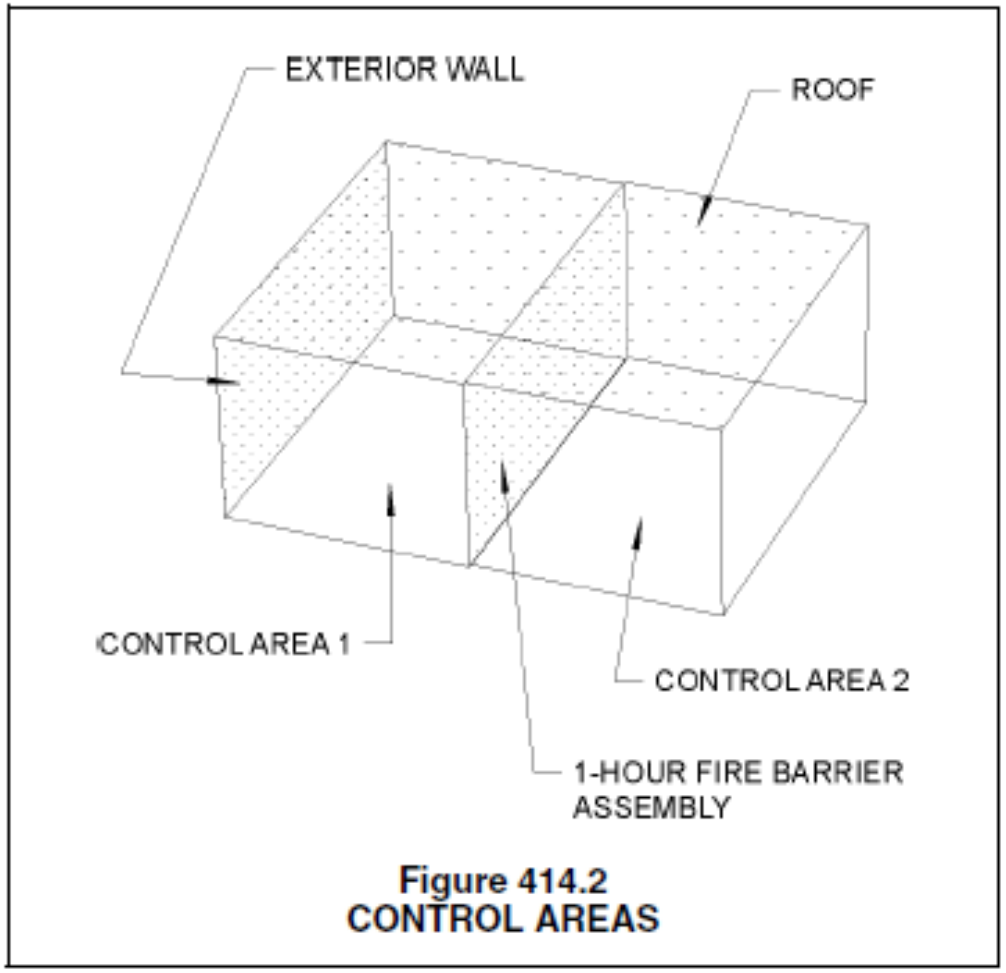


Figure 414.2
CONTROL AREAS

Source: 2012 IBC Code Commentary – Volume 1

Control Areas

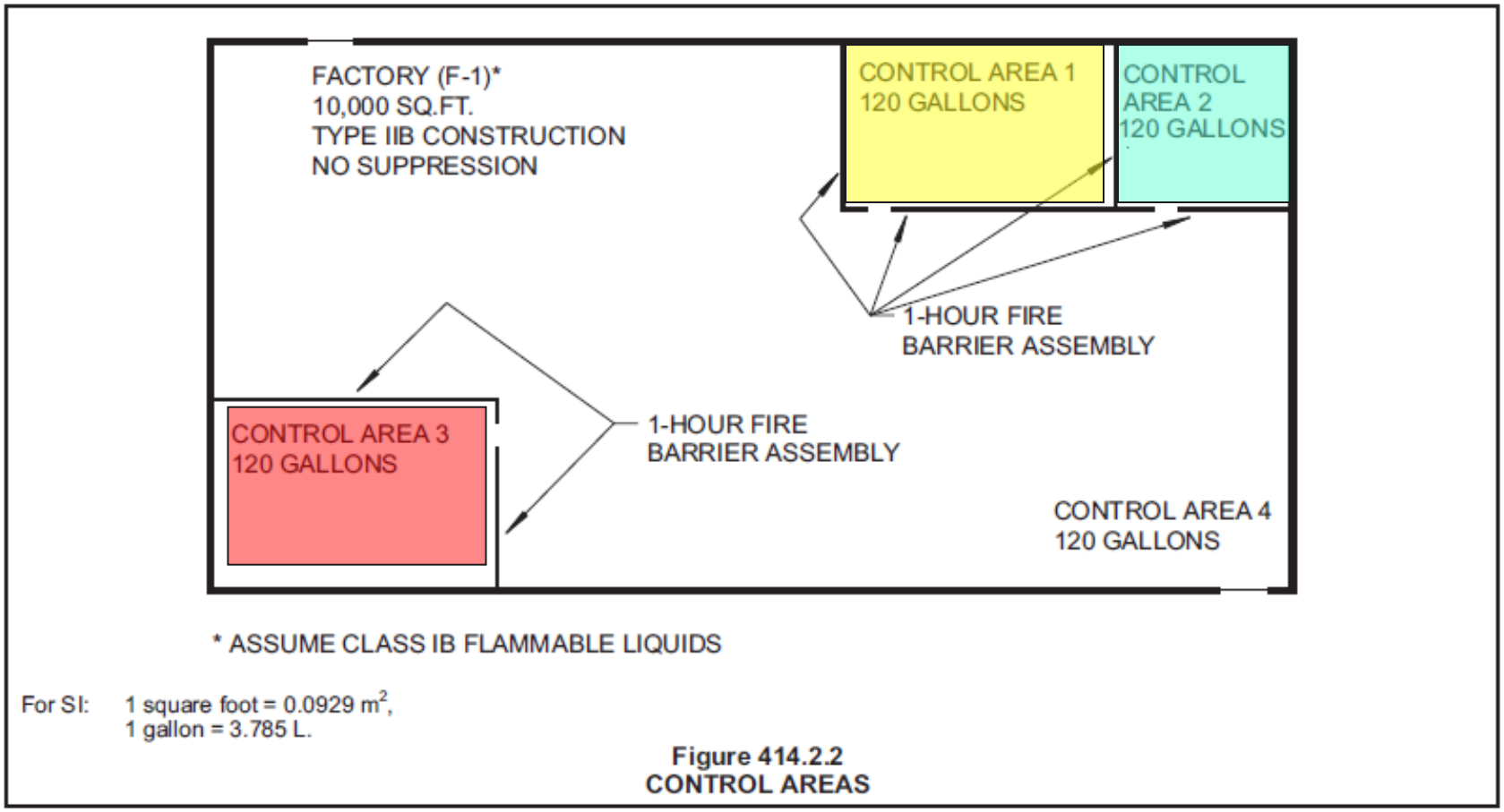


Figure 414.2.2
CONTROL AREAS

Source: 2003 IBC Code Commentary – Volume 1

Control Areas

Location, Number of and Separation

[F] TABLE 414.2.2
DESIGN AND NUMBER OF CONTROL AREAS

FLOOR LEVEL		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA[a]	NUMBER OF CONTROL AREAS PER FLOOR[b]	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS[c]
Above grade	Higher than 9	5	1	2
	7-9	5	2	2
	6	12.5	2	2
	5	12.5	2	2
	4	12.5	2	2
	3	50	2	1
	2	75	3	1
	1	100	4	1
Below grade	1	75	3	1
	2	50	2	1
	Lower than 2	Not Allowed	Not Allowed	Not Allowed

a. Percentages shall be of the maximum allowable quantity per control area shown in Tables 307.7(1) and 307.7(2), with all increases allowed in the notes to those tables.

b. There shall be a maximum of two control areas per floor in Group M occupancies and in buildings or portions of buildings having Group S occupancies with storage conditions and quantities in accordance with Section 414.2.4.

c. Fire barriers shall include walls and floors as necessary to provide separation from other portions of the building.

Control Areas

Group M & S

[F] TABLE 414.2.4
MAXIMUM ALLOWABLE QUANTITY PER INDOOR AND OUTDOOR CONTROL AREA IN GROUP M AND S OCCUPANCIES
NONFLAMMABLE SOLIDS AND NONFLAMMABLE AND NONCOMBUSTIBLE LIQUIDS [d,e,f]

CONDITION		MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	
Material[a]	Class	Solids pounds	Liquids gallons
A. Health-hazard materials—nonflammable and noncombustible solids and liquids			
1. Corrosives[b, c]	Not Applicable	9,750	975
2. Highly toxics	Not Applicable	20[b, c]	2[b, c]
3. Toxics[b, c]	Not Applicable	1,000	100
B. Physical-hazard materials—nonflammable and noncombustible solids and liquids			
1. Oxidizers[b, c]	4	Not Allowed	Not Allowed
	3	1,150[g]	115
	2	2,250[h]	225
	1	18,000[i, j]	1,800[i, j]
2. Unstable (reactives)[b, c]	4	Not Allowed	Not Allowed
	3	550	55
	2	1,150	115
	1	Not Limited	Not Limited
3. Water (reactives)	3[b, c]	550	55
	2[b, c]	1,150	115
	1	Not Limited	Not Limited

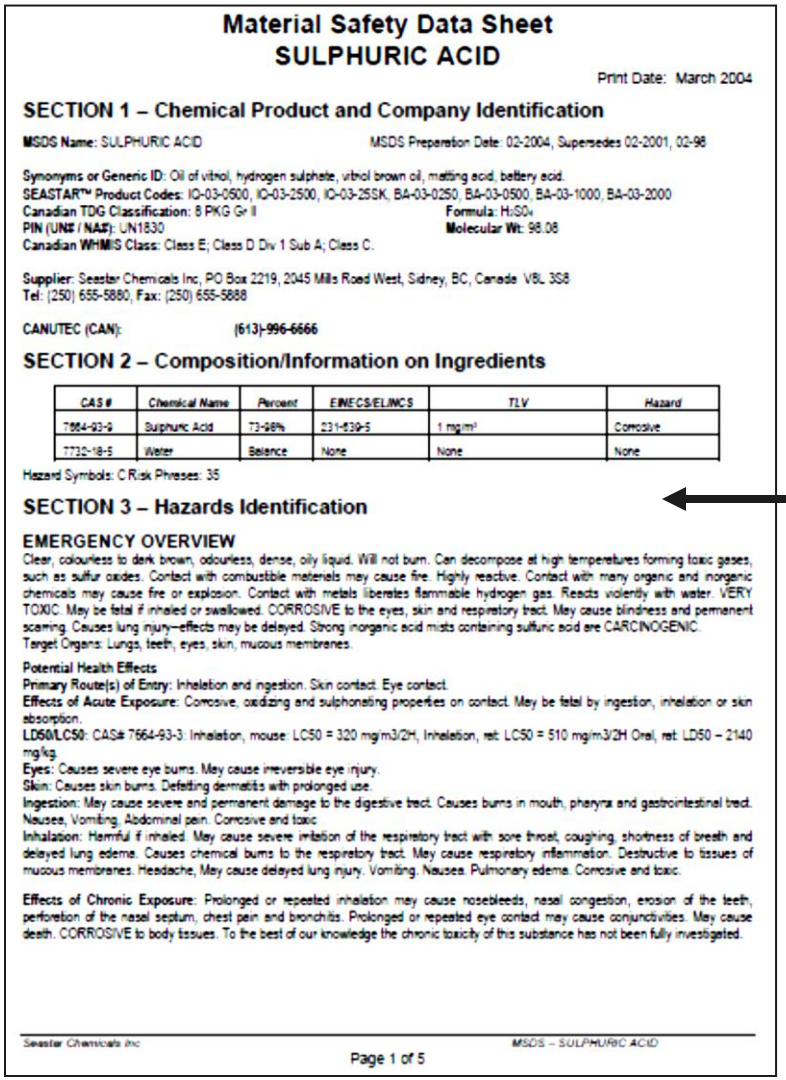
Control Areas

Comparison

Table 414.2.4 MAQ per Indoor & Outdoor Control Area in Group M & S Occupancies Nonflammable Solids and Nonflammable and Noncombustible Liquids			
CONDITION		MAQ PER CONTROL AREA	
Material	Class	Solids – Pounds	Liquid - Gallons
1. Corrosives [b, c]	N/A	9,750	975

Table 307.7(2) MAQ per Control Area of a Hazardous Material posing a Health Hazard								
	STORAGE			USE-CLOSED SYSTEM			USE-OPEN SYSTEM	
Material	Solid Pounds	Liquid Gallons	Gas	Solid Pounds	Liquid Gallons	Gas	Solid Pounds	Liquid Gallons
Corrosive	5,000	500	810	5,000	500	810	1000	100

How Do I Know What it is?



Material Safety Data Sheet
SULPHURIC ACID

Print Date: March 2004

SECTION 1 – Chemical Product and Company Identification

MSDS Name: SULPHURIC ACID MSDS Preperation Date: 02-2004, Supersedes 02-2001, 02-98

Synonyms or Generic ID: Oil of vitriol, hydrogen sulphate, vitriol brown oil, matting acid, battery acid.
SEASTAR™ Product Codes: IO-03-0500, IO-03-2500, IO-03-25SK, BA-03-0250, BA-03-0500, BA-03-1000, BA-03-2000
Canadian TDG Classification: 8 PKG Gr II **Formula:** H_2SO_4
PIN (UN# / NA#): UN1830 **Molecular Wt:** 98.08
Canadian WHMIS Class: Class E; Class D Div 1 Sub A; Class C.

Supplier: Seastar Chemicals Inc, PO Box 2219, 2045 Mills Road West, Sidney, BC, Canada V8L 3S8
Tel: (250) 655-5880, **Fax:** (250) 655-5888

CANUTEC (CAN): (613)-996-6666

SECTION 2 – Composition/Information on Ingredients

CAS #	Chemical Name	Percent	EINECS/ELINCS	TLV	Hazard
7664-93-9	Sulphuric Acid	73-98%	231-639-5	1 mg/m³	Corrosive
7732-18-5	Water	Balance	None	None	None

Hazard Symbols: C Risk Phrases: 35

SECTION 3 – Hazards Identification

EMERGENCY OVERVIEW

Clear, colourless to dark brown, odourless, dense, oily liquid. Will not burn. Can decompose at high temperatures forming toxic gases, such as sulfur oxides. Contact with combustible materials may cause fire. Highly reactive. Contact with many organic and inorganic chemicals may cause fire or explosion. Contact with metals liberates flammable hydrogen gas. Reacts violently with water. VERY TOXIC. May be fatal if inhaled or swallowed. CORROSIVE to the eyes, skin and respiratory tract. May cause blindness and permanent scarring. Causes lung injury--effects may be delayed. Strong inorganic acid mists containing sulfuric acid are CARCINOGENIC.
Target Organs: Lungs, teeth, eyes, skin, mucous membranes.

Potential Health Effects
Primary Route(s) of Entry: Inhalation and ingestion. Skin contact. Eye contact.
Effects of Acute Exposure: Corrosive, oxidizing and sulphonating properties on contact. May be fatal by ingestion, inhalation or skin absorption.
LD50/LC50: CAS# 7664-93-3: Inhalation, mouse: LC50 = 320 mg/m3/2H, Inhalation, rat: LC50 = 510 mg/m3/2H Oral, rat: LD50 – 2140 mg/kg.
Eyes: Causes severe eye burns. May cause irreversible eye injury.
Skin: Causes skin burns. Defatting dermatitis with prolonged use.
Ingestion: May cause severe and permanent damage to the digestive tract. Causes burns in mouth, pharynx and gastrointestinal tract. Nausea, Vomiting, Abdominal pain. Corrosive and toxic
Inhalation: Harmful if inhaled. May cause severe irritation of the respiratory tract with sore throat, coughing, shortness of breath and delayed lung edema. Causes chemical burns to the respiratory tract. May cause respiratory inflammation. Destructive to tissues of mucous membranes. Headache, May cause delayed lung injury. Vomiting. Nausea. Pulmonary edema. Corrosive and toxic.

Effects of Chronic Exposure: Prolonged or repeated inhalation may cause nosebleeds, nasal congestion, erosion of the teeth, perforation of the nasal septum, chest pain and bronchitis. Prolonged or repeated eye contact may cause conjunctivities. May cause death. CORROSIVE to body tissues. To the best of our knowledge the chronic toxicity of this substance has not been fully investigated.

Seastar Chemicals Inc *MSDS – SULPHURIC ACID*
Page 1 of 5

SDS Contents

1. Identification Section
2. Hazard(s) identification
3. Composition/information on ingredients
4. First-aid measures
5. Fire-fighting measures
6. Accidental release measures
7. Handling and storage
8. Exposure controls/personal protection
9. Physical and chemical properties
10. Stability and reactivity
11. Toxicological information
12. Ecological information
13. Disposal considerations
14. Transport information
15. Regulatory information

How Do I Know What it is?

Material Safety Data Sheet
SULPHURIC ACID

Print Date: March 2004

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MSDS Preparation Date: 02-2004, Supersedes 02-2001, 02-98

Synonyms or Generic ID: Oil of vitriol, hydrogen sulphate, vitriol brown oil, matting acid, battery acid.
SEASTAR™ Product Codes: IQ-03-0500, IQ-03-2500, IQ-03-25SK, BA-03-0250, BA-03-0500, BA-03-1000, BA-03-2000
Canadian TDG Classification: 8 PKG Gr II
Formula: H_2S0_4
PIN (UN# / NA#): UN1830
Molecular Wt: 98.08
Canadian WHMIS Class: Class E; Class D Div 1 Sub A; Class C.

Supplier: Seastar Chemicals Inc, PO Box 2219, 2045 Mills Road West, Sidney, BC, Canada V8L 3S8
Tel: (250) 655-5880, **Fax:** (250) 655-5888

CANUTEC (CAN): **(613)-996-6666**

How Do I Know What it is?

SECTION 2 – Composition/Information on Ingredients

CAS #	*Chemical Name*	*Percent*	*EINECS/ELINCS*	*TLV*	*Hazard*
7664-93-9	Sulphuric Acid	73-98%	231-639-5	1 mg/m³	Corrosive
7732-18-5	Water	Balance	None	None	None

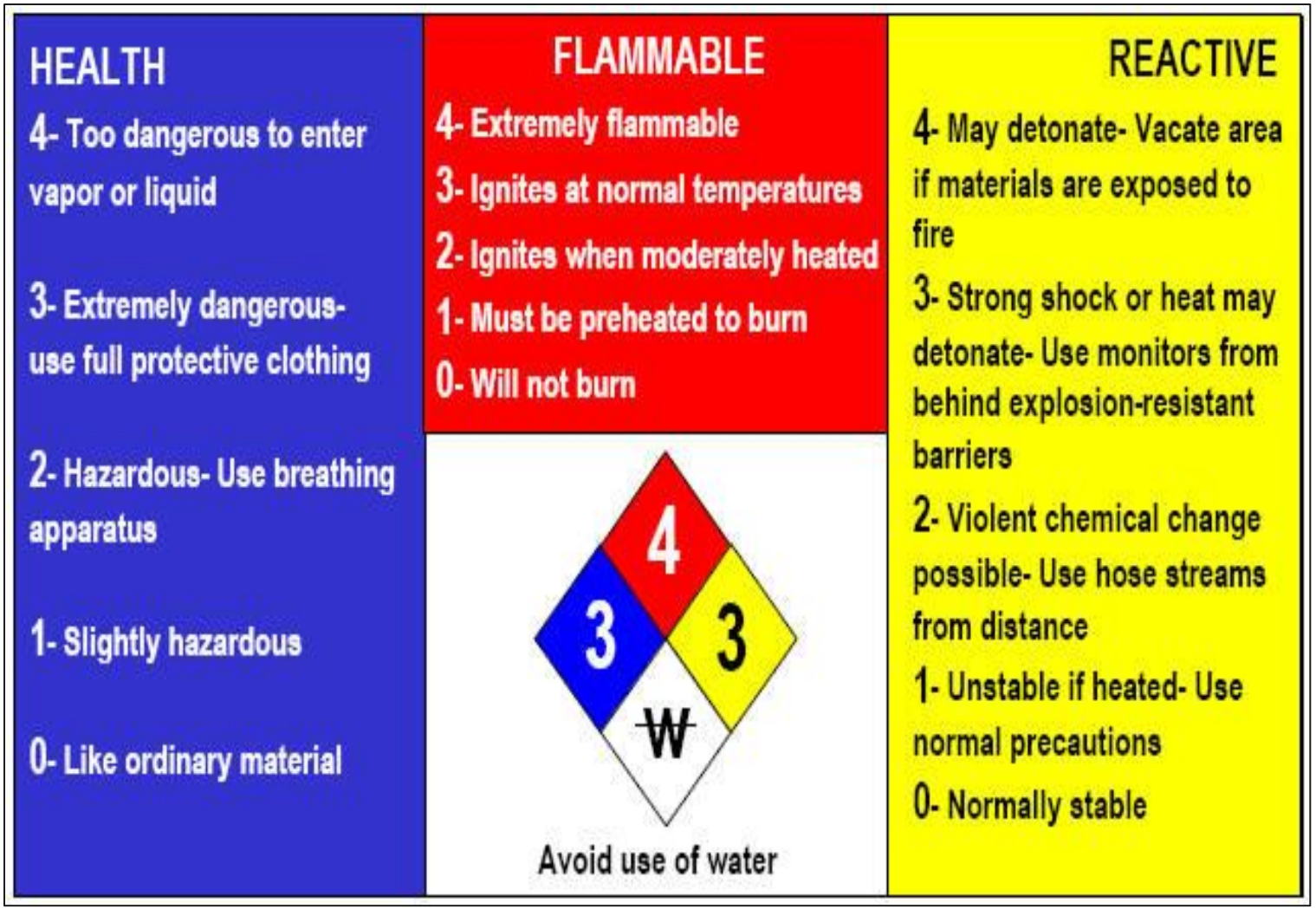
Hazard Symbols: C Risk Phrases: 35

How Do I Know What it is?

SECTION 5 – Fire Fighting Measures

General Information: Wear appropriate protective clothing to prevent contact with skin and eyes. Wear a self-contained breathing apparatus (SCBA) to prevent contact with thermal decomposition products. Contact with water can cause violent liberation of heat and splattering of the material.
Extinguishing Media: Use extinguishing media most appropriate for the surrounding fire. Carbon dioxide. Dry chemical power. Do not use water.
Auto-ignition Temperature: Not available.
Flash Point: Not available.
NFPA Rating: Health – 3, Flammability – 0, Instability – 2, Water Reactive.
Explosion Limits: Lower: Not available. Upper: Not available.
Special Fire and Explosion Hazards: Oxidizing material – contributes to combustion of other materials. Reacts violently with water and organic materials with evolution of heat. Emits toxic and corrosive fumes under fire conditions.

NFPA 704


HEALTH
4- Too dangerous to enter vapor or liquid
3- Extremely dangerous- use full protective clothing
2- Hazardous- Use breathing apparatus
1- Slightly hazardous
0- Like ordinary material
FLAMMABLE
4- Extremely flammable
3- Ignites at normal temperatures
2- Ignites when moderately heated
1- Must be preheated to burn
0- Will not burn
4
3
3
W
Avoid use of water
REACTIVE
4- May detonate- Vacate area if materials are exposed to fire
3- Strong shock or heat may detonate- Use monitors from behind explosion-resistant barriers
2- Violent chemical change possible- Use hose streams from distance
1- Unstable if heated- Use normal precautions
0- Normally stable

How Do I Know What it is?

SECTION 8 – Exposure Control/Personal Protection

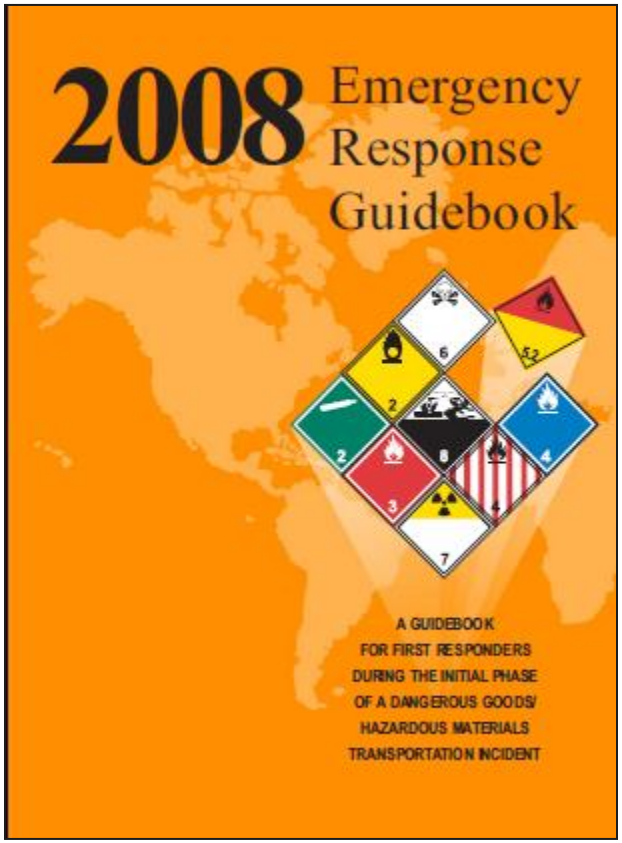
Engineering Controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels.
Exposure Limits:

Chemical Name	*ACGIH*	*NIOSH*	*OSHA*
Sulphuric acid	1 mg/m³ TWA; 3 mg/m³ STEL	1 mg/m³ TWA	1 mg/m³ TWA

Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133.
Skin: Wear appropriate protective neoprene or polyethylene gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure. Apron or clothing to protect skin. Rubber boots. Sufficient to protect skin.
Respiratory Protection: Follow the OSHA respirator regulations found in 29CFR 1910.134. Always use a NIOSH-approved respirator when necessary.
Ventilation: Use only in a chemical fume hood.
Other Protective Equipment: Make eye bath and emergency shower available.

How Do I Know What it is?

UN 1830 →



GUIDE 137 — SUBSTANCES - WATER-REACTIVE - CORROSIVE — ERG2008

POTENTIAL HAZARDS

HEALTH

- CORROSIVE and/or TOXIC; inhalation, ingestion or contact (skin, eyes) with vapors, dusts or substance may cause severe injury, burns or death.
- Fire will produce irritating, corrosive and/or toxic gases.
- Reaction with water may generate much heat that will increase the concentration of fumes in the air.
- Contact with molten substance may cause severe burns to skin and eyes.
- Runoff from fire control or dilution water may cause pollution.

FIRE OR EXPLOSION

- **EXCEPT FOR ACETIC ANHYDRIDE (UN1715), THAT IS FLAMMABLE**, some of these materials may burn, but none ignite readily.
- May ignite combustibles (wood, paper, oil, clothing, etc.).
- Substance will react with water (some violently), releasing corrosive and/or toxic gases and runoff.
- Flammable/toxic gases may accumulate in confined areas (basement, tanks, hopper/tank cars, etc.).
- Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated or if contaminated with water.
- Substance may be transported in a molten form.

PUBLIC SAFETY

- **CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind. • Keep out of low areas. • Ventilate enclosed areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY".

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

Page 220

Group H Occupancies

Classification

Building or portion thereof used for

- manufacturing
- processing
- generation
- Storage

Materials posing a health or physical hazard in amounts exceeding the MAQ

Group H Occupancies

Group H-1

Detonation hazard

- Explosives
- Organic peroxides
- Oxidizers – Class 4
- Unstable (reactive) materials
- Detonable pyrophorics

Group H Occupancies

Group H-2

Deflagration or accelerated burring hazard

- Class I, II, or IIIA FL or CL in *open containers/systems* or *closed containers/systems* >15psi
- Combustible dusts
- Cryogenic fluids - flammable
- Flammable gases
- Oxidizers – Class 3

Group H Occupancies

Group H-3

Readily support combustion or present a *physical hazard*

- Class I, II, or IIIA *closed containers/systems* ≤15psi
- Combustible fibers
- Consumer fireworks
- Cryogenic fluids - oxidizing
- Flammable solids
- Oxidizers – Class 1 or 2 & gases

Group H Occupancies

Group H-4

Health hazard

- Corrosives
- Highly toxic materials
- Toxic materials

Group H Occupancies

Toxic Material

1. A chemical that has a median lethal dose (*LD50) of* more than 50 milligrams per kilogram, but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

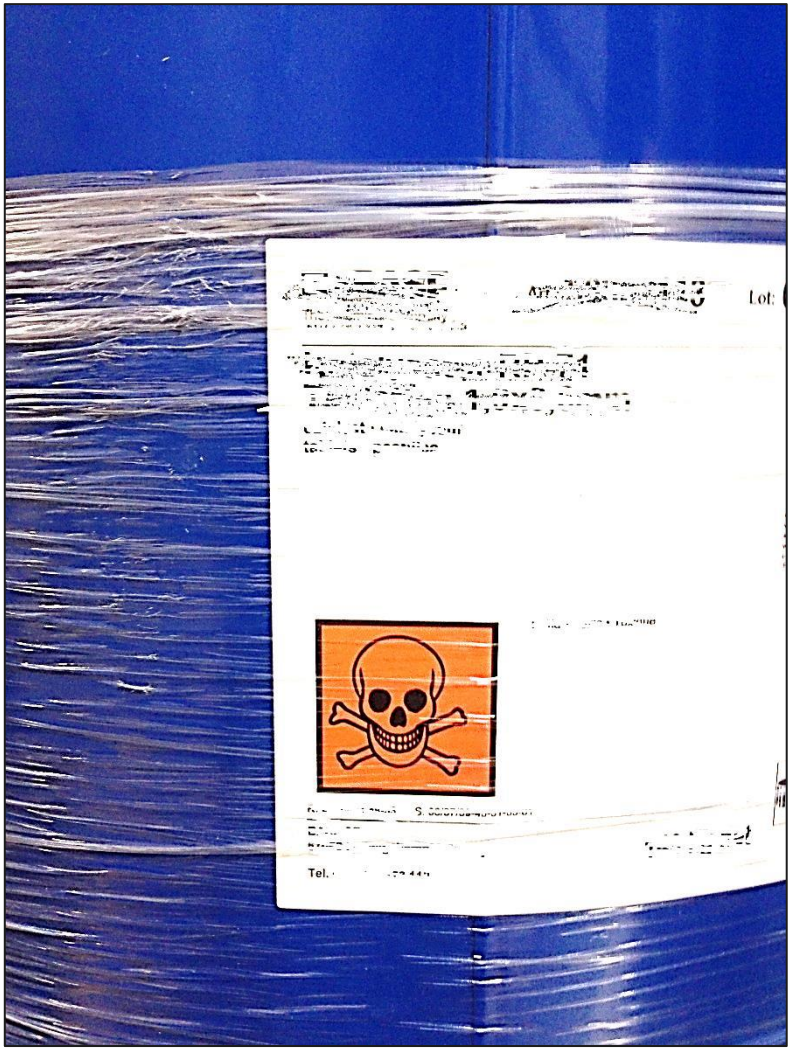
2. A chemical that has a median lethal dose (*LD50) of* more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.

Group H Occupancies

Highly Toxic Material

1. … median lethal dose (*LD50) of 50* milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
2. … median lethal dose (*LD50) of 200* milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours with the bare skin of albino rabbits.
3. … median lethal concentration (*LC50) in air of 200 parts per million by volume or less* of gas or vapor, or 2 milligrams per liter or less of mist, fume or dust, when administered by continuous inhalation for 1 ….

Group H Occupancies



Group H Occupancies

Group H-5

Semiconductor fabrication facilities and comparable research and development areas using hazardous production materials (HPM) – aggregate > MAQ

Group H Occupancies

Multiple Hazards

- Groups H-1, H-2, H-3, & H-4
- Conform to the requirements for each

Group H Occupancies

Exception

1. Control areas

2. Amounts ≤ MAQ in T307.7(1) or (2)

Group H Occupancies

Exception 3

Application of flammable liquids

flammable paints, varnishes and lacquers by spraying, dipping or coating

CSBC & CFSC 416

CT Flammable & Combustible Liquids Code

- NFPA 34-1995 Dipping and Coating Processes

Group H Occupancies

Exception 4

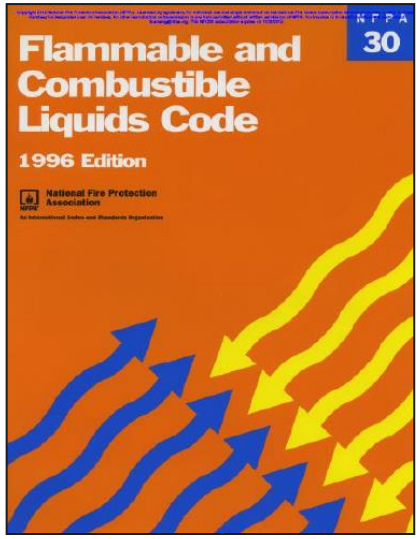
Mercantile sales – wholesale or retail

Group H Occupancies

Exception 4

Mercantile sales – *continued*

CT Flammable & Combustible Liquids Code



4-5.6 Mercantile Occupancies

Class I & II

- Never in basements
- > 5 gal. container - non public areas
- ≤ 60 (≤ 120 w/AS) gal. other than at grade

Group H Occupancies

Exception 4

Mercantile sales – *continued*

Table 4-5.6 Allowable Storage and Display Amounts for Mercantile Occupancies[3]

Level of Protection		Liquid Classification		
		IA[2]	IB, IC, II, and IIIA (Any Combination)	IIIB
Unprotected	Maximum quantity allowed[1]	60 gal	3750 gal per building area; a maximum of two areas permitted per occupancy when separation is provided by a minimum 1-hr-rated fire separation wall	15,000 gal
	Maximum storage density	2 gal per square foot in storage or display area and adjacent aisles		
NFPA 13, Ordinary Hazard (Group 2) Sprinkler System	Maximum quantity allowed[1]	120 gal	7500 gal per building area; a maximum of two areas permitted per occupancy when separation is provided by a minimum 1-hr-rated fire separation wall	Unlimited
	Maximum storage density	4 gal per square foot in storage or display area and adjacent aisles		
NFPA 30, Section 4-8	Maximum quantity allowed[1]	120 gal	30,000 gal per occupancy	Unlimited

SI units: 1 gal = 3.8 L.

[1]Does not include liquids exempted by Section 4-1.1.
[2]Ground-level floor only.
[3]Existing unprotected mercantile occupancies in operation prior to January 1, 1997, are permitted to store or display up to 7500 gal of Class IB, IC, II, and IIIA liquids (any combination) in each area.

Group H Occupancies

Exception 5

Closed systems – machinery or equipment

flammable & combustible liquids or gases

Group H Occupancies

Exceptions 6 & 7

Cleaning establishments

combustible liquid solvents
flashpoint >140°F
closed loop system
listed equipment

liquid solvents flashpoint >200°F

Group H Occupancies

Exception 8

Stores & distributors – bulk liquor storage

combustible liquid

Group H Occupancies

Exception 9

Refrigeration systems

refrigerants typically flammable or toxic

IMC Chapter 11
CFSC Part III – 606
- FD Access
- Detection
- Ventilation

Group H Occupancies

Exception 10

Agricultural materials – on premise

fertilizers
pesticides
fungicides

Group H Occupancies

Exception 11

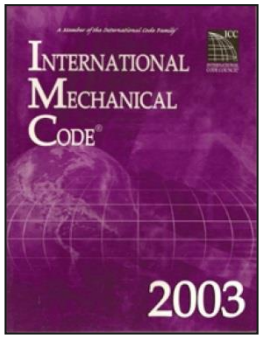
Stationary batteries

EPS
UPS
Telecommunications

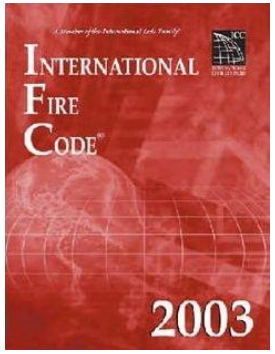
Group H Occupancies

Exception 11

Storage batteries – *continued*



IMC Chapter 4



CFSC Part III – 608

- If lead-acid batteries w/ electrolyte capacity of > 50 gallons

Group H Occupancies

Exception 12

Corrosives

personal or household products
original packaging – retail display
- bleaches,
- detergents
- household cleaning supplies in normal-size containers

commonly used building materials

Group H Occupancies

Exception 13

Aerosol storage *(flammable propellants only)*

CT Flammable & Combustible Liquids Code

NFPA 30B-1994 Manufacture and Storage of Aerosol Products

- Construction
- Egress
- Electrical & heating
- Fire protection
- Arrangement of storage

Group H Occupancies

Exception 13

Aerosol storage - *continued*

Table 4-3(a) Arrangement and Protection of Palletized and Solid-Pile Level 2 Aerosol Storage[1]

Maximum Ceiling Height (ft)	30	30	25	25
Maximum Pile Height (ft)	5	15	18	20
Sprinkler	Standard or Large orifice	ESFR (K = 13.5 to 14.5)	Large drop 0.64 in.	ESFR (K = 13.5 to 14.5)
Temperature Rating[2]	High	Ordinary	Ordinary	Ordinary
Sprinkler Spacing (ft²)	100 max.	80–100	80–100	80–100
Sprinkler Demand	0.30 gpm/ft² over 2500 ft²	12 sprinklers at 50 psi	15 sprinklers at 50 psi	12 sprinklers at 50 psi
Hose Stream Demand (gpm)	See 2-6.4			
Duration (hr)	2	1	2	1

Group H Occupancies

Exception 14

Display & storage – hazardous materials

Nonflammable solids
Nonflammable liquids
Noncombustible liquids

- ≤ MAQ
- Group M or S
- Comply w/ 414.2.4

Group H Occupancies

Exception 15 *part 1*

Storage of …

black powder
smokeless propellant
small arms primers

- Groups M & R-3

Group H Occupancies

Exception 15 *part 2*

Storage of …

special industrial explosive devices

- Groups B, F, M, & S

Group H Occupancies

Exception 15 *part 2*

Special Permit required

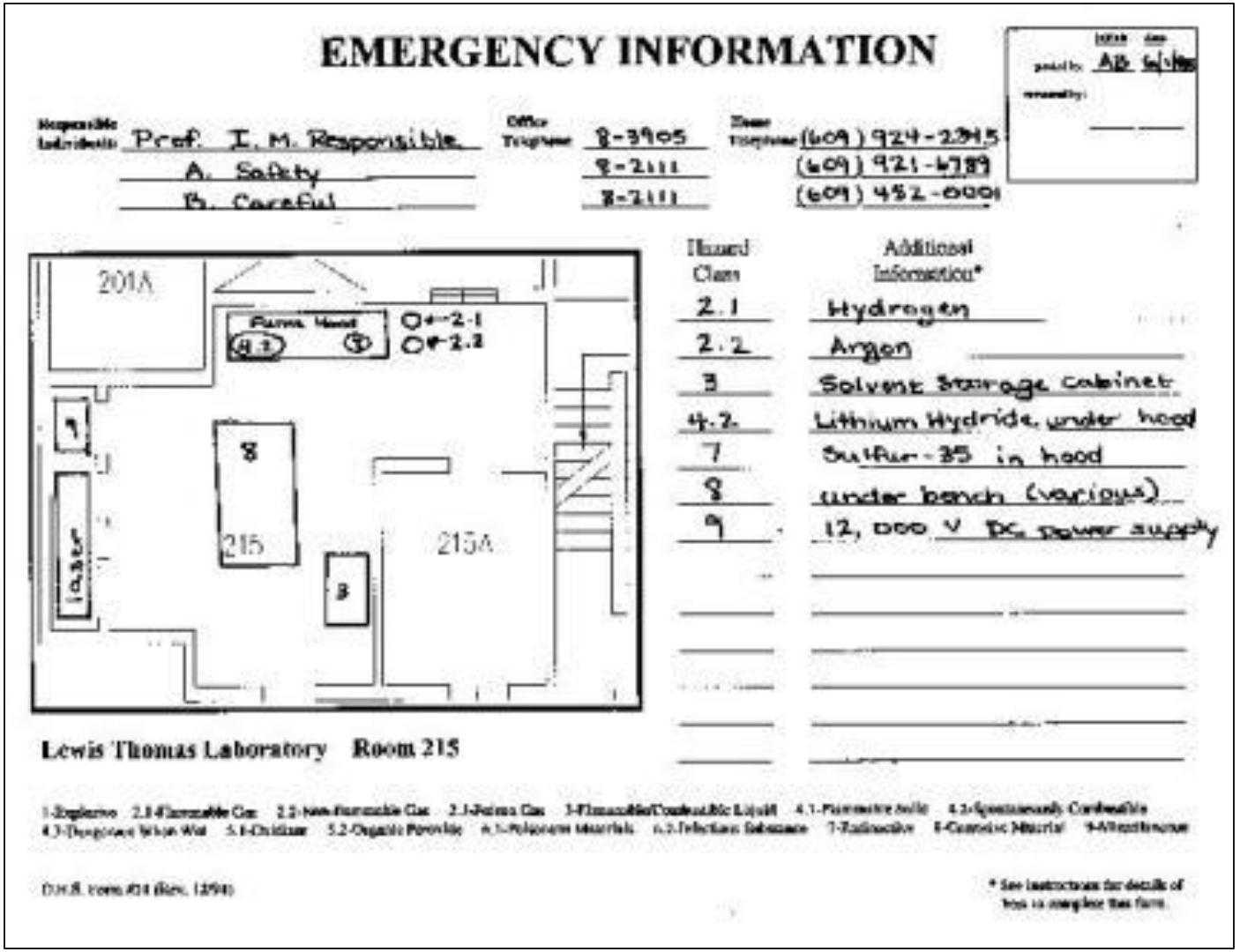
Group H Occupancies

General Requirements

Information required

- Floor plans
  - Contents
  - Processes

Group H Occupancies



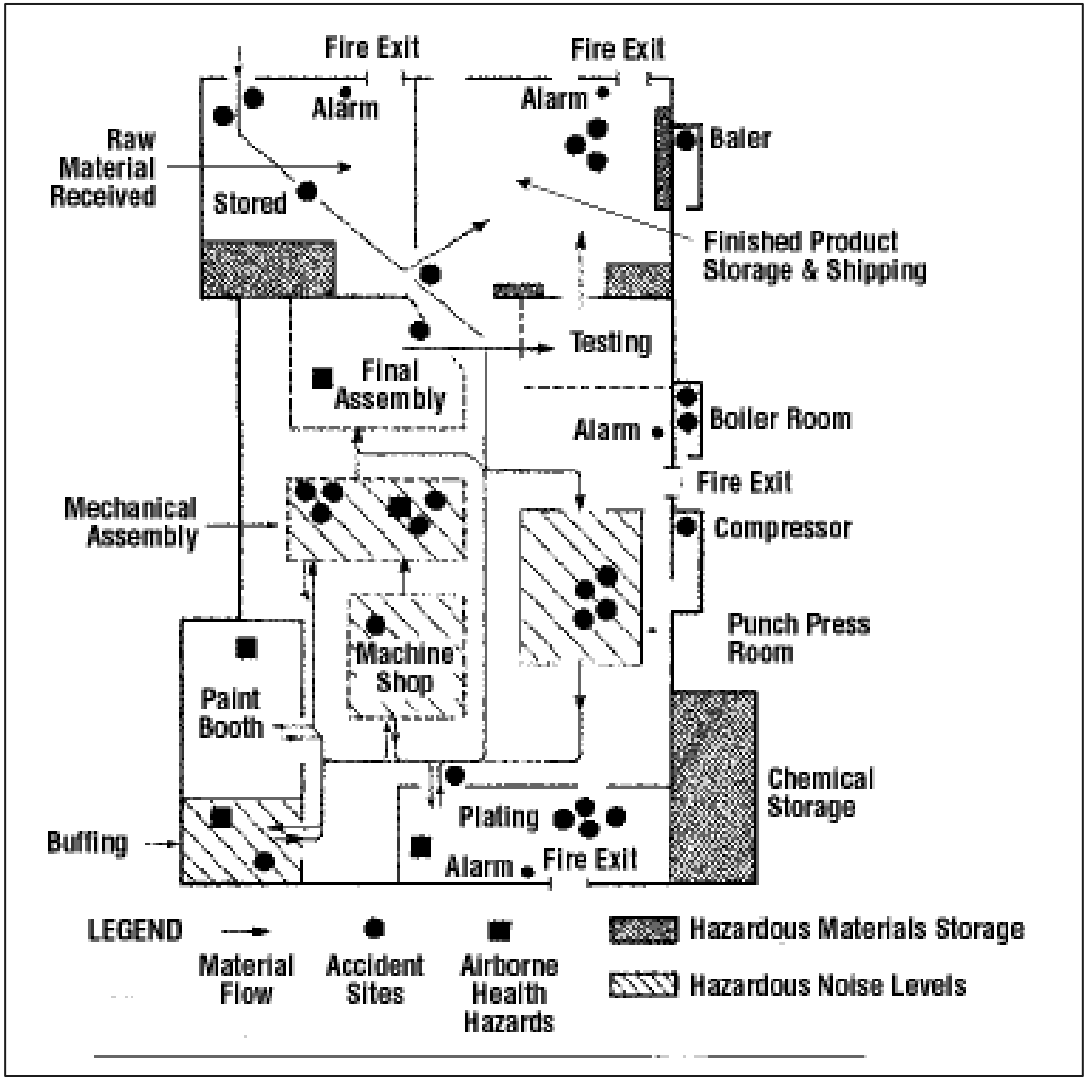
EMERGENCY INFORMATION

Responsible Individuals: Prof. I. M. Responsible — Office Telephone: 8-3905 — Home Telephone: (609) 924-2345
A. Safety — 8-2111 — (609) 921-4789
B. Careful — 8-2111 — (609) 452-6001

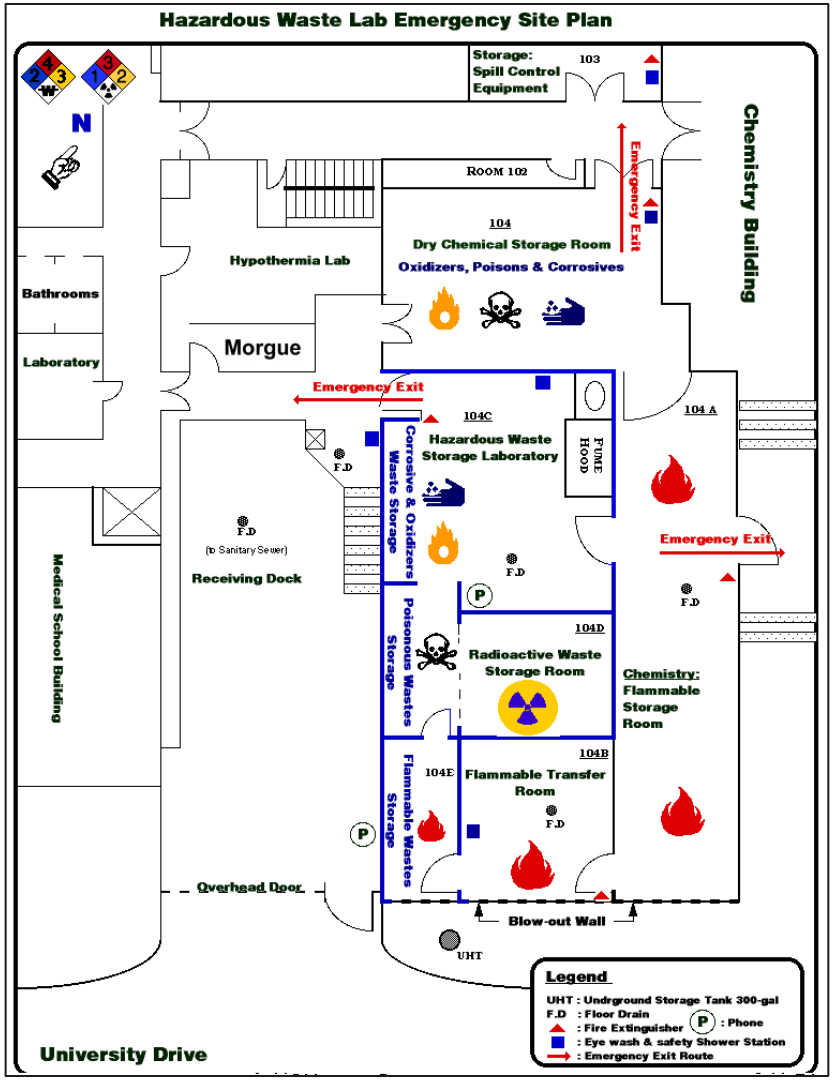
Hazard Class	Additional Information*
2.1	Hydrogen
2.2	Argon
3	Solvent Storage Cabinet
4.2	Lithium Hydride, under hood
7	Sulfur-35 in hood
8	under bench (various)
9	12,000 V DC power supply

Lewis Thomas Laboratory Room 215

Group H Occupancies



Group H Occupancies



Group H Occupancies

General Requirements

Information required

- Report
  - Materials
  - Hazards
  - Protection

Group H Occupancies

Inventory (Superfund Amendments and Reauthorization Act of 1986 **SARA**)

- Manufacturer's name.
- Chemical name, trade names, hazardous ingredients.
- Hazard classification.
- MSDS or equivalent.
- United Nations (UN), North America (NA) or the Chemical Abstract Service (CAS) identification number.
- Maximum quantity stored or used on-site at one time.
- Storage conditions related to the storage type, temperature and pressure.

Group H Occupancies

HM Management Plan

- Max amount of each material stored or used
- Container sizes
- Locations of emergency isolation valves
- Product conveying piping - liquids or gases
- Location and type of emergency equipment

Group H Occupancies

HM Management Plan

- Process hazard analyses
- Pre-startup safety review
- Operating and emergency procedures
- Emergency response plan
- Accident procedures
- Safety audits
- Facility closure plan

Group H Occupancies

Focuses

- Reliability of equipment and operations
- Prevention of unintentional reaction or release
- Spill mitigation
- Ignition hazards
- Protection of materials
- Reliable power source
- Ventilation

Group H -1

Group H-1

Detonation hazard

- Explosives
- Organic peroxides
- Oxidizers – Class 4
- Unstable (reactive) materials
- Detonable pyrophorics

Group H Occupancies

Group H-2

Deflagration or accelerated burring hazard

- Class I, II, or IIIA FL or CL in *open containers/systems* or *closed containers/systems* >15psi
- Combustible dusts
- Cryogenic fluids - flammable
- Flammable gases
- Oxidizers – lass 3

Group H Occupancies

Group H-3

Readily support combustion or present a *physical hazard*

- Class I, II, or IIIA *closed containers/systems* ≤15psi
- Combustible fibers
- Consumer fireworks
- Cryogenic fluids - oxidizing
- Flammable solids
- Oxidizers – Class 1 or 2 & gases

Group H Occupancies

Height & Area

Table 503 Allowable Building Heights and Areas										
Group		Type of Construction								
		Type I		Type II		Type III		Type IV	Type V	
		A	B	A	B	A	B	HT	A	B
	Height (Feet)	UL	160	65	55	65	55	65	50	40
M	S A	UL UL	11 UL	4 21,500	4 12,500	4 18,500	4 12,500	4 20,500	3 14,000	1 9,000
S-1	S A	UL UL	11 48,000	5 26,000	3 17,500	5 26,000	3 17,500	5 25,500	3 14,000	2 9,000
F-1	S A	UL UL	11 UL	4 25,000	2 15,000	3 14,000	2 12,000	4 33,500	2 14,000	1 8,500
H-2	S A	UL 21,000	3 16,500	2 11,000	1 7,000	2 9,500	1 7,000	2 10,500	1 7,500	1 3,000
H-3	S A	UL UL	6 60,000	4 26,500	2 14,000	4 17,500	2 13,000	4 25,500	2 10,000	1 5,000

Control Areas

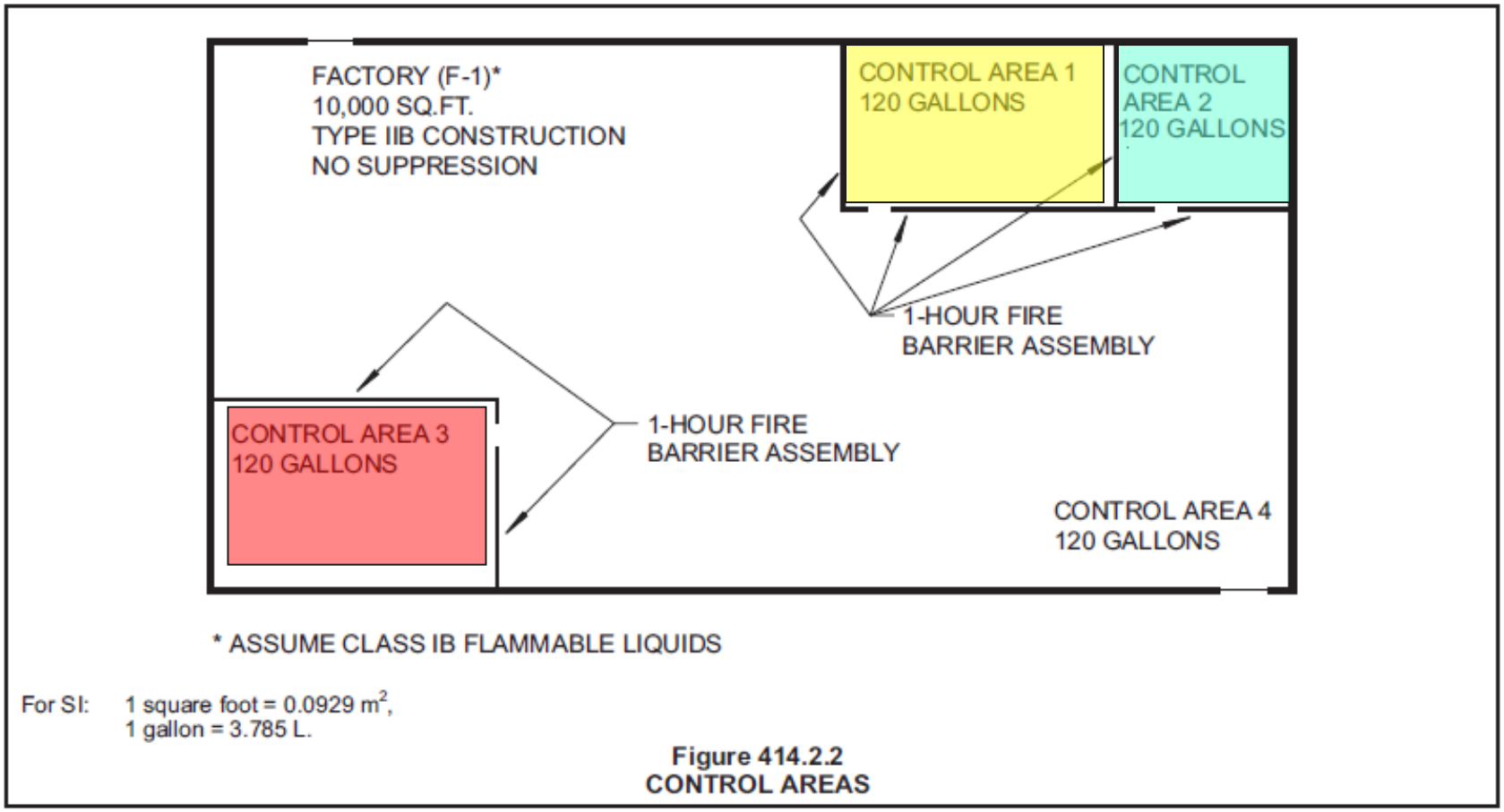
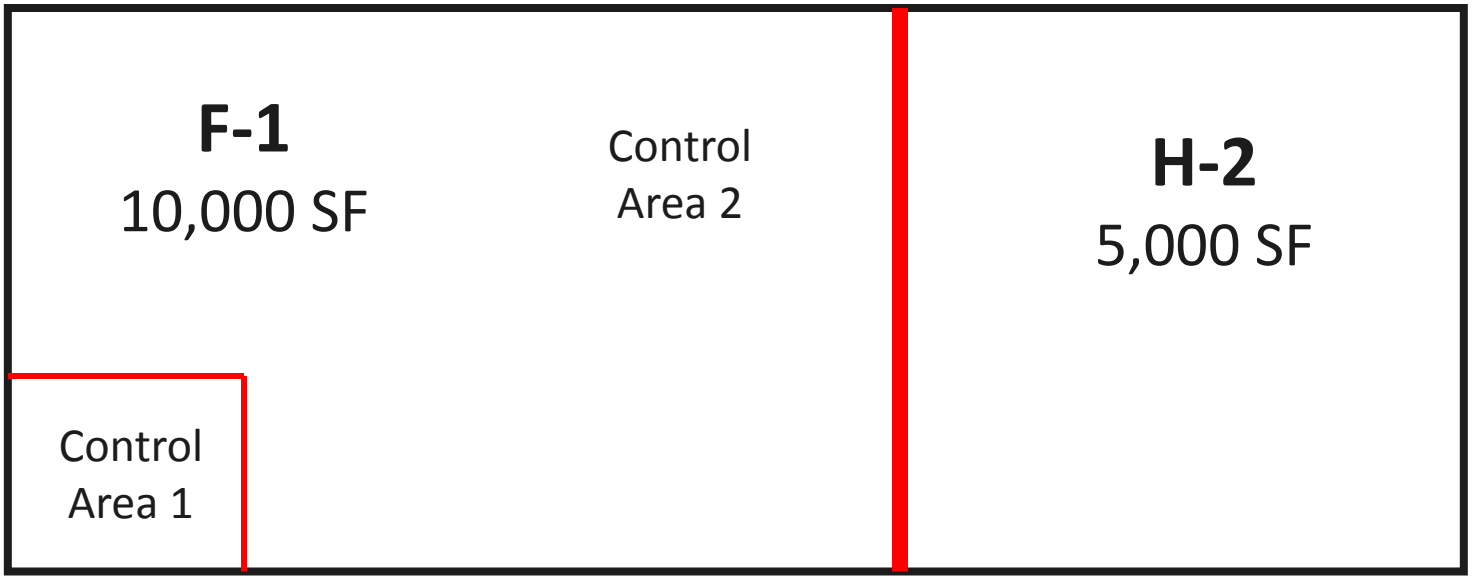


Figure 414.2.2
CONTROL AREAS

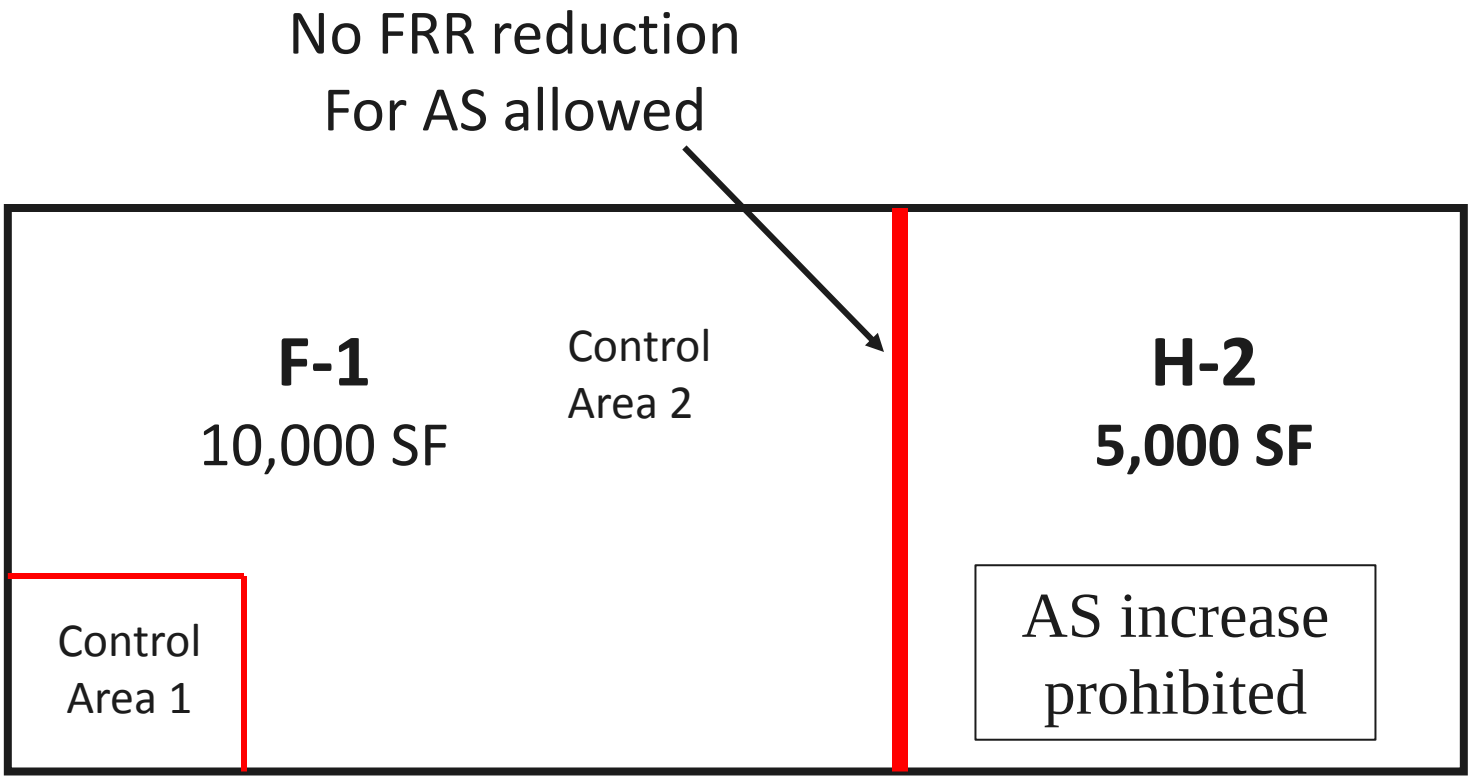
Source: 2003 IBC Code Commentary – Volume 1

Separated Occupancies



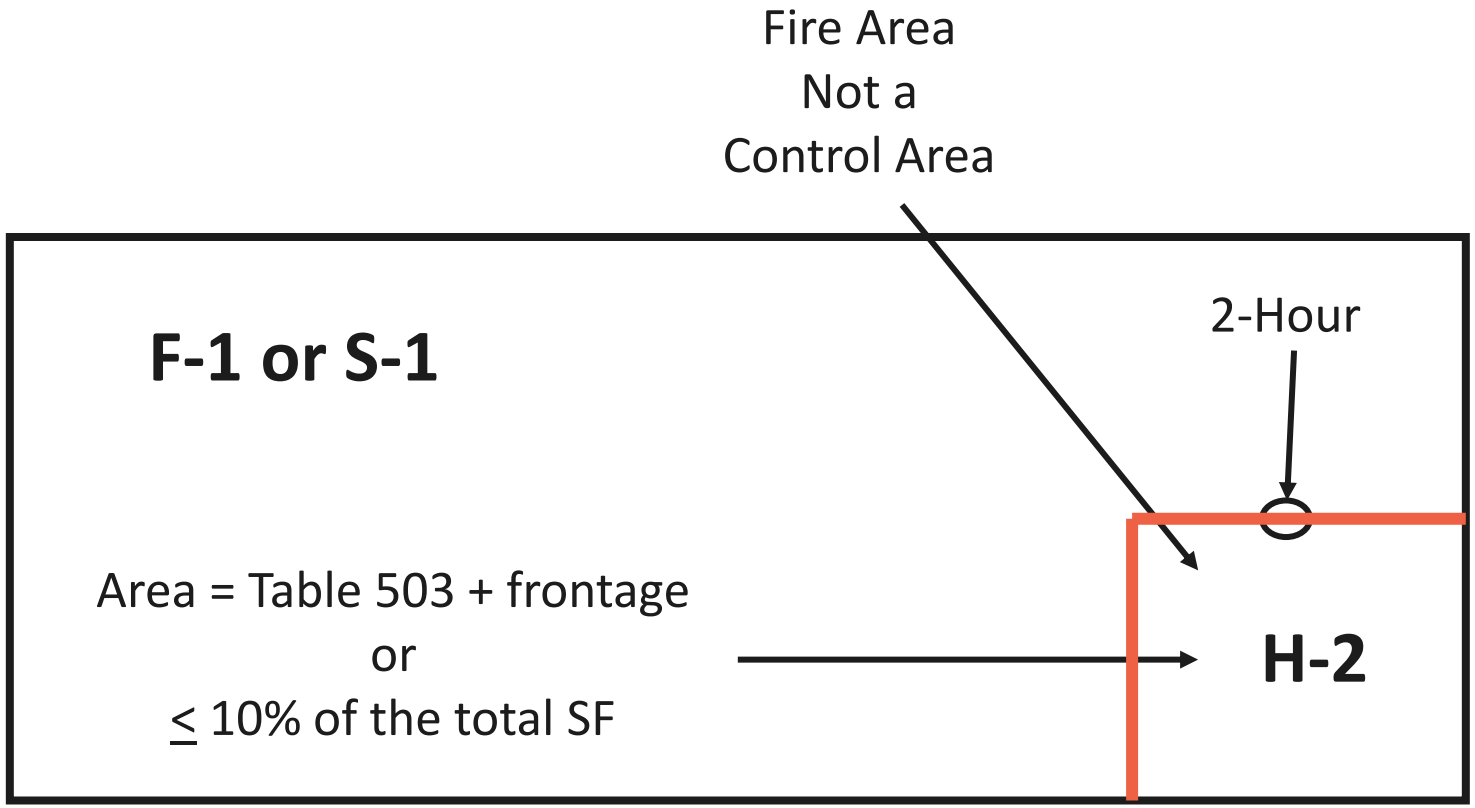
II-B Sprinklered Building

Separated Occupancies



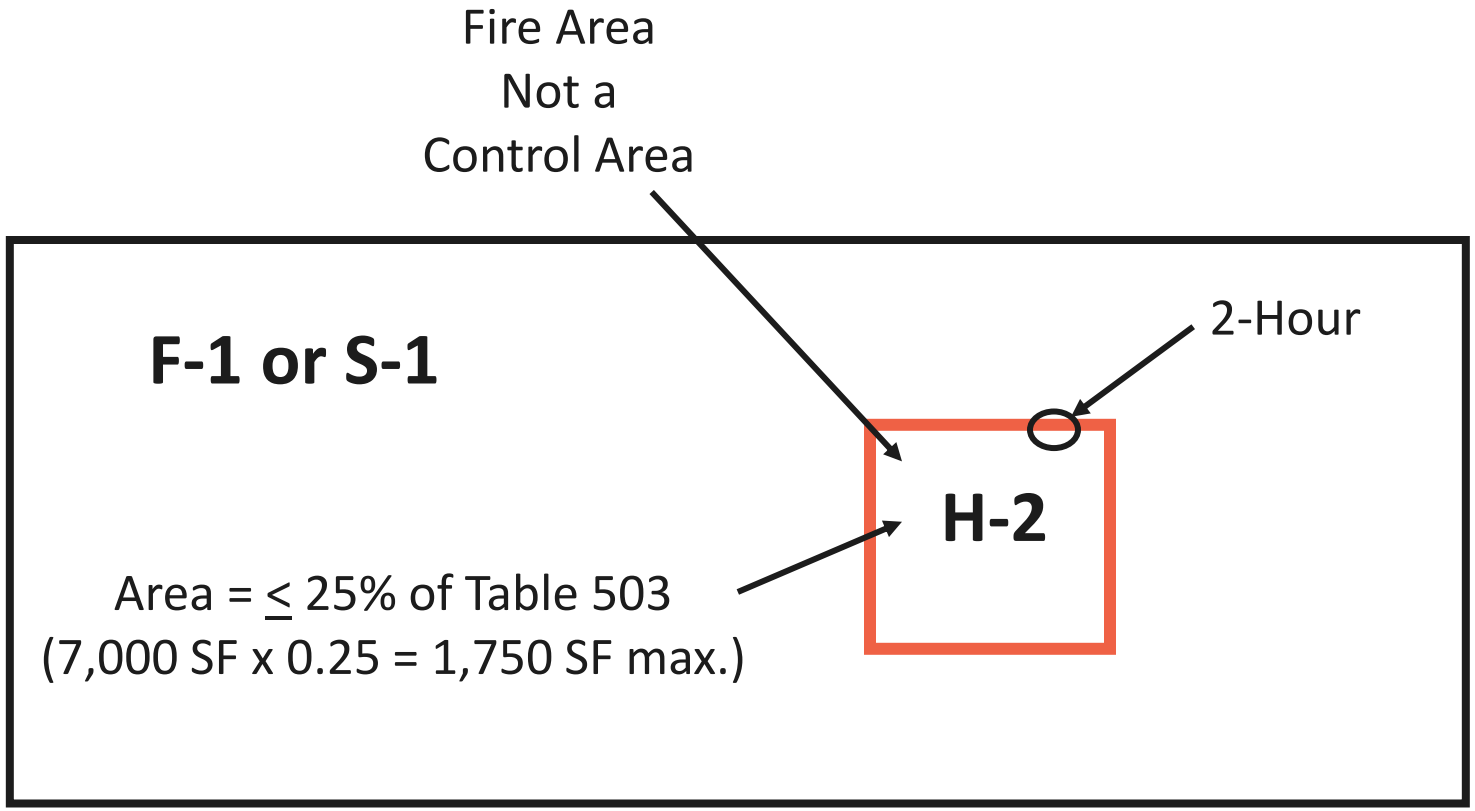
II-B Sprinklered Building

Unlimited Area



II-B Sprinklered – Unlimited Area Building

Unlimited Area



II-B Sprinklered – Unlimited Area Building

Unlimited Area

Aircraft Paint Hangar

- H-2
- Type I or II
- NFPA 409 suppression
- Limits – paint in use
- Separate cleaning
- Limits – paint storage
- Ventilation

Group H Occupancies

General Requirements

Ventilation *per* IMC

- Store, use, handle, or process
- Dusts, mists, fumes, or gases
  - Corrosive
  - Explosive
  - Combustible
  - Flammable
  - Highly toxic

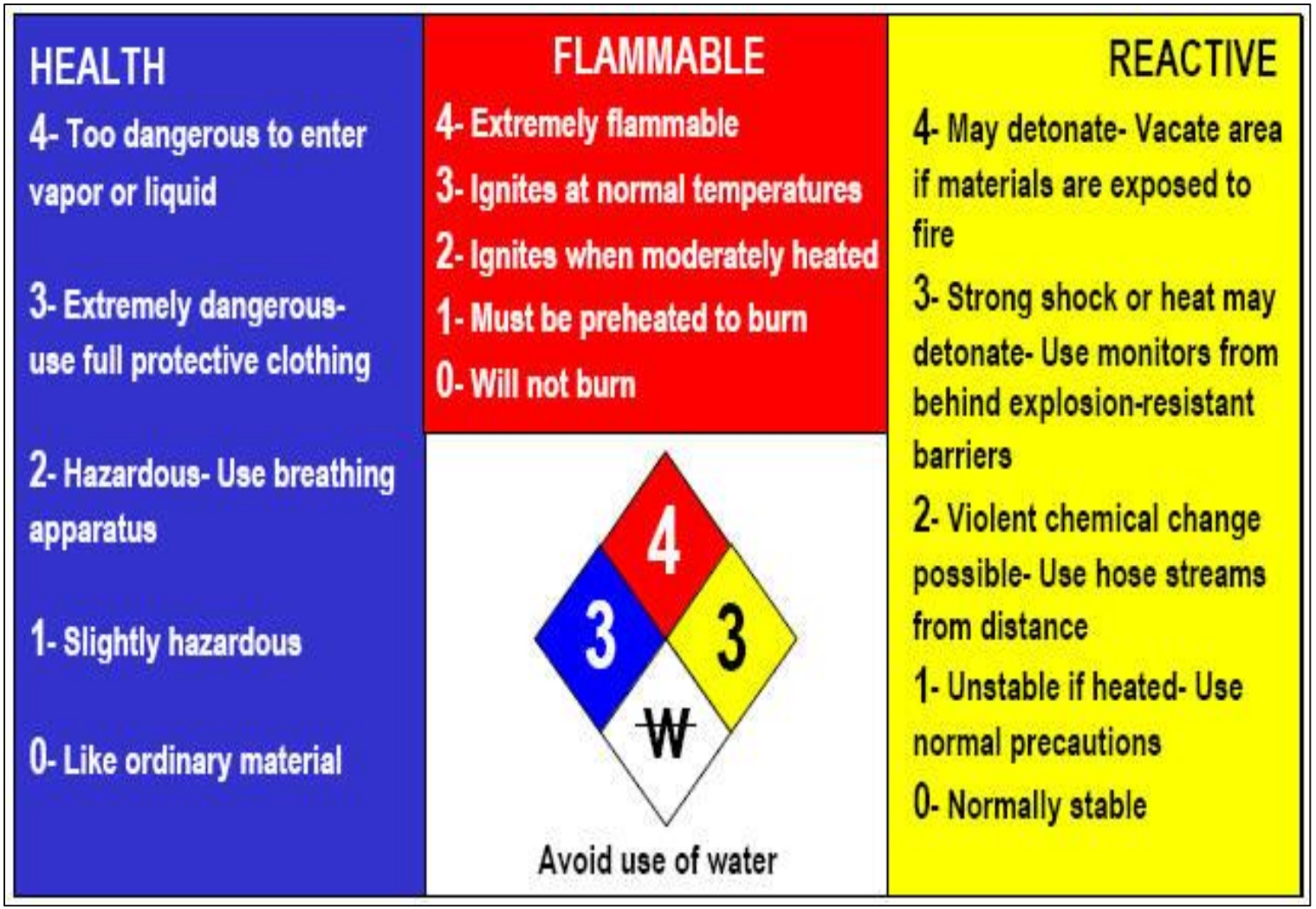
Group H Occupancies

- **Flammable** vapor, gas, fume, mist or dust is present in concentrations exceeding 25 percent of the lower flammability limit of the substance for the expected room temperature.

- Vapor, gas, fume, mist or dust with a **health-hazard** rating of 4 is present in any concentration.

- Vapor, gas, fume, mist or dust with a **health-hazard** rating of 1, 2 or 3 is present in concentrations exceeding 1 % of the median lethal concentration of the substance for acute inhalation toxicity.

Group H Occupancies



Group H Occupancies

Comparison of NFPA 704 and HazCom 2012 Labels

	 NFPA 704	 HazCom 2012
Purpose	Provides basic information for emergency personnel responding to a fire or spill and those planning for emergency response.	Informs workers about the hazards of chemicals in workplace under normal conditions of use and foreseeable emergencies.
Number System: NFPA Rating and OSHA's Classification System	0-4 0-least hazardous 4-most hazardous	1-4 1-most severe hazard 4-least severe hazard • The Hazard category numbers are NOT required to be on labels but are required on SDSs in Section 2. • Numbers are used to CLASSIFY hazards to determine what label information is required.

www.osha.gov/dsg/hazcom/index.html

Group H Occupancies

General Requirements

Outdoor Storage

Group H - 1

Special Provisions

≤ 1 story
No basement
Lightweight roof
≥ 75 to lot lines
(not FSD)

Group H - 2

Combustible dusts, grain processing/storage

- NFPA standards
- Table 503 *(except grain elevators)*
- Grinding rooms
- Coal pockets

Group H - 2

Flammable & Combustible Liquids

- NFPA standards
- Tank protection
- Leak alarms
- Ventilation
  - tanks
  - rooms
  - explosion

Group H - 2

LP-Gas Distribution Facilities

- LP-Gas Code
- Construction
- Attached buildings
- Rooms within

Group H - 2

Dry Cleaning *Plants*

- NFPA 32 - 2004
  - Class I – IV solvents
  - Sprinklers
  - Separations
- IMC
- IPC

Group H – 2 & H – 3

Special Provisions

TABLE 415.3.2
REQUIRED DETACHED STORAGE

DETACHED STORAGE IS REQUIRED WHEN THE QUANTITY OF MATERIAL EXCEEDS THAT LISTED HEREIN			
Material	**Class**	**Solids and Liquids (tons)[a,b]**	**Gases (cubic feet)[a,b]**
Explosives	Division 1.1 Division 1.2 Division 1.3 Division 1.4 Division 1.4[c] Division 1.5 Division 1.6	Maximum Allowable Quantity Maximum Allowable Quantity Maximum Allowable Quantity Maximum Allowable Quantity 1 Maximum Allowable Quantity Maximum Allowable Quantity	Not Applicable
Oxidizers	Class 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Unstable (reactives) detonable	Class 3 or 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Oxidizer, liquids and solids	Class 3 Class 2	1,200 2,000	Not Applicable Not Applicable
Organic peroxides	Detonable Class I Class II Class III	Maximum Allowable Quantity Maximum Allowable Quantity 25 50	Not Applicable Not Applicable Not Applicable Not Applicable
Unstable (reactives) nondetonable	Class 3 Class 2	1 25	2,000 10,000
Water reactives	Class 3 Class 2	1 25	Not Applicable Not Applicable
Pyrphoric gases	Not Applicable	Not Applicable	2,000

Group H – 2 & H – 3

Special Provisions

- > 15,000 SF single floor
  - Except NC building w/ NC materials
- Class 2, 3, or 4 oxidizers
- Some organic peroxides
- Some water reactive stuff

Group H – 3 & H – 4

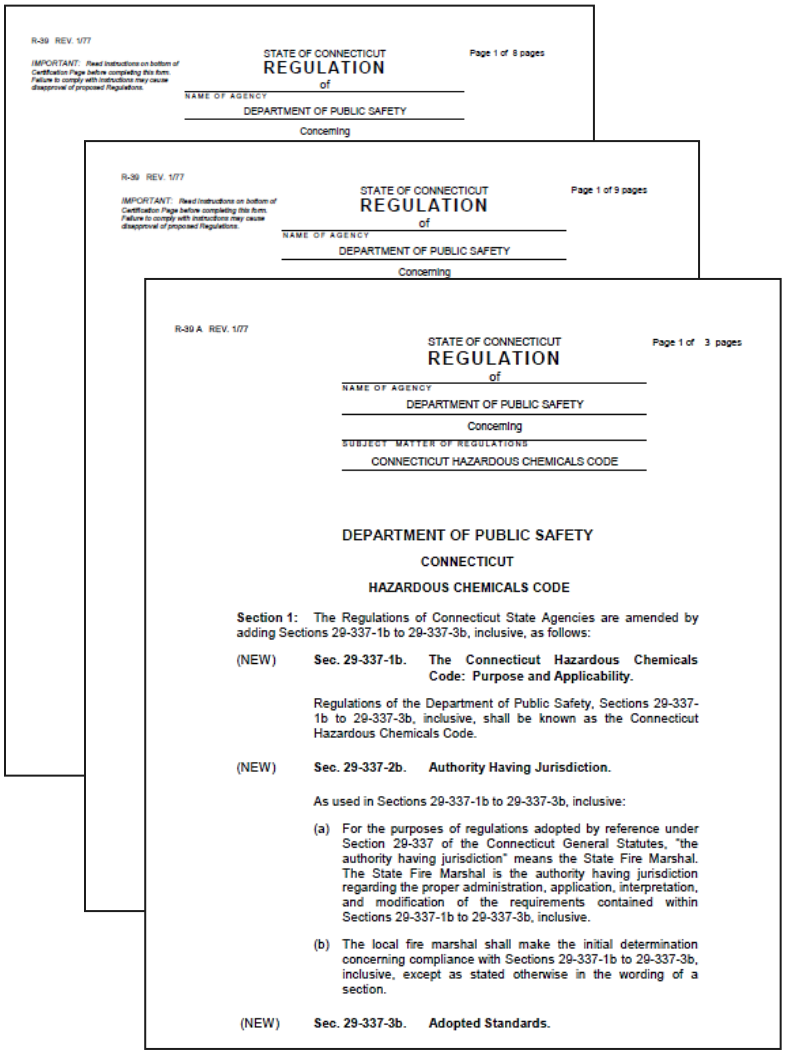
Readily support combustion or physical hazards

- F & CL = NFPA 30
- Gas rooms – 1-hour
- Liquid-tight floors
  - corrosive liquids
  - toxic or highly toxic
- Highly toxic stuff
  - storage cabinets
  - 1-hour barriers

Group H – 5

Semiconductor & HPM's

CT Code Changes



R-39 REV. 1/77

STATE OF CONNECTICUT
REGULATION
of
DEPARTMENT OF PUBLIC SAFETY
Concerning

Page 1 of 8 pages

R-39 REV. 1/77

STATE OF CONNECTICUT
REGULATION
of
DEPARTMENT OF PUBLIC SAFETY
Concerning

Page 1 of 9 pages

R-39 A REV. 1/77

STATE OF CONNECTICUT
REGULATION
of
DEPARTMENT OF PUBLIC SAFETY
Concerning
CONNECTICUT HAZARDOUS CHEMICALS CODE

Page 1 of 3 pages

DEPARTMENT OF PUBLIC SAFETY

CONNECTICUT

HAZARDOUS CHEMICALS CODE

Section 1: The Regulations of Connecticut State Agencies are amended by adding Sections 29-337-1b to 29-337-3b, inclusive, as follows:

(NEW) **Sec. 29-337-1b. The Connecticut Hazardous Chemicals Code: Purpose and Applicability.**

Regulations of the Department of Public Safety, Sections 29-337-1b to 29-337-3b, inclusive, shall be known as the Connecticut Hazardous Chemicals Code.

(NEW) **Sec. 29-337-2b. Authority Having Jurisdiction.**

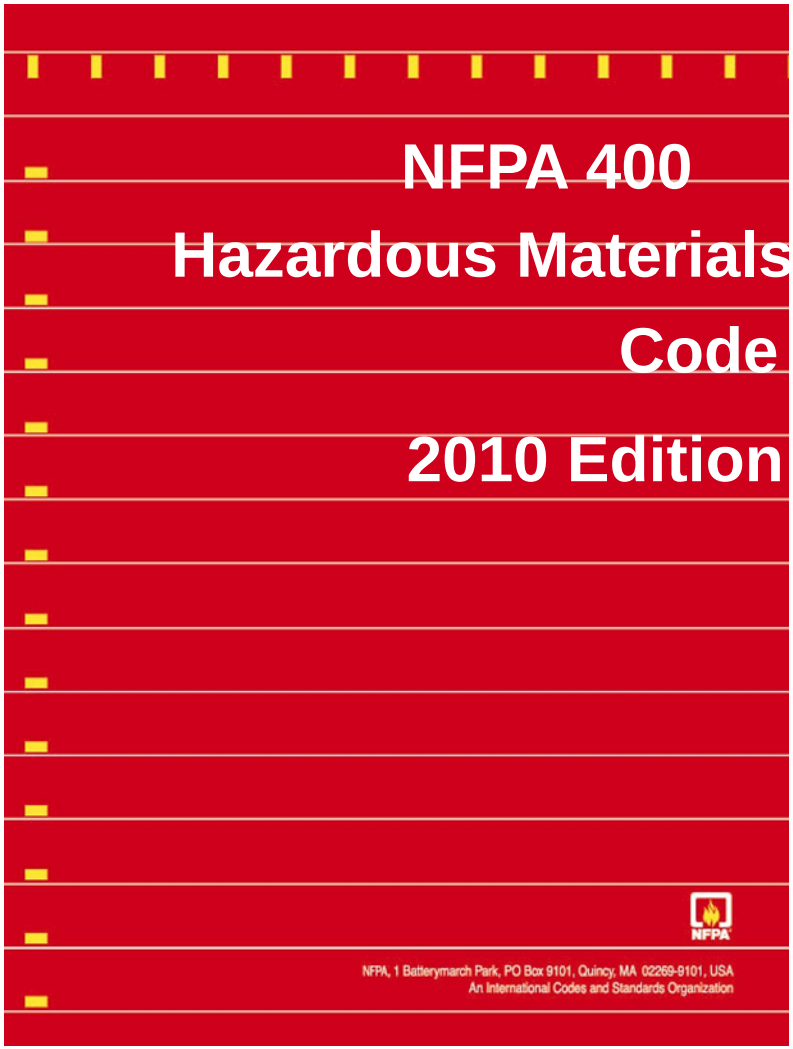
As used in Sections 29-337-1b to 29-337-3b, inclusive:

(a) For the purposes of regulations adopted by reference under Section 29-337 of the Connecticut General Statutes, "the authority having jurisdiction" means the State Fire Marshal. The State Fire Marshal is the authority having jurisdiction regarding the proper administration, application, interpretation, and modification of the requirements contained within Sections 29-337-1b to 29-337-3b, inclusive.

(b) The local fire marshal shall make the initial determination concerning compliance with Sections 29-337-1b to 29-337-3b, inclusive, except as stated otherwise in the wording of a section.

(NEW) **Sec. 29-337-3b. Adopted Standards.**

CT Code Changes



Applicability. …storage, use, and handling of the following hazardous materials in all occupancies and facilities:

(1) Ammonium nitrate solids and liquids
(2) Corrosive solids and liquids
(3) Flammable solids
(4) Organic peroxide formulations
(5) Oxidizer — solids and liquids
(6) Pyrophoric solids and liquids
(7) Toxic and highly toxic solids and liquids
(8) Unstable (reactive) solids and liquids
(9) Water-reactive solids and liquids
(10) Compressed gases and cryogenic fluids

Thank You & Goodbye