HAZMAT AND FIRE CODE VII: THE REUNION TOUR

TH-J3

MARCH 27, 2025

JANICE VAN MULLEM, FIRE MARSHAL H.B.F.D.
GRANT MINER, PRESIDENT HAZTAC INC.

27th California Unified Program
Annual Training Conference
March 24-27, 2025

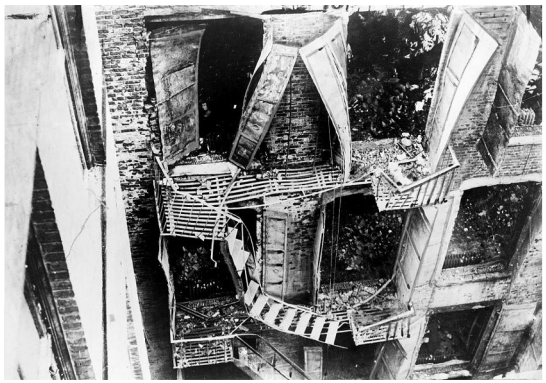
WE'RE GETTING THE BAND BACK TOGETHER!

- Overview of some historic incidents
- Code origins and overlap with other programs
- Max. Allowable Quantities and classifications
- Global Harmonization System
- HMBP vs. HMIS
- Recent Incident

FIRST, A LITTLE HISTORY

Iroquois
Theater Fire

Triangle
Shirtwaist
Factory Fire



Bhopal Disaster

Fricker Fire

One Year After, Fricker Fire Leaves Legacy of Ordinances

June 22, 1986 | ROXANA KOPETMAN | Times Staff Writer

Shelley J. Odom doesn't have garage sales often. Matter of fact, this weekend's sale outside her Anaheim home is the first since the one she had exactly one year ago. But that sale was interrupted.

The smell was too strong to take. The air was "too thick," she said. And her arms were itching. Every part of her body that was exposed began to itch. The garage sale was off.

Nearby, firefighters were battling what soon became known as Orange County's worst hazardous materials accident.

THE FRICKER FIRE, ANAHEIM CA JUNE 22-25,1985

- Responders had no information about the facility
- Bags of pesticides and fertilizers were observed on site
- The fire took three days to extinguish
- Chemicals involved included organophosphates, ammonium nitrate and methyl bromide
- Between 7500-11500 people evacuated
- Freeway and road closures


LOW NUMBER GIVEN FOR ILLEGAL ALIENS

Report Says Their Population Has Probably Not Gone Up Sharply in Recent Years

New Orleans Hotel Business Depressed Since Fair

Around the Nation

11,500 Are Evacuated In Coast Pesticide Fire

Plans Falter for a World's Fair in Chicago in 1992

Solzhenitsyn Secluded as Wife Becomes a Citizen

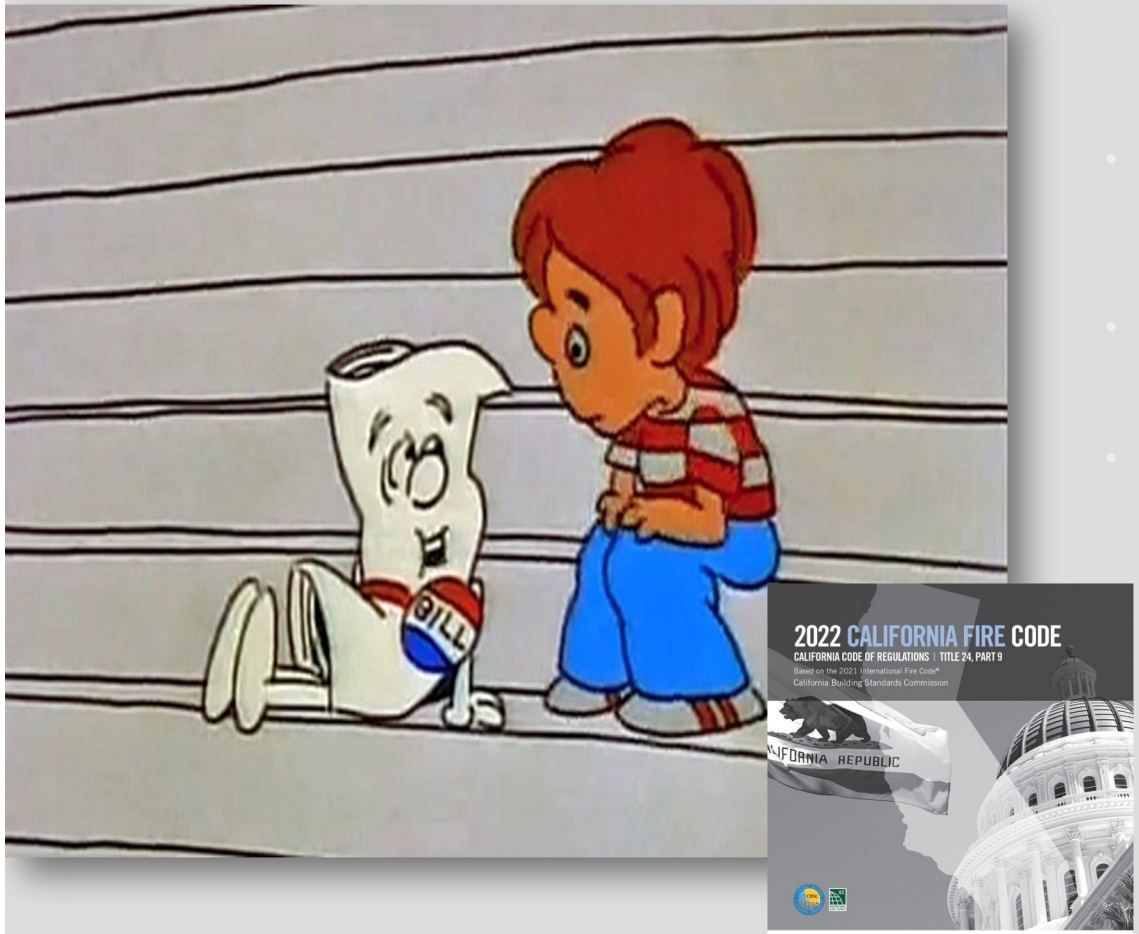
THE LEGACY OF THE FRICKER FIRE

- Numerous lawsuits (most dropped or dismissed)
- In October 1985, the Orange County board of supervisors adopted a hazardous materials disclosure ordinance
- Seventeen Orange County cities also adopted disclosure ordinances
- Was a major impetus for the creation of Chapter 6.95 of the California Health and Safety Code (which preceded the Federal SARA and EPCRA laws)

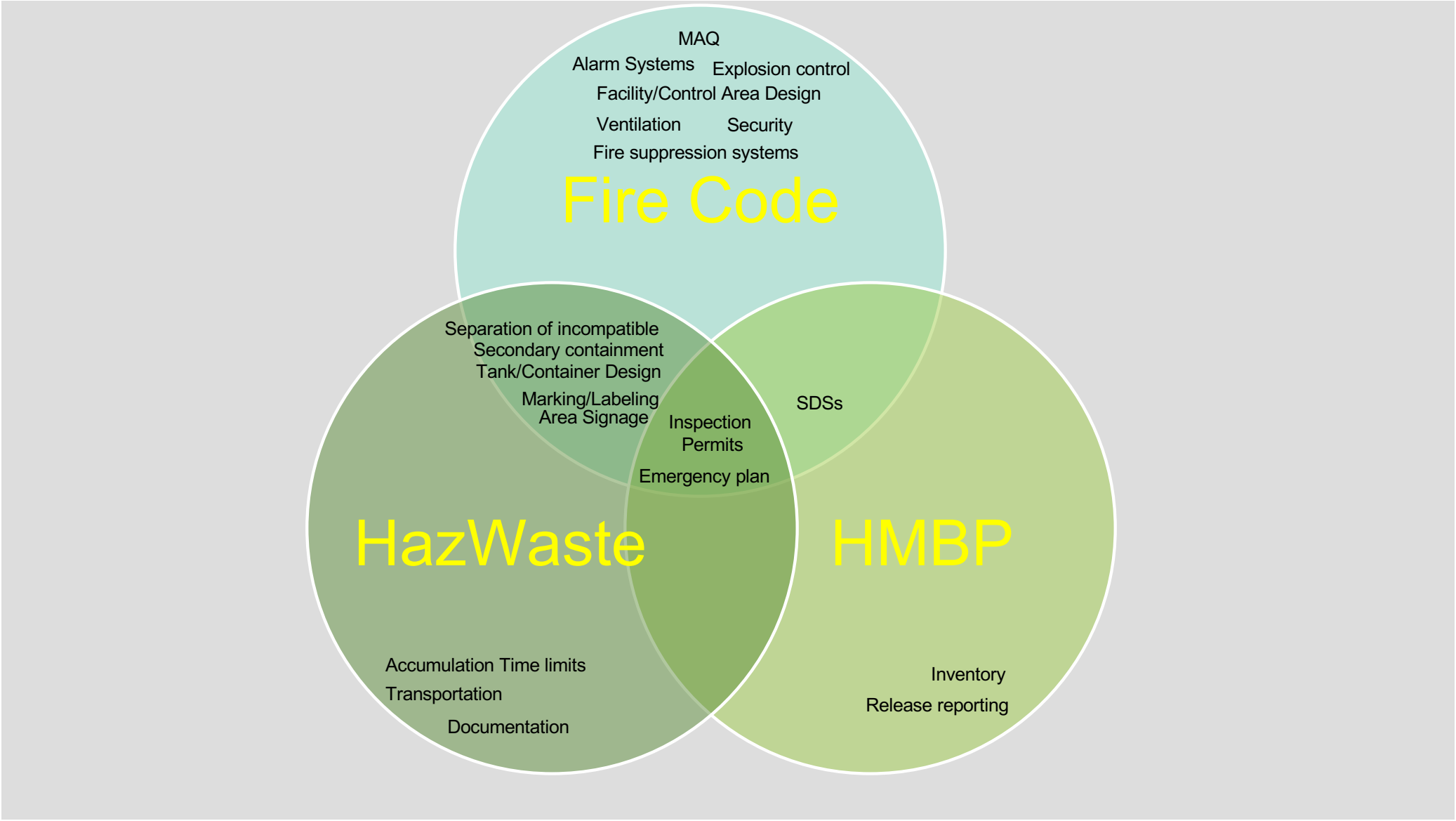

REMEMBER THIS HIT FROM A FEW YEARS BACK?


FIRE AT BIOLAB LAKE CHARLES FACILITY,
LOUISIANA 8/27/20
WAIT UNTIL YOU HEAR THE 2025 REMIX!

HOW THE CFC WAS CREATED



- Model code (developed by ICC) is adopted by the State as the CFC
- Individual jurisdictions may amend the CFC
- Therefore, the specifics of a given code section or its interpretation may vary from jurisdiction to jurisdiction
- Current California Fire Code adopted 2022 based on 2021 International Fire Code


MAQ
Alarm Systems
Explosion control
Facility/Control Area Design
Ventilation
Security
Fire suppression systems
Fire Code
Separation of incompatible
Secondary containment
Tank/Container Design
Marking/Labeling
Area Signage
Inspection
Permits
Emergency plan
SDSs
HazWaste
HMBP
Accumulation Time limits
Transportation
Documentation
Inventory
Release reporting

CALIFORNIA FIRE CODE – HAZMAT SECTIONS

- 407 Hazard Communication
- 2104 Dry Cleaning
- 2306 Flammable/Combustible Liquid Motor Fueling
- 2307 Liquid Propane Gas Motor Fueling
- 2308 Compressed Natural Gas Motor Fueling
- 2309 Hydrogen Gas Motor Fueling
- 2404 Spray Finishing
- 2503 Ethylene Gas (fruit ripening)
- 2705 Use and Handling of HazMat in Semiconductor Fabrication
- Chapter 50 Hazardous Materials
- Chapter 53 Compressed Gases
- Chapter 54 Corrosive Materials
- Chapter 55 Cryogenic Fluids

CALIFORNIA FIRE CODE – HAZMAT SECTIONS

- Chapter 56 Explosives and Fireworks
- Chapter 57 Flammable and Combustible Liquids
- Chapter 58 Flammable Gases and Flammable Cryogenic Fluids
- Chapter 59 Flammable Solids
- Chapter 60 Highly Toxic and Toxic Materials
- Chapter 61 Liquefied Propane Gases
- Chapter 62 Organic Peroxide
- Chapter 63 Oxidizers, Oxidizing Gases and Oxidizing Cryogenic Fluids
- Chapter 64 Pyrophoric Materials
- Chapter 66 Unstable (Reactive) Materials
- Chapter 67 Water-Reactive Solids and Liquids
- Appendix E Hazard Categories
- Appendix H Hazardous Materials Management Plans and Hazardous Materials Inventory Statements

CHAPTER 50 GENERAL PROVISIONS

Maximum Allowable Quantities

MAQ

- Maximum amount in a specific control area that is deemed reasonably safe by design for that quantity of hazardous material
- Once MAQ is exceeded, additional requirements apply
  - "Hazardous" occupancy – building, electrical, mechanical
  - Storage
  - Use, Dispensing and Handling

CONTROL AREAS

- Spaces within a building where quantities of hazardous materials not exceeding the MAQ per area are stored, dispensed, used or handled
- Can also have 'outdoor control area' (separate MAQ table)
- Control areas are separated by fire barriers or horizontal assemblies constructed in accordance with the building code

ONE CONTROL AREA

CONTROL AREAS

- Control areas are separated by fire barriers or horizontal assemblies constructed in accordance with the building code

TWO CONTROL AREAS

- Each control area now can accommodate up to MAQ without being an H occupancy

INDOOR – PHYSICAL HAZARD

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

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	Not Applicable	H-2	See Note q	Not Applicable	Not Applicable	See Note q	Not Applicable	Not Applicable	See Note q	Not Applicable
Combustible fiber	Loose Baled[o]	H-3	(100) (1,000)	Not Applicable	Not Applicable	(100) (1,000)	Not Applicable	Not Applicable	(20) (200)	Not Applicable
Combustible liquid[c, l]	II IIIA IIIB	H-2 or H-3 H-2 or H-3 Not Applicable	Not Applicable	120[d, e] 330[d, e] 13,200[e, f]	Not Applicable	Not Applicable	120[d] 330[d] 13,200[f]	Not Applicable	Not Applicable	30[d] 80[d] 3,300[f]
Cryogenic Flammable	Not Applicable	H-2	Not Applicable	45[d]	Not Applicable	Not Applicable	45[d]	Not Applicable	Not Applicable	10[d]
Consumer fireworks	1.4G	H-3	125[d, e, l]	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Cryogenic Oxidizing	Not Applicable	H-3	Not Applicable	45[d]	Not Applicable	Not Applicable	45[d]	Not Applicable	Not Applicable	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 H-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[e, g]	(1)[e, g] (1)[e, g] (5)[e, g] (50)[e, g] Not Applicable (1)[e, g] Not Applicable	Not Applicable	0.25[g] 0.25[g] 1[g] 50[g] Not Applicable 0.25[g] Not Applicable	(0.25)[g] (0.25)[g] (1)[g] (50)[g] Not Applicable (0.25)[g] Not Applicable	Not Applicable	0.25[g] 0.25[g] 1[g] Not Applicable Not Applicable 0.25[g] Not Applicable	(0.25)[g] (0.25)[g] (1)[g] Not Applicable Not Applicable (0.25)[g] Not Applicable
Flammable gas	Gaseous Liquefied	H-2	Not Applicable	Not Applicable (150)[d, e]	1,000[d, e] Not Applicable	Not Applicable	Not Applicable (150)[d, e]	1,000[d, e] Not Applicable	Not Applicable	Not Applicable
Flammable liquid[c]	IA IB and IC	H-2 or H-3	Not Applicable	30[d, e] 120[d, e]	Not Applicable	Not Applicable	30[d] 120[d]	Not Applicable	Not Applicable	10[d] 30[d]
Flammable liquid, combination (IA, IB, IC)	Not Applicable	H-2 or H-3	Not Applicable	120[d, e, h]	Not Applicable	Not Applicable	120[d, h]	Not Applicable	Not Applicable	30[d, h]
Flammable solid	Not Applicable	H-3	125[d, e]	Not Applicable	Not Applicable	125[d]	Not Applicable	Not Applicable	25[d]	Not Applicable

(continued)

INDOOR – PHYSICAL HAZARD

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Combustible liquid[c, l]	II IIIA IIIB	H-2 or H-3 H-2 or H-3 Not Applicable	Not Applicable	120[d,e] 330[d, e] 13,200[e, f]	Not Applicable	Not Applicable	120[d] 330[d] 13,200[f]	Not Applicable	Not Applicable	30[d] 80[d] 3,300[f]
Cryogenic Flammable	Not Applicable	H-2	Not Applicable	45[d]	Not Applicable	Not Applicable	45[d]	Not Applicable	Not Applicable	10[d]
Consumer fireworks	1.4G	H-3	125[d, e, l]	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Cryogenic Oxidizing	Not Applicable	H-3	Not Applicable	45[d]	Not Applicable	Not Applicable	45[d]	Not Applicable	Not Applicable	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 H-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[e, g]	(1)[e, g] (1)[e, g] (5)[e, g] (50)[e, g] Not Applicable (1)[e,g] Not Applicable	Not Applicable	0.25[g] 0.25[g] 1[g] 50[g] Not Applicable 0.25[g] Not Applicable	(0.25)[g] (0.25)[g] (1)[g] (50)[g] Not Applicable (0.25)[g] Not Applicable	Not Applicable	0.25[g] 0.25[g] 1[g] Not Applicable Not Applicable 0.25[g] Not Applicable	(0.25)[g] (0.25)[g] (1)[g] Not Applicable Not Applicable (0.25)[g] Not Applicable
Flammable gas	Gaseous Liquefied	H-2	Not Applicable	Not Applicable (150)[d, e]	1,000[d, e] Not Applicable	Not Applicable	Not Applicable (150)[d, e]	1,000[d, e] Not Applicable	Not Applicable	Not Applicable
Flammable liquid[c]	IA IB and IC	H-2 or H-3	Not Applicable	30[d, e] 120[d, e]	Not Applicable	Not Applicable	30[d] 120[d]	Not Applicable	Not Applicable	10[d] 30[d]
Flammable liquid, combination (IA, IB, IC)	Not Applicable	H-2 or H-3	Not Applicable	120[d, e, h]	Not Applicable	Not Applicable	120[d, h]	Not Applicable	Not Applicable	30[d, h]
Flammable solid	Not Applicable	H-3	125[d, e]	Not Applicable	Not Applicable	125[d]	Not Applicable	Not Applicable	25[d]	Not Applicable

(continued)

INDOOR – PHYSICAL HAZARD

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MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, j, m, n, p]

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			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	Not	H-2	See Note g	Not	Not		Not	Not		Not
liquid, combination (IA, IB, IC)	Not Applicable	H-2 or H-3	Not Applicable	120[d, e, h]	Not Applicable	Not Applicable	120[d, h]	Not Applicable	Not Applicable	30[d, h]
Flammable solid	Not Applicable	H-3	125[d, e]	Not Applicable	Not Applicable	125[d]	Not Applicable	Not Applicable	25[d]	Not Applicable

(continued)

INDOOR – PHYSICAL HAZARD

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					Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustibl dust										
Combustibl fiber										
Combustibl liquid[c, i]										
Cryogenic Flammab										
Consumer fireworks										
Cryogenic Oxidizing										
Explosives										
Flammable gas										
Flammable liquid[c]										
Flammable liquid, combinat (IA, IB, I										
Flammable solid	Not Applicable	H-3	125[d, e]	Not Applicable	Not Applicable	125[d]	Not Applicable	Not Applicable	25[d]	Not Applicable

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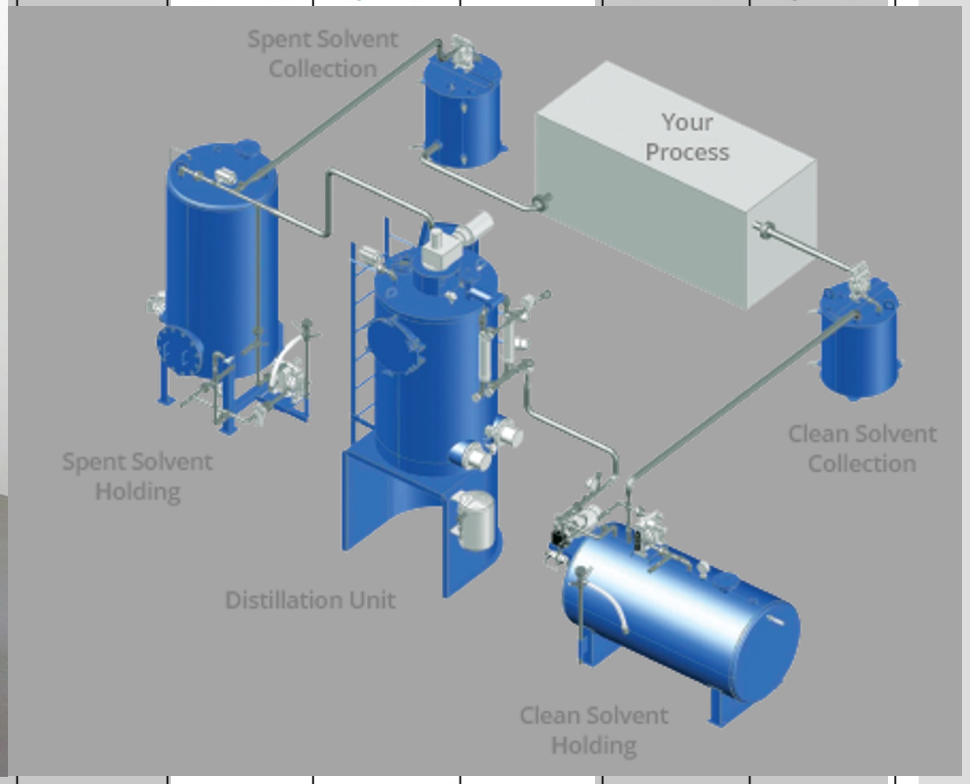

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HAZAR

TABLE 5003.1.1(1)
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MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
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Combustible dust	Not Applicable	H-2	See Note q	Not Applicable	Not Applicable	See Note q	Not Applicable	Not Applicable	See Note q	Not Applicable
Combustible fiber	Loose Baled[o]	H-3	(100) (1,000)	Not Applicable	Not Applicable	(100) (1,000)	Not Applicable	Not Applicable	(20) (200)	Not Applicable
Flammable liquid[c]	IA	H-2 or H-3	Not Applicable	30	Not Applicable	Not Applicable	30	Not Applicable	Not Applicable	10
	IB and IC			120[d, e]			120[d]			30[d]
Flammable liquid, combination (IA, IB, IC)	Not Applicable	H-2 or H-3	Not Applicable	120[d, e, h]	Not Applicable	Not Applicable	120[d, h]	Not Applicable	Not Applicable	30[d, h]
Flammable solid	Not Applicable	H-3	125[d, e]	Not Applicable	Not Applicable	125[d]	Not Applicable	Not Applicable	25[d]	Not Applicable

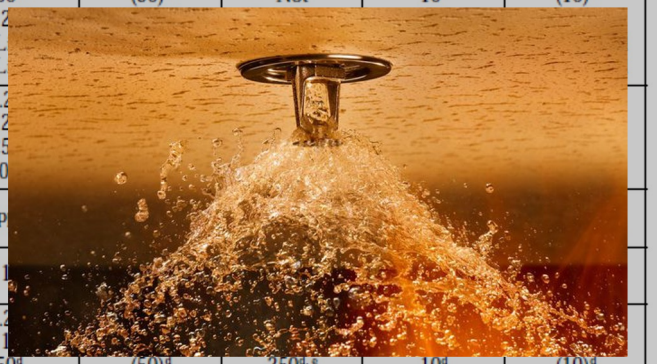
(continued)

INDOOR – PHYSICAL HAZARD

TABLE 5003.1.1(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)
Inert Gas	Gaseous	Not Applicable	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
	Liquefied	Not	Not	Not	Not	Not	Not	Not	Not	Not
Cryogenic						pplicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
						Not pplicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Organic pe						0.25[g] 1[d] 50[d]	(0.25)[g] (1)[d] (50)[d]	Not	0.25[g] 1[d] 10[d]	(0.25)[g] (1)[d] (10)[d]
						12				
						ot L				
						ot L				
Oxidizer						0.2				
						2				
						25				
						4,0				
Oxidizing g						Ap				
Pyrophoric						1				
Unstable (r						0.2				
						1				
						50[d] ot Limited	(50)[d] Not Limited	250[d, e] Not Limited	10[d] Not Limited	(10)[d] Not Limited
Water reactive	3	H-2	[illegible]	(5)[d, e]	Not Applicable	5[d]	(5)[d]	Not Applicable	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	1	Not Applicable	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited

Maximum allowable quantities shall be increased 100 percent in buildings equipped with automatic sprinkler systems



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

a. For use of control areas, see Section 5003.8.3.

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

c. The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited providing the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs, consumer or industrial products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.

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

INDOOR – PHYSICAL HAZARD

TABLE 5003.1.1(1)—continued
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, j, m, n, p]

e. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, exhausted enclosures, or listed safety cans. Listed safety cans shall be in accordance with Section 5003.9.10. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an approved automatic sprinkler system.

h. Containing not

i. The maximum

j. Quantities in pa

k. A maximum qu
storage containe

l. Net weight of p
packaging shall

m. For gallons of li

n. For storage and

o. Densely-packed

p. The following s
1. Liquid or g
2. Liquid or g
3. Gaseous fu
4. Liquid fuels

q. Where manufac

Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, dry boxes, gas cabinets, exhausted enclosures, or listed safety cans.

INDOOR – PHYSICAL HAZARD

TABLE 5003.1.1(1)—continued
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, j, m, n, p]

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f. Quantities shall not be limited in a building equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an approved automatic sprinkler system.

h. Containi

i. The maxi

j. Quantitie

k. A maxim when the storage containers and the manner of storage are approved.

l. Net weight of pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks including packaging shall be used.

m. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

n. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 5003.11, see Table 5003.11.1.

o. Densely-packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.

p. The following shall not be included in determining the maximum allowable quantities:

1. Liquid or gaseous fuel in fuel tanks on vehicles.
2. Liquid or gaseous fuel in fuel tanks on motorized equipment operated in accordance with this code.
3. Gaseous fuels in piping systems and fixed appliances regulated by the *California Mechanical Code*.
4. Liquid fuels in piping systems and fixed appliances, regulated by the *California Mechanical Code*.

q. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.7.2.

Footnote d & e are applied accumulatively

GLOBAL HARMONIZATION SYSTEM

DO PICTOGRAMS GIVE US CLUES TO FIRE CODE CLASSIFICATIONS?

POSSIBLE FIRE CODE CLASS:

NONE

POSSIBLE FIRE CODE CLASS:

FLAMMABLE, COMBUSTIBLE

DO PICTOGRAMS GIVE US CLUES TO FIRE CODE CLASSIFICATIONS?

POSSIBLE FIRE CODE CLASS:

NONE

POSSIBLE FIRE CODE CLASS:

GAS (FLAM., INERT, OX., TOX).

DO PICTOGRAMS GIVE US CLUES TO FIRE CODE CLASSIFICATIONS?

POSSIBLE FIRE CODE CLASS:

CORROSIVE

POSSIBLE FIRE CODE CLASS:

EXPLOSIVE, ORGANIC PEROXIDE, UNSTABLE

DO PICTOGRAMS GIVE US CLUES TO FIRE CODE CLASSIFICATIONS?

POSSIBLE FIRE CODE CLASS:

OXIDIZER

POSSIBLE FIRE CODE CLASS:

NONE

DO PICTOGRAMS GIVE US CLUES TO FIRE CODE CLASSIFICATIONS?

POSSIBLE FIRE CODE CLASS:

TOXIC, HIGHLY TOXIC

CFC DEFINITIONS VS. GHS HAZ. STATEMENTS

CFC DEFINITIONS VS. GHS HAZ STATEMENTS

F.C. CORROSIVE

A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the point of contact. A chemical shall be considered corrosive if, when tested on the intact skin of albino rabbits by the method described in DOTn 49 CFR 173.137, such chemical destroys or changes irreversibly the structure of the tissue at the point of contact following an exposure period of 4 hours. This term does not refer to action on inanimate surfaces.

GHS CORROSIVE

H314, Category 1 (1A, 1B, 1C); Causes severe skin burns and eye damage. Skin corrosion refers to the production of irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis occurring after exposure to a substance or mixture.

CFC DEFINITIONS VS. GHS HAZ STATEMENTS

F.C. TOXIC (ORAL)

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

GHS TOXIC (ORAL)

H301, Category 3; Toxic if swallowed: LD50 > 50 ≤ 300 mg/kg bodyweight

H302, Category 4; Harmful if swallowed: LD50 > 300 ≤ 2,000 mg/kg bodyweight

CFC DEFINITIONS VS. GHS HAZ STATEMENTS

F.C. TOXIC (CONTACT)

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

GHS TOXIC (CONTACT)

H311, Category 3, Toxic in contact with skin: LD50 > 200 ≤ 1,000 mg/kg bodyweight

CFC DEFINITIONS VS. GHS HAZ STATEMENTS

F.C. TOXIC (INHALATION)

3. A chemical that has a median lethal concentration (LC50) in air of more than 200 ppm but not more than 2,000 ppm by volume or less of gas or vapor, or more than 2 mg/l but not more than 20 mg/l of mist, fume or dust, when administered by continuous inhalation for 1 hr (or less if death occurs within 1 hr) to albino rats weighing between 200 and 300 g

GHS "FATAL" (INHALATION)

H330, Category 2; Fatal if inhaled:

Gases: LC50 > 100 ppm (4 hr) ≈ 200 ppm (1 hr) ≤ 500 ppm (4 hr) ≈ 1,000 ppm (1 hr)

Vapours: LC50 > 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) ≤ 2 mg/l (4 hr) ≈ 8 mg/l (1 hr)

Dust/mist: LC50 > 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr) ≤ 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr)

CFC DEFINITIONS VS. GHS HAZ STATEMENTS

F.C. TOXIC (INHALATION)

3. A chemical that has a median lethal concentration (LC50) in air of more than 200 ppm but not more than 2,000 ppm by volume or less of gas or vapor, or more than 2 mg/l but not more than 20 mg/l of mist, fume or dust, when administered by continuous inhalation for 1 hr (or less if death occurs within 1 hr) to albino rats weighing between 200 and 300 g

GHS "TOXIC" (INHALATION)

H331, Category 3; Toxic if inhaled:

Gases: LC50 > 500 ppm (4 hr) ≈ 1,000 ppm (1 hr) ≤ 2,500 ppm (4 hr) ≈ 5,000 ppm (1 hr)

Vapours: LC50 > 2 mg/l (4 hr) ≈ 8 mg/l (1 hr) ≤ 10 mg/l (4 hr) ≈ 40 mg/l (1 hr)

Dust/mist: LC50 > 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) ≤ 1 mg/l (4 hr) ≈ 4 mg/l (1 hr)

HMBP VERSUS HMIS

HMBP REQUIREMENT

- All starts with Health and Safety Code, Section 25504

  "To streamline and ease the regulatory burdens of doing business in this state, compliance with Section 25505 shall also suffice to meet the requirements for a Hazardous Materials Management Plan and the Hazardous Materials Inventory Statement as set forth in the California Fire Code and its appendices, to the extent that the information in the California Fire Code is contained in Section 25505."

The HMBP shall suffice as HMMP/HMIS from CFC

But does it?

CALIFORNIA FIRE CODE HMIS REQUIREMENTS

- CFC Section 5001.5.2

Where is this information?

5001.5.2 Hazardous Materials Inventory Statement (HMIS). Where required by the fire code official, an application for a permit shall include an HMIS, such as Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III, Tier II Report or other approved statement. The HMIS shall include the following information:

1. Product name.
2. Component.
3. Chemical Abstract Service (CAS) number.
4. Location where stored or used.
5. Container size.
6. Hazard classification.
7. Amount in storage.
8. Amount in use-closed systems.
9. Amount in use-open systems.

[For SFM] The HMIS shall comply with Health and Safety Code, Chapter 6.95, Sections 25500 through 25545, and Title 19, Division 2, Chapter 4.

CFC Hazard Class (HMIS) vs. GHS (HMBP)

PHYSICAL:

- Combustible liquid (II, IIIA, IIIB)
- Cryogenic Flammable
- Cryogenic Inert
- Cryogenic Oxidizing
- Explosives (Division 1.1, 1.2, 1.3, etc)
- Flammable gas
- Flammable liquid (1A, IB and IC)
- Flammable solid
- Inert gas
- Organic peroxide (UD, I, II, II, etc.)
- Oxidizing gas
- Pyrophoric
- Unstable (4, 3, 2, 1)
- Water reactive (3, 2,1)

HEALTH:

- Corrosives
- Highly toxic
- Toxic

PHYSICAL: Flammable
PHYSICAL: Gas Under Pressure
PHYSICAL: Explosive
PHYSICAL: Self-heating
PHYSICAL: Pyrophoric
PHYSICAL: Oxidizer
PHYSICAL: Organic Peroxide
PHYSICAL: Self-reactive
PHYSICAL: Pyrophoric Gas
PHYSICAL: Corrosive to Metal
PHYSICAL: In Contact with Water Emits Flammable Gas
PHYSICAL: Combustible Dust
PHYSICAL: Hazard Not Otherwise Classified (HNOC)

HEALTH: Carcinogenicity
HEALTH: Acute Toxicity
HEALTH: Reproductive Toxicity
HEALTH: Skin Corrosion or Irritation
HEALTH: Respiratory or Skin Sensitization
HEALTH: Serious Eye Damage or Eye Irritation
HEALTH: Specific Target Organ Toxicity
HEALTH: Aspiration Hazard
HEALTH: Germ Cell Mutagenicity
HEALTH: Simple Asphyxiant
HEALTH: Hazard Not Otherwise Classified (HNOC)

HMBP REQUIREMENTS

- Bottom line –
  - A fire chief may require additional information to the HMBP to meet the California Fire Code HMMP/HMIS requirements
  - Misleading to say that HMBP meets HMMP/HMIS requirements even if fire hazard class is included

This conundrum is what we will discuss in this section…

HMIS VS. HMBP (HMMP)

HMIS

- No threshold quantity
- Grouped by hazard class and control areas
- Same material may be included in multiple hazard classes
- Amounts listed in storage, closed use, and open use
- No emergency plan or maps*

HMBP

- Threshold quantities and exemptions
- Disclosed as individual materials
- Amounts listed as average daily and maximum daily
- Requirements for emergency plans with maps containing specific information

WHAT'S MISSING IN HMBP

- Fire code hazard class
  - unless required by Fire Chief (and in muni code)
- Summary by control area
  - Where does HMBP defined "control area" (?)
- Comparison to MAQ
  - HMBP has nothing to do with MAQ
- Use – storage, open use or closed use
  - Where is that on HMBP?

A WORD ABOUT CFC APPENDIX H

APPENDIX H

HAZARDOUS MATERIALS MANAGEMENT PLAN (HMMP) AND HAZARDOUS MATERIALS INVENTORY STATEMENT (HMIS) INSTRUCTIONS *(See Sections 5001.5.1 and 5001.5.2)*

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.

User note:

About this appendix: *Appendix H is intended to assist businesses in establishing a Hazardous Materials Management Plan (HMMP) and Hazardous Materials Inventory Statement (HMIS) based on the classification and quantities of materials that would be found on-site in storage or use. The sample forms and available Safety Data Sheets (SDS) provide the basis for the evaluations. It is also a companion to Sections 407.5 and 407.6, which provide the requirement that the HMIS and HMMP be submitted where required by the fire code official.*

APPENDIX H - HMIS REQUIREMENTS

FIGURE 5
SECTION II — HAZARDOUS MATERIALS INVENTORY STATEMENT (HMIS) INVENTORY REPORT
(Sort Products Alphabetically by Location of Product and then Alphabetically by Product Name)

Product Name (Components)[c]	CAS Number	Location[a]	Container > 55 gal[b]	Haz Class 1	Haz Class 2	Haz Class 3	Stored (lbs)	Stored (gal)	Stored (gas)[d]	Closed (lbs)	Closed (gal)	Closed gas[d]	Open (lbs)	Open (gal)
ACETYLENE (Acetylene gas)	74-86-2	Control Area 1		FLG	UR2				150					
(Hydrotreated Heavy Paraffinic Distillate-85%; Additives-20%)	64742-54-7 Mixture	Control Area 1		C3B				3						
OXYGEN, GAS (Oxygen)	7782-44-7	H-3		OXG					5,000					

a. Identify the control area or, if it is a Group H occupancy, provide the classification, such as H-2, H-3, etc.
b. If the product container, vessel or tank could exceed 55 gallons, indicate yes in the column.
c. Specify percentages of main components if available.
d. In cubic feet, gallons or pounds.
(This is an example; add additional hazard classes as needed.)

Product Name (Components)[c]	CAS Number	Location[a]	Container > 55 gal[b]	Haz Class 1	Haz Class 2	Haz Class 3	Stored (lbs)	Stored (gal)	Stored (gas)[d]	Closed (lbs)	Closed (gal)	Closed gas[d]	Open (lbs)	Open (gal)
ACETYLENE (Acetylene gas)	74-86-2	Control Area 1		FLG	UR2				150					

a. Identify the control area or, if it is a Group H occupancy, provide the classification, such as H-2, H-3, etc.
b. If the product container, vessel or tank could exceed 55 gallons, indicate yes in the column.
c. Specify percentages of main components if available.
d. In cubic feet, gallons or pounds.

APPENDIX H – HM INVENTORY REPORT

FIGURE 4
SECTION II—HAZARDOUS MATERIALS INVENTORY STATEMENT (HMIS) SUMMARY REPORT[a] (Storage[b] Conditions)[c]

IBC/IFC HAZARD CLASS	HAZARD CLASS	INVENTORY AMOUNT			IBC/IFC MAXIMUM ALLOWABLE QUANTITY[d]		
	(Abbrev)	Solid (lb)	Liquid (gal)	Gas (cu ft, gal, lb)	Solid (lb)	Liquid (gal)	Gas (cu ft, gal, lb)
Combustible Liquid	C2		5			120	
	C3A					330	
	C3B		6			13,200	
Organic Peroxide	OPU				0		
	OP1				5		
	OP2				50		
	OP3				125		
	OP4				NL		
	OP5				NL		
Oxidizer	OX4				0		
	OX3				10		
	OX2				250		
	OX1				4,000		

a. Complete a summary report for each control area and Group H occupancy.
b. Storage = storage + use-closed + use-open systems.
c. Separate reports are required for use-closed and use-open systems.
d. Include increases for sprinklers or storage in cabinets, if applicable.
(This is an example; add additional hazard classes as needed.)

IBC/IFC HAZARD CLASS	HAZARD CLASS	INVENTORY AMOUNT			IBC/IFC MAXIMUM ALLOWABLE QUANTITY[d]		
	(Abbrev)	Solid (lb)	Liquid (gal)	Gas (cu ft, gal, lb)	Solid (lb)	Liquid (gal)	Gas (cu ft, gal, lb)
Combustible Liquid	C2		5			120	
	C3A					330	
	C3B		6			13,200	

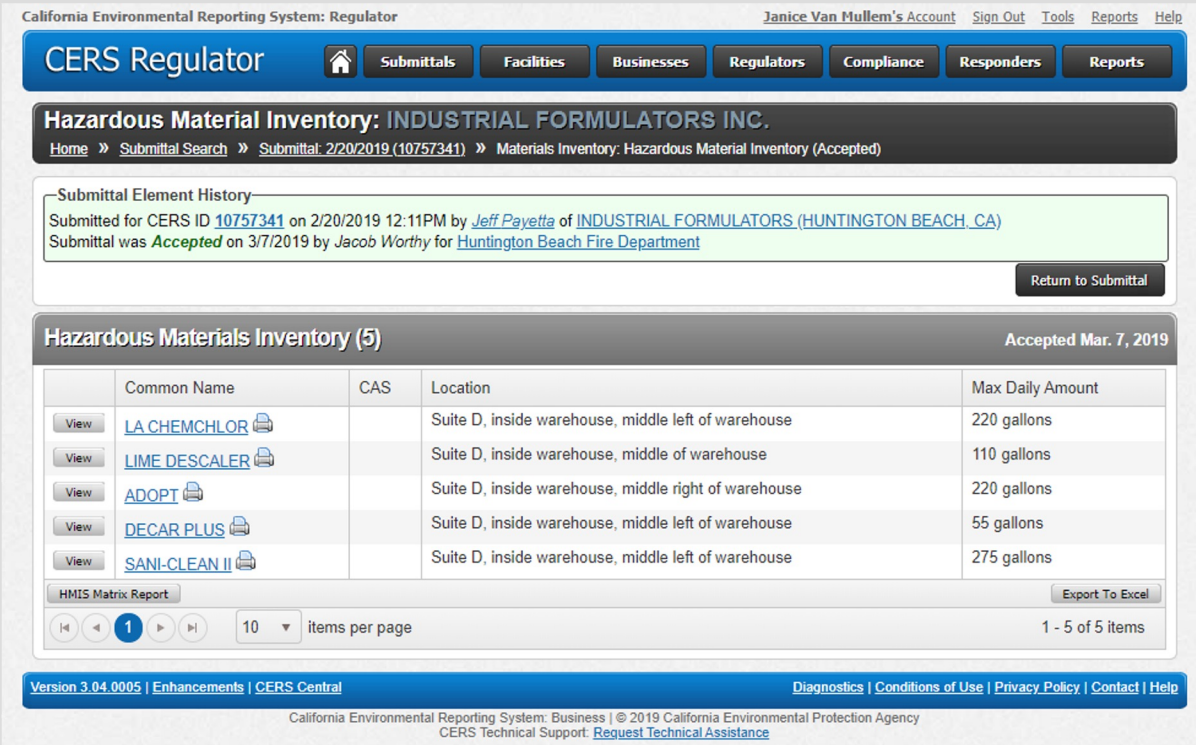
a. Complete a summary report for each control area and Group H occupancy.
b. Storage = storage + use-closed + use-open systems.
c. Separate reports are required for use-closed and use-open systems.
d. Include increases for sprinklers or storage in cabinets, if applicable.

HMIS VERSUS HMBP

- HMIS is used prior to construction when known hazardous materials will be stored
  - BEST CASE Scenario
  - Building Construction permits will be conditioned to submit an HMIS to Fire

HMIS VERSUS HMBP

- HMBP is for existing facilities
  - Can be used as tool to determine Fire Code compliance
  - Can be used to request HMIS



A GOOD HMIS SHOULD SHOW BREAKDOWN BY HAZ CLASS & CHEMICAL

	Storage		Use-Closed		Use-Open			
Hazard Class: Class 2 Oxidizer								
HYDROGEN PEROXIDE- 50%	620	gal	100	gal	100	gal	Control-1	Control-1
TOTAL CLASS 2 OXIDIZER	**620**	**GAL**	**100**	**GAL**	**100**	**GAL**		
Hazard Class: Class 2 Unstable Reactive								
ACETYLENE DISSOLVED	100	c/f			100	c/f	Control-1	Control-1
TOTAL CLASS 2 UNSTABLE REACTIVE	**100**	**C/F**			**100**	**C/F**		

HAZ CLASS & CHEMICAL CONTINUED

	Storage		Use-Closed		Use-Open			
Hazard Class: Class 1 Unstable Reactive								
HYDROGEN PEROXIDE- 50%	620	gal	100	gal	100	gal	Control-1	Control-1
TOTAL CLASS 1 UNSTABLE REACTIVE	**620**	**GAL**	**100**	**GAL**	**100**	**GAL**		
Hazard Class: Class 1 Water Reactive								
CAUSTIC SODA - LIQUID	700	gal	100	gal	100	gal	Control-1	Control-1
TOTAL CLASS 1 WATER REACTIVE	**700**	**GAL**	**100**	**GAL**	**100**	**GAL**		

HAZ CLASS & CHEMICAL CONTINUED

	Storage		Use-Closed		Use-Open			
Hazard Class: Corrosive								
ACETIC ACID	810	gal	100	gal	100	gal	Control-1	Control-1
CAUSTIC SODA - LIQUID	700	gal	100	gal	100	gal	Control-1	Control-1
HYDROGEN PEROXIDE- 50%	620	gal	100	gal	100	gal	Control-1	Control-1
STABILON NS NEW	220	gal	100	gal			Control-1	
ACETIC ACID 56%	287	gal					Control-1	
TOTAL CORROSIVE	**2,637**	**GAL**	**400**	**GAL**	**300**	**GAL**		

EXAMPLE HMIS

CHEMICAL CLASSIFICATION SUMMARY TOTALS

CONTROL 1

Class III-A Combustible Liquids

Location	Quantity	CFC Allowable Quantity/Required Occupancy Class
Interior Storage:	660 gal	660 gal (2703.1.1(1)*d)
Exterior Storage:		
Open System Use:	100 gal	160 gal (2703.1.1(1)*d)
Closed System Use:		

Class III-B Combustible Liquids

Location	Quantity	CFC Allowable Quantity/Required Occupancy Class
Interior Storage:	800 gal	Not Limited (2703.1.1(1)*f)
Exterior Storage:		
Open System Use:		
Closed System Use:		

EXAMPLE HMIS CONTINUED

Class 2 Oxidizer

Location	Quantity	CFC Allowable Quantity/Required Occupancy Class
Interior Storage:	620 gal	500 gal (2703.1.1(1)*d) / H-3
Exterior Storage:		
Open System Use:	100 gal	2 gal (2703.1.1(1)*d) / H-3
Closed System Use:	100 gal	500 gal (2703.1.1(1)*d)

Class 2 Unstable Reactive

Location	Quantity	CFC Allowable Quantity/Required Occupancy Class
Interior Storage:	100 c/f	500 c/f (2703.1.1(1)*d)
Exterior Storage:		
Open System Use:		
Closed System Use:	100 c/f	500 c/f (2703.1.1(1)*d)

EXAMPLE HMIS CONTINUED

Class 1 Water Reactive

Location	Quantity	CFC Allowable Quantity/Required Occupancy Class
Interior Storage:	700 gal	Not Limited (2703.1.1(1))
Exterior Storage:		
Open System Use:	100 gal	Not Limited (2703.1.1(1))
Closed System Use:	100 gal	Not Limited (2703.1.1(1))

Corrosive

Location	Quantity	CFC Allowable Quantity/Required Occupancy Class
Interior Storage:	2,637 gal	1,000 gal (2703.1.1(2)*e) / H-4
Exterior Storage:		
Open System Use:	100 gal	200 gal (2703.1.1(2)*e)
Closed System Use:	100 gal	1,000 gal (2703.1.1(2)*e)

REMEMBER THAT FIRE AT BIOLAB LAKE CHARLES FACILITY, LOUISIANA, AUGUST 27, 2020?

Time for the remix!

FIRE AT BIOLAB FACILITY CONYERS GEORGIA, SEPTEMBER 29, 2024!

U.S. Chemical Safety Board Sends Team to Bio-Lab

Washington, D.C. September 30, 2024 – The U.S. Chemical Safety and Hazard Investigation Board (CSB) is sending investigators to investigate the major chemical fire that occurred on September 29 at the Bio-Lab facility in Conyers, GA. According to news reports, as many as 17,000 people in the area evacuated due to the fire and 90,000 others east of Atlanta were advised to shelter in place due to the massive plume of dark smoke from the fire.

Bio-Lab manufactures pool and spa chemicals containing trichloroisocyanuric acid (TCCA).

WHY IS THE PRESENCE OF TRICHLOROISOCYANURIC ACID POTENTIALLY SIGNIFICANT?

Notice anything on the packaging?

LET SEE IF THE SDS CAN PROVIDE US WITH SOME CLUES…

Microphor
A Wabtec company

SAFETY DATA SHEET

1. PRODUCT IDENTIFICATION

Product Name:	CHLORINATING SLUGS
Synonym(s):	1,3,5-trichloro-s-triazine-2,4,6-trione; TCCA; Trichlor; Symclosene; Trichloroisocyanuric Acid
Recommended Uses:	Sanitizer, Disinfectant
SDS Reference:	105

Company Information: ALLCHEM PERFORMANCE PRODUCTS, INC.
6010 NW FIRST PLACE
GAINESVILLE, FL 32607
Tel: 352-378-9696

Distributed By: MICROPHOR
452 E. HILL ROAD
WILLITS CA 95490

24 HOUR EMERGENCY NUMBER: INFOTRAC (TRANSPORTATION): 1-800-535-5053

THE HAZARD I.D. SECTION INDICATES MULTIPLE HAZARDS

2. HAZARD(S) IDENTIFICATION

Classification:	CORROSIVE
	FATAL IF INHALED
	HARMFUL IF SWALLOWED
	TARGET ORGAN TOXICITY (SINGLE)
	REPRODUCTIVE TOXIN
	OXIDIZER
	ENVIRONMENTAL HAZARD

WE'RE GOING TO FOCUS ON THE HAZARDS THAT MAY HAVE CONTRIBUTED TO THE FIRE

PHYSICAL HAZARDS:
Oxidizing Solid - May intensify fire; oxidizer - Category 2 - OXIDIZING AGENT. Contact with water slowly liberates irritating and hazardous chlorine containing gases. Contamination with moisture, organic material, or other incompatible chemicals may start a reaction with generation of heat, liberation of hazardous gases, and possible fire and explosion. Contact with acids liberates toxic gas. Decomposes at temperatures above 464°F with liberation of harmful gases. When ignited will burn with the evolution of chlorine and equally toxic gases. Do not get water inside container. Wet material may generate nitrogen trichloride, an explosion hazard.

WHAT'S NITROGEN TRICHLORIDE?

- First made in 1812 by Pierre Louis Dulong
- The discovery cost him an eye and two fingers
- Extremely unstable
- Not in widespread commercial use

WHAT ELSE CAN THE SDS TELL US?

5. FIREFIGHTING MEASURES

Suitable / Unsuitable Extinguishing Media:	Flood with water. Do not use ABC fire extinguishers. Do not use dry chemicals, carbon dioxide, or halogenated extinguishing agents.
Specific Hazards from Chemical:	Negligible fire hazard. If heated by outside source to temperatures above 240°C (464°F), this product will undergo decomposition with the evolution of noxious gases but no visible flame. Wet material may generate nitrogen trichloride, an explosion hazard. This product is an NFPA Class 1 Oxidizer. Fire Fighting: Consider evacuation of personnel located downwind. Keep unnecessary people away, isolate hazard area and deny entry. Move container from fire area if it can be done without risk. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Containers which appear undamaged, except for being damp on the outside, should be opened and inspected immediately. DO NOT attempt to reseal contaminated drums. Damp material should be neutralized to a non-oxidizing state.
Special Protective Equipment:	Wear NIOSH approved positive-pressure self-contained breathing apparatus operated in pressure demand mode.
Other Information:	Hazardous Combustion Products: Chlorine, Nitrogen, Nitrogen trichloride, Cyanogen chloride, Oxides of carbon, Phosgene.

I'M SENSING A PATTERN HERE

7. HANDLING AND STORAGE

Handling:	Do not get in eyes, on skin, or on clothing. Avoid breathing vapors or dust when opening container. Avoid creation of dust. Wash thoroughly after handling. Wear personal protective equipment as described in Exposure Controls/Personal Protection (Section 8) of the SDS. NEVER add water to this product. Always add product to large quantities of water. Use clean, dry utensils. Do not add the product to any dispensing device containing residuals of other products.
Storage:	Store in original container and in a dry area where temperatures do not exceed 52°C (125°F) for 24 hours. Store and handle in accordance with all current regulations and standards. Do not allow water to get in container. If liner is present, tie after each use. Keep container tightly closed and properly labeled. Store containers on pallets. Keep away from food, drink and animal feed. Keep separated from incompatible substances (see Section 10 of the Safety Data Sheet). (NFPA Oxidizer Class 1)

SURELY, BIOLAB COULDN'T HAVE SEEN THIS INCIDENT COMING…

BioLab told federal investigators they had established a permanent fire watch two or three months before the event "after detecting strong odors from oxidizers in two storage buildings," including Plant 12.

WHAT TOOLS DO WE HAVE TO PREVENT THESE TYPES OF INCIDENT?

1. **Material classifications**: CFC Chapter 2 classifies hazardous materials based on their specific hazards, such as oxidizers, flammable solids, water-reactive substances, and toxic materials. Each classification has distinct storage and handling guidelines to mitigate associated risks.
2. **Quantity limits**: CFC Chapter 50 sets maximum allowable quantities of hazardous materials that can be stored or used within certain areas, depending on the building occupancy, construction, and whether or not fire protection systems are in place.
3. **Storage and segregation**: CFC Chapter 50 emphasizes the proper storage of hazardous materials in approved containers and designated areas. Incompatible materials must be stored separately to prevent dangerous reactions, such as fires or explosions. Specific criteria for separation distances and fire-resistant barriers are outlined.
4. **Fire protection and suppression**: For facilities handling hazardous materials, CFC Chapter 9 requires the installation of appropriate fire suppression systems. The fire protection measures vary depending on the materials stored, with special attention to materials that react with water or require special fire extinguishing agents (e.g., dry chemicals or inert gases).
5. **Ventilation and spill control**: Adequate ventilation is required to prevent the buildup of flammable or toxic vapors. In the case of spills or leaks, CFC Chapter 50 specifies containment measures, including spill control systems and emergency procedures.
6. **Emergency planning**: CFC Chapter 50 mandates that facilities develop comprehensive emergency plans, including evacuation routes, fire response procedures, and communication protocols to handle incidents involving hazardous materials.
7. **Special considerations for oxidizers and water-reactive materials**: CFC Chapter 63 outlines specific guidelines for materials like oxidizers, which can intensify fires. Chapter 67 outlines specific guidelines water-reactive chemicals, which can cause hazardous reactions when exposed to moisture.

TAKEAWAYS

- Fire Code provides extensive tools for regulating HazMat that are distinct from those provided in HSC.
- MAQ's provide a limit on the amount of a particular hazard class that can be stored or used in a specific control area.
- GHS labeling offers clues to CFC hazard classes, but the two systems differ in their definitions.
- HMIS's provide a detailed analysis of the hazard classes and quantities in storage and use at facility, including those that exceed MAQ's.
- Proactive enforcement of CFC HazMat provisions can prevent incidents like the BioLab Fires.


Grant Miner
haztacinc@gmail.com
Janice Van Mullem
Janice.vanmullem@surfcity-hb.org