HazMat and Fire Code: Episode VI

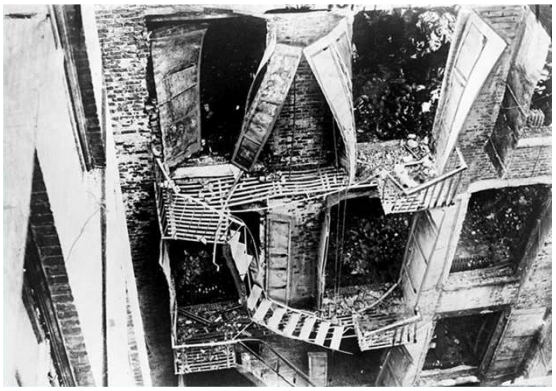
Janice Van Mullem- HBFD
Grant Miner- HazTAC Inc.

Rise of the Permits!

First, A Little History...

A series of unfortunate events

- 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

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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

New Orleans Hotel Business Depressed Since Fair

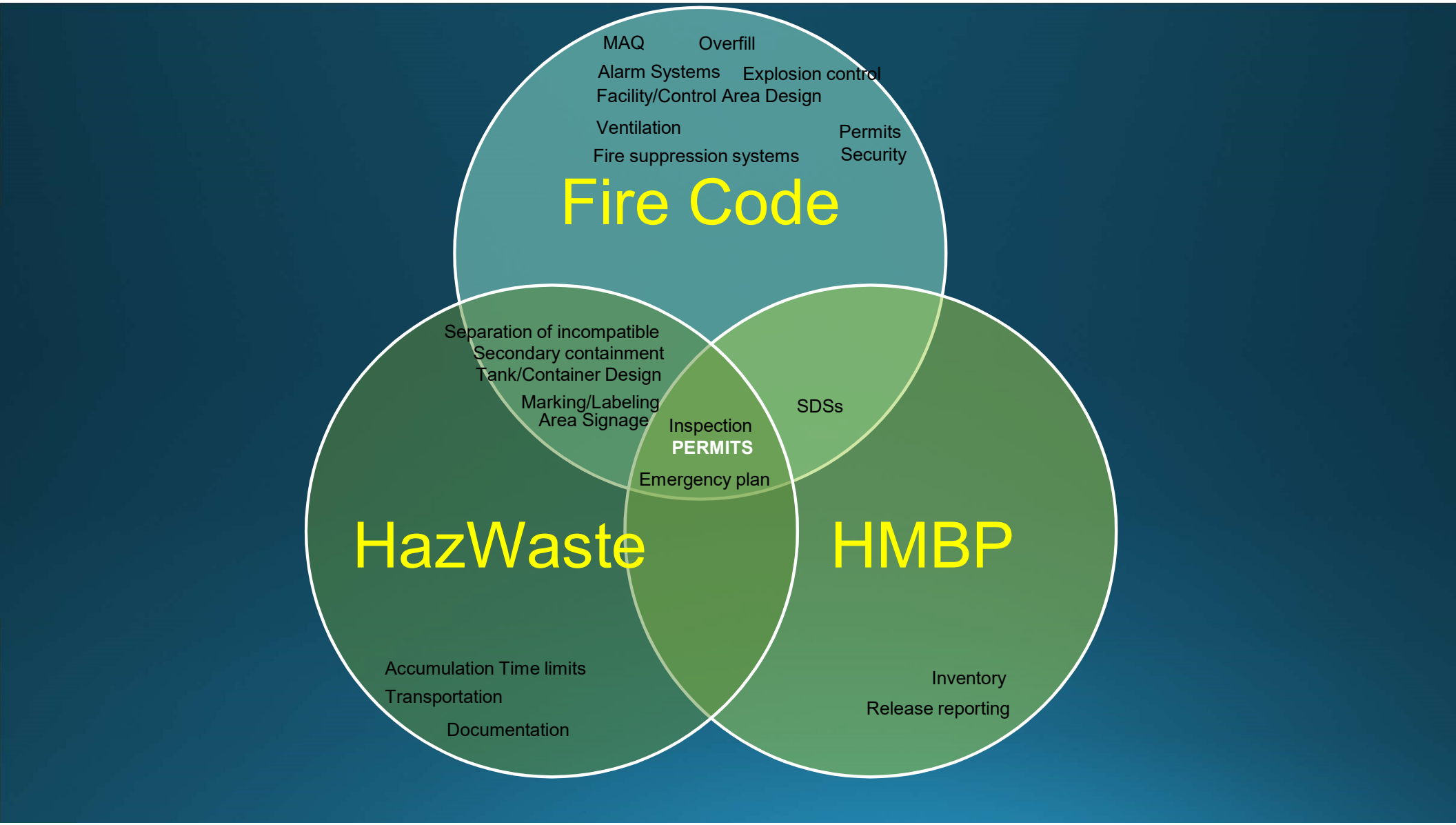
Around the Nation

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

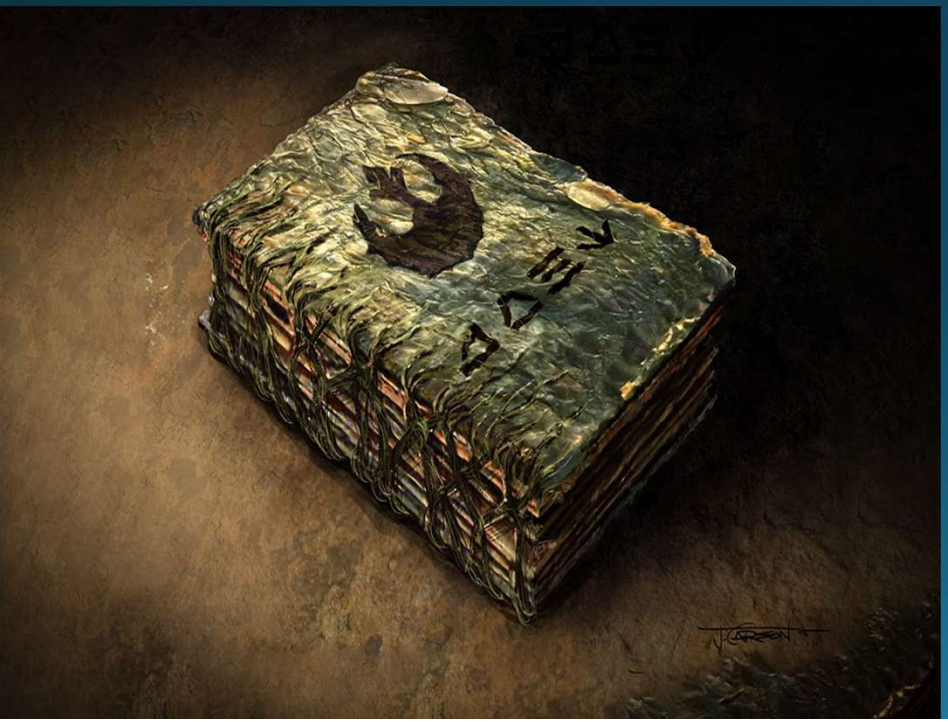
Solzhenitsyn Secluded as Wife Becomes a Citizen

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)


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

Permits

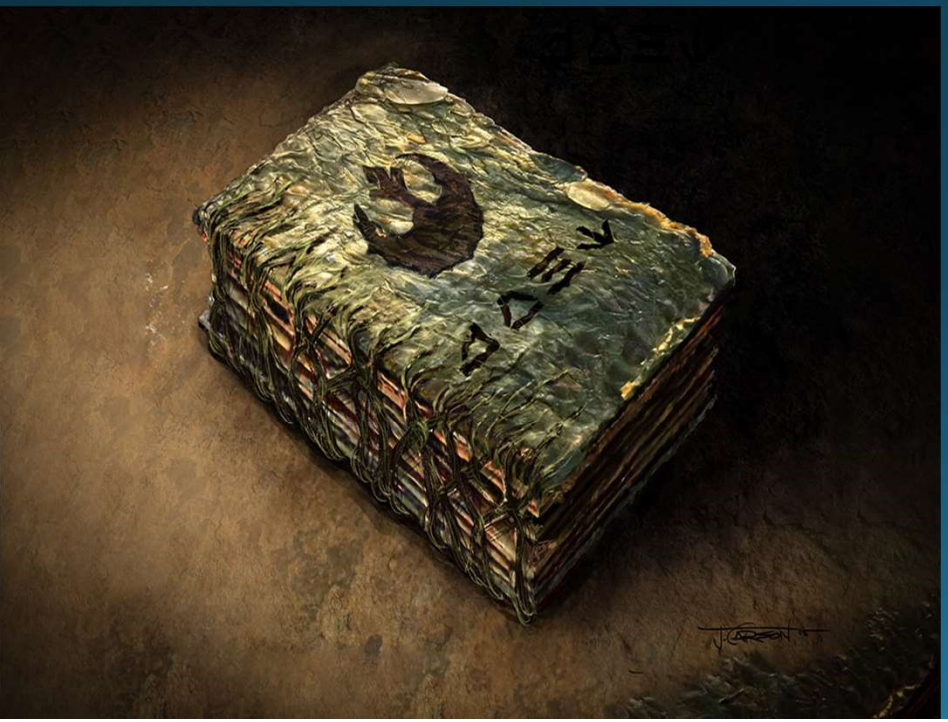


Section 105 Permits

[A] 105.1 General
Permits shall be in accordance with Sections 105.1.1 through 105.6.24.

[A] 105.1.1 Permits Required
A property owner or owner's authorized agent who intends to conduct an operation or business, or install or modify systems and equipment that are regulated by this code, or to cause any such work to be performed, shall first make application to the fire code official and obtain the required permit.

Permits

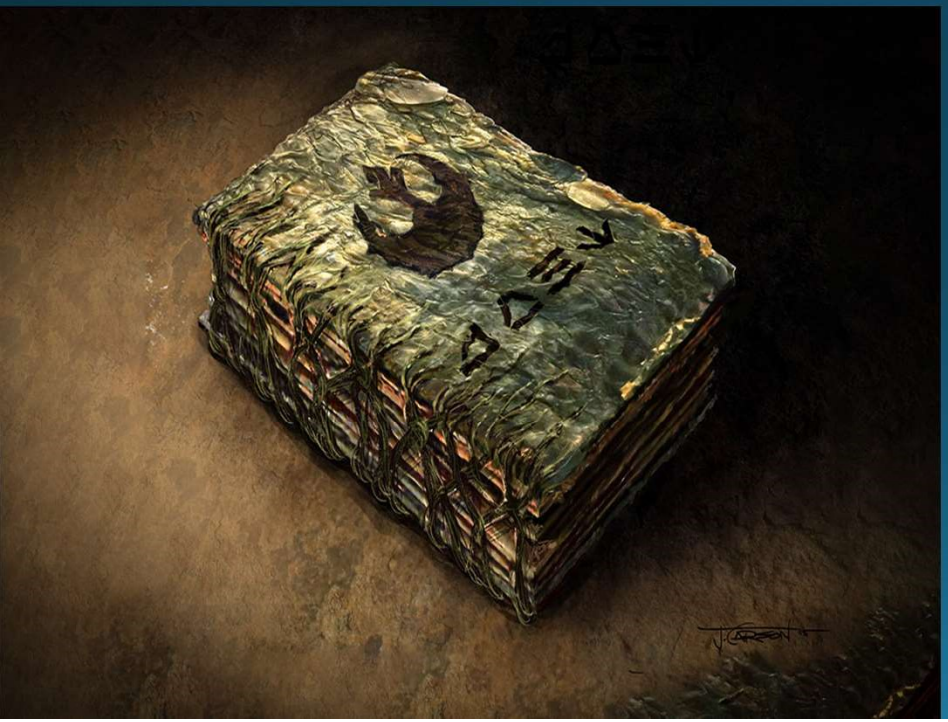


105.1.2 Types of Permits

There shall be two types of permits as follows:
1. Operational permit. An operational permit allows the applicant to conduct an operation or a business for which a permit is required by Section 105.5 for either:
1.1. A prescribed period.
1.2. Until renewed or revoked.

2. Construction permit. A construction permit allows the applicant to install or modify systems and equipment for which a permit is required by Section 105.6.

Permits



[A] 105.2 Application
Application for a permit required by this code shall be made to the fire code official in such form and detail as prescribed by the fire code official. Applications for permits shall be accompanied by such plans as prescribed by the fire code official.

[A] 105.2.1 Refusal to Issue Permit
If the application for a permit describes a use that does not conform to the requirements of this code and other pertinent laws and ordinances, the fire code official shall not issue a permit, but shall return the application to the applicant with the refusal to issue such permit. Such refusal shall, where requested, be in writing and shall contain the reasons for refusal.

Permits

[A] 105.2.2 Inspection Authorized
Before a new operational permit is approved, the fire code official is authorized to inspect the receptacles, vehicles, buildings, devices, premises, storage spaces or areas to be used to determine compliance with this code or any operational constraints required.

Permit – Operational Permit Conditions

- Permission to
  - Maintain, store or handle materials
  - Conduct processes that produce conditions hazardous to life or property
- CFC states general terms, the AHJ determines the specific conditions
  - E.g., LP-gas: an operational permit is required for storage and use of LP-gas

"Permit quantities are not MAQs"

Permits

- Operational Permits apply to:
  - Conditions and operations arising after the adoption of current code
  - Existing conditions and operations
- Implications
  - When code changes - operational permit conditions may change
  - e.g., CO_2 beverage dispensing systems

Operational Permit

Construction Permit

Current Code

Code at time of Permit

Permits

- Local adoption may vary

Includes 52 permit types

23 of IFC permit types not adopted

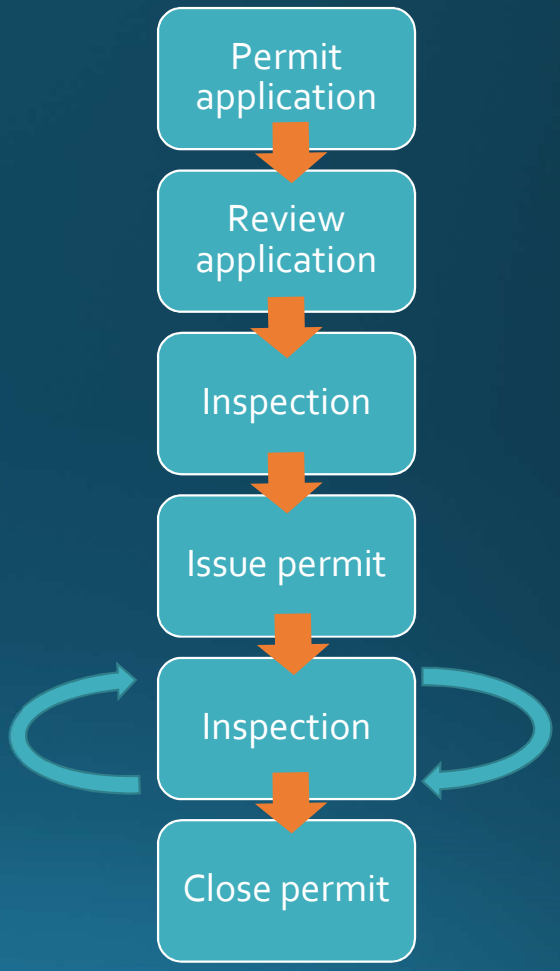
Added Lithium batteries, and 3 permits associated with motion picture/television

CFC minimum

May pull in anything from IFC

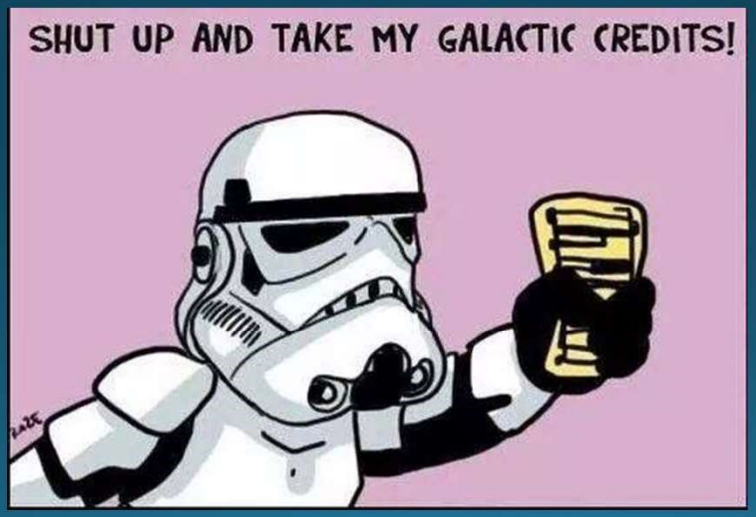
May add additional permits for local needs

Permit Workflow



Fees for Operational Permits

- AHJ may collect fee for permits
- Cost for permit established by local jurisdiction



Contents of a Permit

- CFC says:
  - General description of operation or occupancy
  - Location
  - "Any other information required by the Fire Code Official"
- In practice you might see:
  - Occupancy information
  - Owner or Owner's Authorized Agent
  - Permit Subject (type of permit)
  - Permit Scope
  - Permit Conditions
  - Reference (e.g., to a CofO)

RECORD ID:

City of Huntington Beach

FIRE DEPARTMENT

2000 Main Street, Huntington Beach, CA 92648

Phone (714) 536-5411 Fax (714) 374-1551 Email fireinspection@surfcity-hb.org

Fire Operational Permit

Mailing Address:

HUNTINGTON BEACH CA 92649

Location:

Huntington Beach, CA 92649

Expiration:

Valid until revoked.

Permittee:

Phone:

The Huntington Beach Fire Code (HBFC) requires that a permit be obtained from the fire code official to authorize any operations or conditions that are identified in Section 105.6 or 105.7. This permit shall constitute permission to maintain, store or handle materials; or to conduct processes which produce conditions hazardous to life or property. Such permission shall not be construed as authority to violate, cancel or set aside any of the provisions of the HBFC or other applicable regulations or laws of the jurisdiction.

This operational permit does not constitute permission to construct, modify or install systems or equipment that are regulated by the HBFC.

The fire code official is authorized to revoke a permit issued under the provision of the HBFC when it is found by inspection or otherwise that there has been a false statement or misrepresentation as to the material facts in the application or documents on which the permit or approval was based including, but not limited to, any one of the following:

1. Conditions and limitations set forth in the permit have been violated.
2. The permit is used for a condition or activity other than that listed in the permit.
3. The permitee failed, refused or neglected to comply with orders or notices duly served in accordance with the provisions of the HBFC within the time provided therein.
4. The permit was issued in error or in violation of an ordinance, regulation or the HBFC.

Issued permits shall be kept on the premises designated therein at all times and shall be readily available for inspection by the fire code official. Permits are not transferrable and any change in occupancy, operation, tenancy or ownership shall require that a new permit be issued.

Janice Van Mullem

Janice Van Mullem
Fire Marshal

RECORD ID:

Permit Type	Permit Condition
Flammable or Combustible Liquids	Scope: 2 - 10,000 gallon underground Diesel fuel tanks. Reference: Compliance with the 2016 California Fire Code, Chapter 50 and 57 and all other applicable building and fire codes is required Conditions: * >10 gallons of flammable and combustible liquids for maintenance purposes shall be kept in approved flammable liquids storage cabinets. * <10 gallons of flammable and combustible liquids for maintenance purposes are allowed to be stored outside of a cabinet in approved containers. * Extinguishers: Flammable/Combustible liquids area: 4A:40BC within 30' or 4A:80BC within 50 ft. * Ordinary hazard areas: 2A:20BC within 30', Light hazard areas (i.e. office) 2A:10BC within 75' of travel * An NFPA 704 Placard is required for stationary containers and above ground tanks and at entrances and locations containing flammable liquids. * Emergency Fuel Shutoff sign with disconnect switch within 100 feet of fuel dispenser (CFC 2303.2) * Signs shall be posted in storage areas prohibiting open flames and smoking. * Storage of any liquids, including stock for sale items shall not be stored near or be allowed to obstruct physically the route of egress.

RECORD ID:

Permit Type	Permit Condition
Places of Assembly	Scope: A3 Restaurant with a maximum occupancy load of 63 . Reference: CO1998-001603. Compliance with the 2016 California Fire Code, Chapter 10 is required. Conditions: * The number of people in the building shall not exceed the maximum occupancy load limit shown on the Certificate of Occupancy at any time. * An occupancy load sign displaying 'Maximum Occupancy Load' shall be posted adjacent to the main entrance. The sign shall be made of plastic, metal, or other substantial material, letters shall be at least 1 inch in height and a contrasting color to the sign's background color. Any room inside this facility that has an occupancy load of 50 or more persons shall also have a 'Maximum Occupancy Load' sign posted near its main entrance point. * Exit doors must remain clear and unobstructed at all times the facility is occupied and shall not be locked from the inside while the business is occupied. * Illuminated 'EXIT' signs shall be visible above the exit doors, with the exception of the main door; that door may be designated with a sign reading 'THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED' above or beside it rather than an illuminated EXIT sign. * 'EXIT' signs must not be obscured from view by draperies, decorative materials, furnishings, or any other items. * There shall be at least one fire extinguisher for every 6000 sq feet of floor space, or within 75 feet of any point inside the business; the more restrictive of these two options is applicable. * Exit pathways, aisles, or hallways shall be kept clear at all times. Storage of furnishings, kitchen equipment, props, or other items allowed in these areas. * Emergency Exit lights, where installed, shall be maintained and in operable condition at times.
Carbon Dioxide Systems for Beverage Dispensing	Scope: 550 LBS CO2 TANK Conditions: " Tank or cylinder marked identifying the contents with NFPA 704 sign and the words CARBON DIOXIDE, CFC 5003.5.1 " Manual or automatic emergency shut-off available and identified (e.g., tag or sign), CFC 5003.2.2.1 " Venting of gases directed to an approved area (outdoor preferred or inside well ventilated, out of foot traffic area); no venting in basement or low area, CFC 5305.5 " Tanks secured to prevent falling due to contact, vibration, or seismic, CFC 5303.5 " Storage area secure from unauthorized entry, CFC 5003.9.2 " Tank storage area unobstructed and does not interfere with means of egress, CFC 1030.3 " Lighting (natural or artificial) provided, CFC 5303.15 " NFPA 704 signage on access doors or other approved areas, CFC 5003.5 " Tanks installed after 1/1/17 must obtain structural, mechanical, and fire construction permits.

RECORD ID:

Permit Type	Permit Condition
Compressed Gases	Scope: For (1) 1 ton chlorine and (1) 150lb chlorine cylinders. Total 2150 lbs. Reference: Storage and handling of compressed gas shall comply with and be maintained in accordance with the 2013 California Fire Code Chapter 53. Conditions: * Cylinders marked with contents (name of gas, DOT marking) * NFPA 704 signs located on a stationary container/tank or at building entrances * "No Smoking" and "No Welding" sign posted within 25 feet of flammable gases * Cylinders protected from indoor or outdoor vehicular damage
Hazardous Materials	Scope: For 100 gal. of Hydrofluorosilicic acid. Reference: Compliance with the 2016 California Fire Code, Chapter 50 is required. Conditions: * Visible hazard identification signs as specified in NFPA 704 for the specific materials contained shall be placed , on stationary containers and above ground tanks and at entrances to locations where hazardous exist. * Compliance and maintenance of Hazardous Materials in accordance with the 2013 California Fire Code, Chapter 50 is required.

Examples of Operational Permits Concerning Hazardous Materials

Permits

- Permits based on operation
  - Cutting and welding
  - Dry cleaning
  - Floor finishing
  - Fruit and crop ripening
  - Fumigation and insecticidal fogging
  - HPM facilities
  - Hot works
  - Motor fuel dispensing facilities
  - Organic coating manufacturing
  - Plant extraction systems
  - Spraying or dipping

Permits

- Common hazardous material permits based on chemical
  - Compressed gas
  - Cryogenic fluids
  - Explosives
  - Flammable and combustible liquids
  - Hazardous materials
  - LP-gas

Overlap between Chemical and Operation

- Example:
  - Chewy's Repair Garage
    - Repair Garage Operational Permit
    - Flammable and Combustible Liquids Operational Permit
- Example:
  - Leia's Dry Cleaning
    - Dry Cleaning Operational Permit
    - Flammable and Combustible Liquids Operational Permit

- Do you issue both? Or one? What do you charge for inspection?

Examples of Operational Permits Concerning Hazardous Materials

- Flammable and Combustible Liquids
- Compressed Gas
- Hazardous Materials
- Cutting and Welding
- Spraying or Dipping
- Motor Vehicle Fueling

Flammable and Combustible Liquid Permit

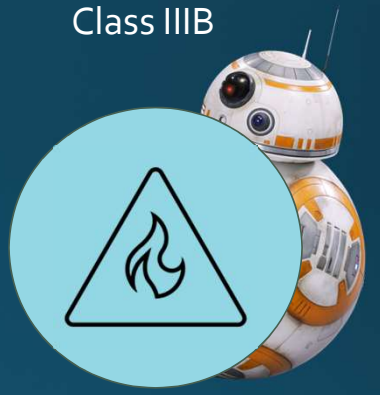
Class I

- > 5 gallons (19 L) in a building
- >10 gallons (37.9 L) outside of a building

Class II or IIIA

- > 25 gallons (95 L) in a building
- > 60 gallons (227 L) outside a building

Class IIIB



- In tanks or portable tanks for fueling motor vehicles at motor fuel-dispensing facilities
- Where connected to fuel-burning equipment.

TANK. A vessel containing more than 60 gallons (227 L).

Compressed Gas

Table 105.5.9 Permit Amounts for Compressed Gases

Type of Gas	Amount (cubic feet, STP)
Carbon dioxide used in carbon dioxide enrichment systems	875 (100 lbs)
Carbon dioxide used in insulated liquid carbon dioxide beverage dispensing applications	875 (100 lbs)
Corrosive	200
Flammable (except cryogenic fluids and liquefied petroleum gases)	200
Highly toxic	Any amount
Inert and simple asphyxiant	6,000
Oxidizing (including oxygen)	504
Pyrophoric	Any amount
Toxic	Any amount

In Excess of these Amounts

Hazardous Materials

- Confusing to many
  - If a hazardous material is covered under another permit – then use that permit (e.g., flammable/combustible liquid, LP-Gas, compressed gas)
  - If not – hazardous material permit is issued
- Not 'CUPA' HMBP permit
- Examples

Table 105.5.22 Permit Amounts for Hazardous Materials

Type of Material	Amount
Combustible liquids	See Section 105.5.18
Corrosive materials	
Gas	See Section 105.5.9
Liquid	55 gallons
Solid	1,000 pounds
Explosive materials	See Section 105.5.16
Flammable materials	
Gas	See Section 105.5.9
Liquid	See Section 105.5.18
Solid	100 pounds
Highly toxic materials	
Gas	See Section 105.5.9
Liquid	Any amount
Solid	Any amount
Organic peroxides	
Liquids	
Class I	Any amount
Class II	Any amount
Class III	1 gallon
Class IV	2 gallons
Class V	No permit required
Solids	
Class I	Any amount
Class II	Any amount
Class III	10 pounds
Class IV	20 pounds
Class V	No permit required

In Excess of these Amounts

Spraying or Dipping

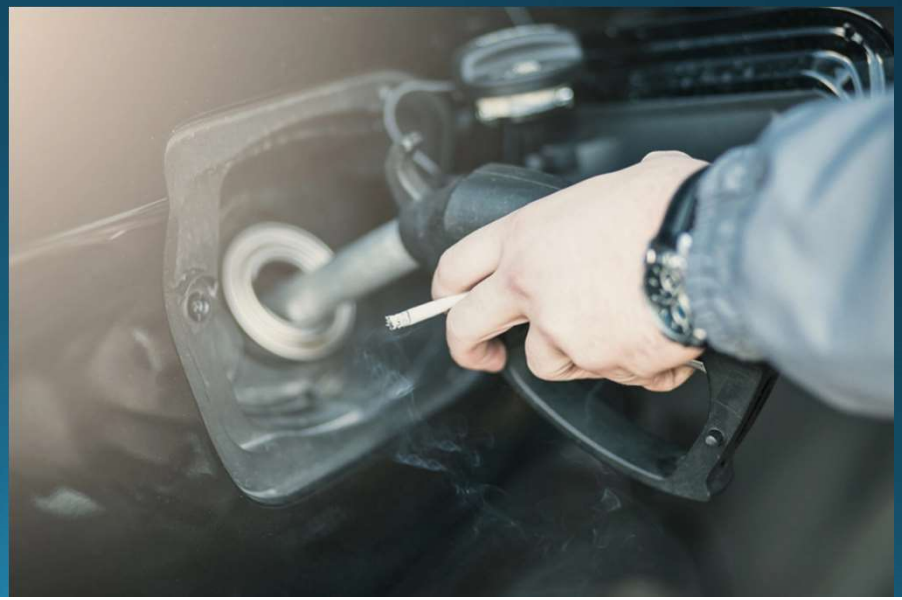
105.5.47 Spraying or Dipping
An operational permit is required to conduct a spraying or dipping operation utilizing flammable or combustible liquids, or the application of combustible powders regulated by Chapter 24.

Spraying & Dipping – Spray Booths

- Chapter 24 – Flammable Finishes
- Spray booths
  - Need to be permitted for construction & operation
  - Auto extinguishing system
  - Covered sprinkler heads
  - Interlocks – *spraying, drying, and ventilation*
  - Constructed of approved noncombustible materials

Examples of Operational Permits Concerning Hazardous Materials

105.5.33 Motor Fuel-Dispensing Facilities
An operational permit is required for the operation of automotive, marine and fleet motor fuel-dispensing facilities.



Motor Vehicle Fueling

Chapter 57 incorporates UST requirements similar to Title 23 CCR:

- Overfill prevention
- Spill containers
- Leak detection (approved method)
- Acceptance testing for tanks and piping

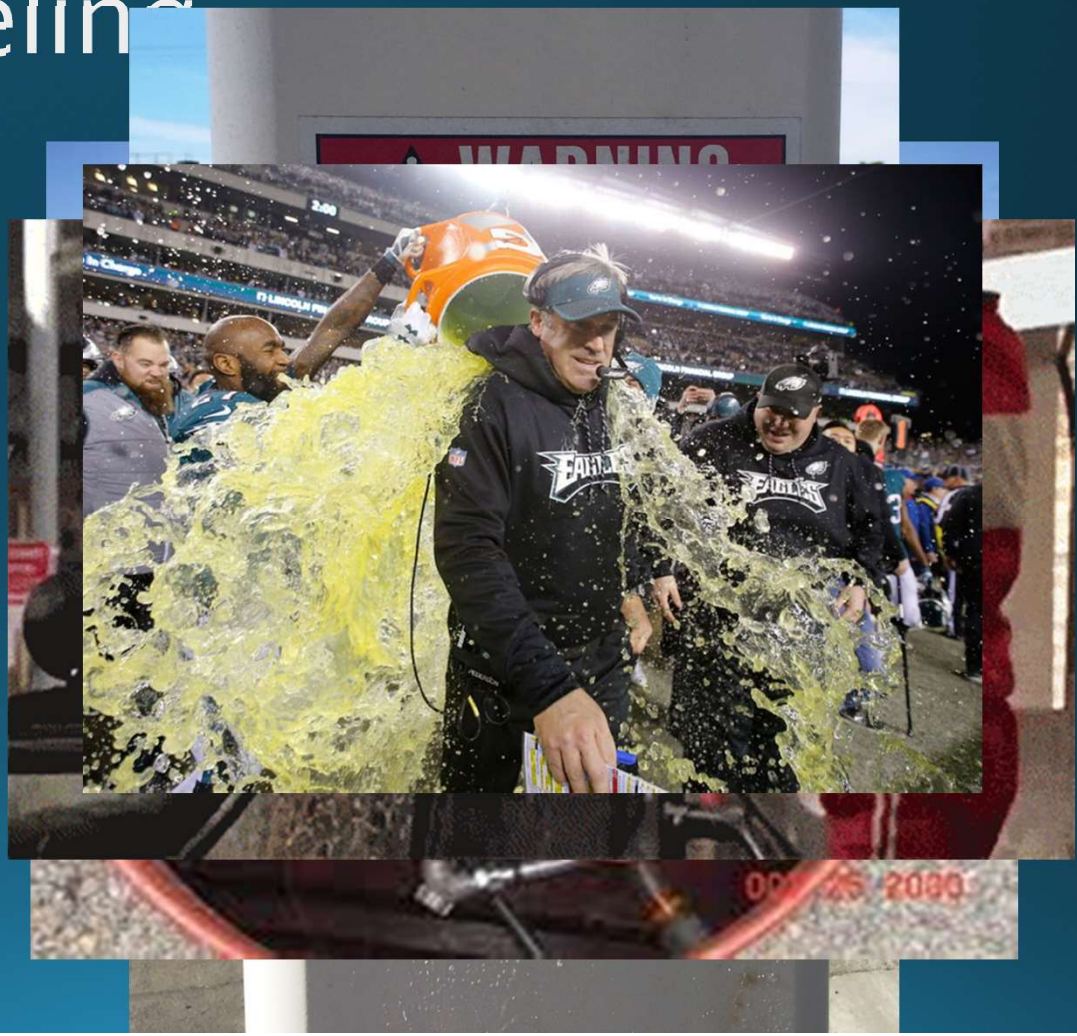
Motor Vehicle Fueling

Chapter 23 regulates fuel dispensing at grade and above:

- Impact (aka shear) valves
- Breakaway devices on dispenser hoses
- Nozzles with listed self-closing valves and latch-open devices
- Emergency disconnect switches (aka E.S.O.)

Motor Vehicle Fueling

- Crash protection
- Warning signs
- Electrical Requirements (Class 1, Division 1 in sumps and UDC's for gasoline)
- Supervision of dispensing
- Listed Equipment: Electrical equipment, dispensers, hose, nozzles, turbine pumps, etc.
- Spill kits/absorbent (CFC 5001.3.3.4 "…means to render a spill harmless shall be provided where a spill is determined to be a plausible event..")

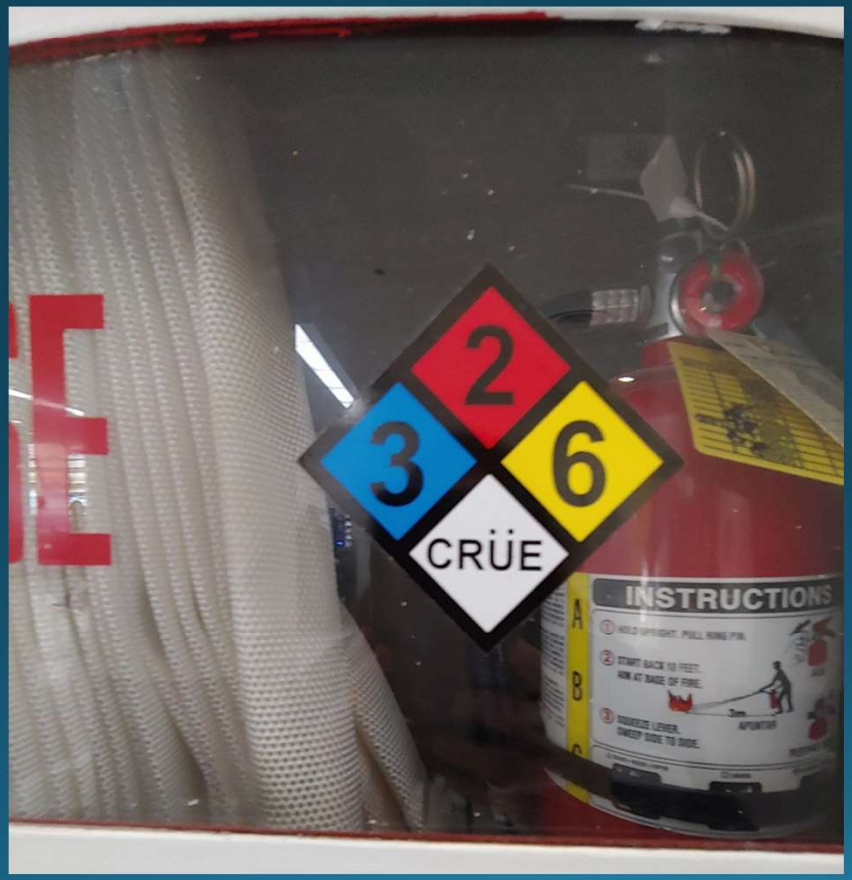


Examples of Operational Permits Concerning Hazardous Materials

105.5.22 Hazardous Materials
An operational permit is required to store, transport on site, dispense, use or handle hazardous materials in excess of the amounts listed in Table 105.5.22.*

*These quantities also trigger the requirement for NFPA placarding

NFPA 704 Placards



Fire Code Requirement for NFPA 704

Where to post signage

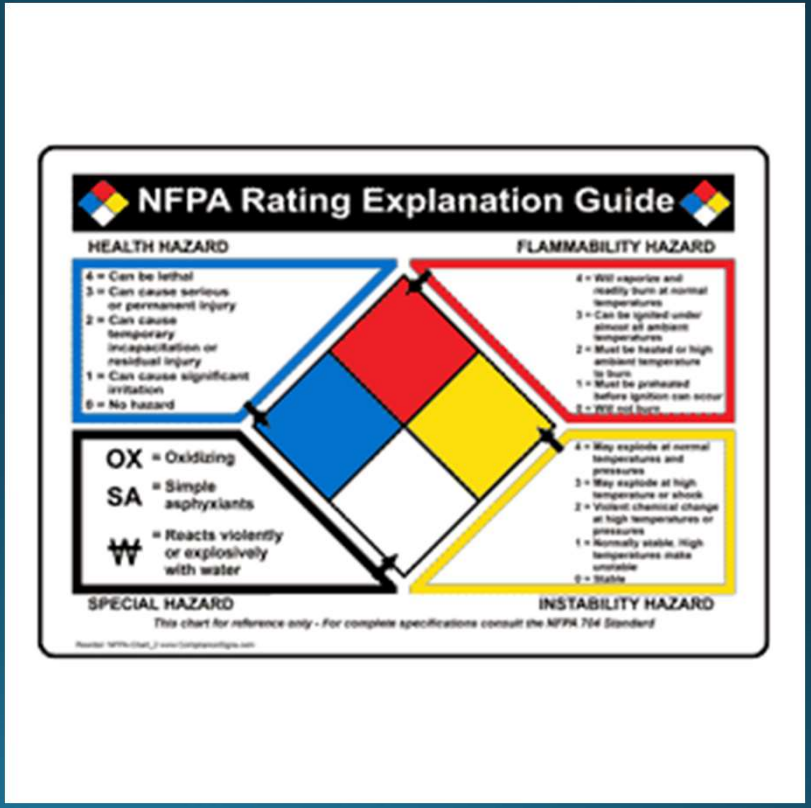
On stationary containers and aboveground tanks and at entrances to locations where hazardous materials are stored, dispensed, used or handled

Trigger amount for signage

In **quantities requiring a permit** and at specific entrances and locations designated by the fire code official.

Rating System

- BLUE SECTION = HEALTH
- RED SECTION = FLAMMABILITY
- YELLOW SECTION = INSTABILITY
- Each section has a numeric value:
  - 0 = No Hazard
  - 4 = Most Severe Hazard



Special Hazards

- This section can provide more specific information about the hazard.
- NFPA only designates symbols for Water-Reactive, Oxidizer and Simple Asphyxiant
- "SA" designation can be used for large quantities of CO_2

Special Hazards

- Facilities often use other, non-NFPA approved, symbols
- AHJ's will need to determine whether to allow these symbols on placards
- It is important that first responders understand the significance of <u>any</u> special hazard symbols in use in their areas of responsibility

Benefits

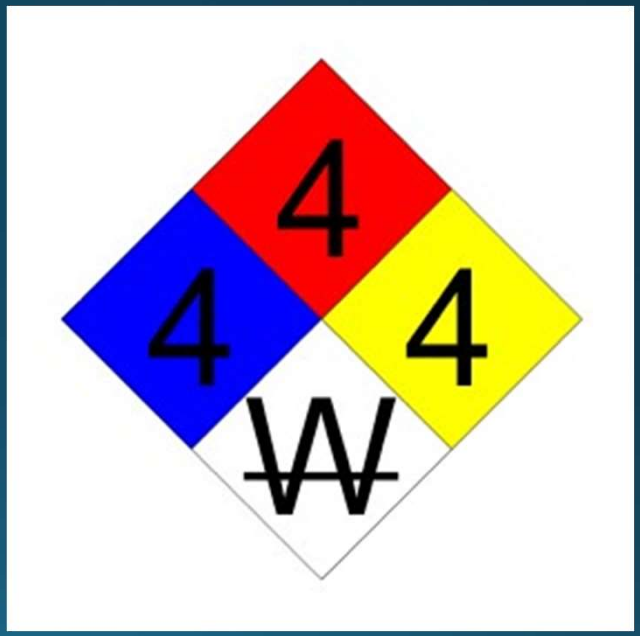
- Can provide responders an initial warning prior to starting operations
- Doesn't require special knowledge of chemical terminology
- Gives broad overview of type and severity of hazards present

Drawbacks

- Doesn't provide specific information about the hazard(s)
- May reflect a "composite" rating combining different hazards
- Often displays incorrect or out-dated ratings

Sign Location

- Approved by the authority having jurisdiction
- Posted at the following locations:
  - (1) Two exterior walls or enclosures containing a means of access to a building or facility
  - (2) Each access to a room or area
  - (3) Each principal means of access to an exterior storage area



What's wrong with this picture?

Ratings

- May vary between different physical forms

CO2 - Gas

CO2 – Liquid

Ratings

- May vary between different physical forms

Oxygen - Gas

Oxygen – Liquid/Cryogenic

Ratings

- May vary between location

Ammonia - Outside

Ammonia - Inside

Reference: IMC Table 1103.1

An example of composite placarding

Facility has

- 500 gallons of Polyurethane Resin Part A
- 500 gallons of Polyurethane Resin Part B
- 110 gallons of Acetone

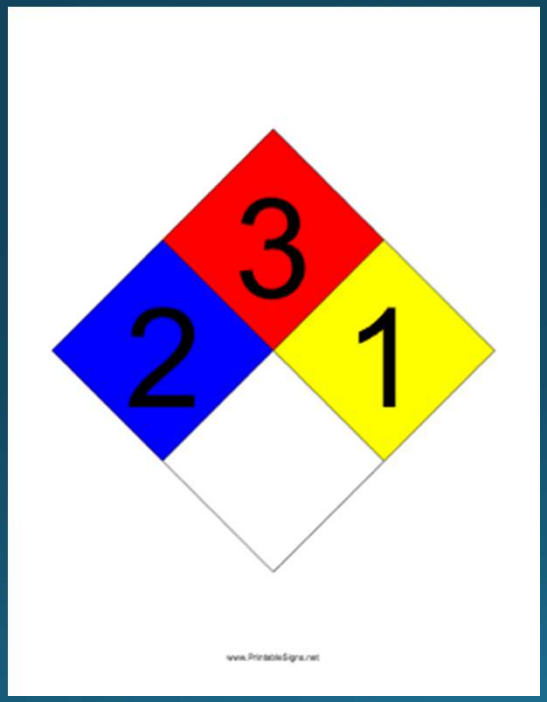
- All three chemicals are present in **quantities requiring a permit** (CFC 105.6.17.2/105.6.17.6).

Polyurethane Resin Part A would have this 704 placard:

Polyurethane Resin Part B would have this placard:

Acetone would have this placard:

This would be the composite placard for all three chemicals:



NFPA 704 Take Aways

- Triggered at 'permitted' amount
- Location, location, location
- Composite often used (and often incorrect)

Chapter 50 Awakens!

Chapter 50 General Provisions

- All hazardous materials/all hazard classes
- Where **specific requirements** are provided in other chapters, the specific requirements shall apply
- Where a material has **multiple hazards**, all hazards shall be addressed

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

Control area -

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)

Areas in which you can isolate hazmat without reclassifying the building as 'hazardous' occupancy

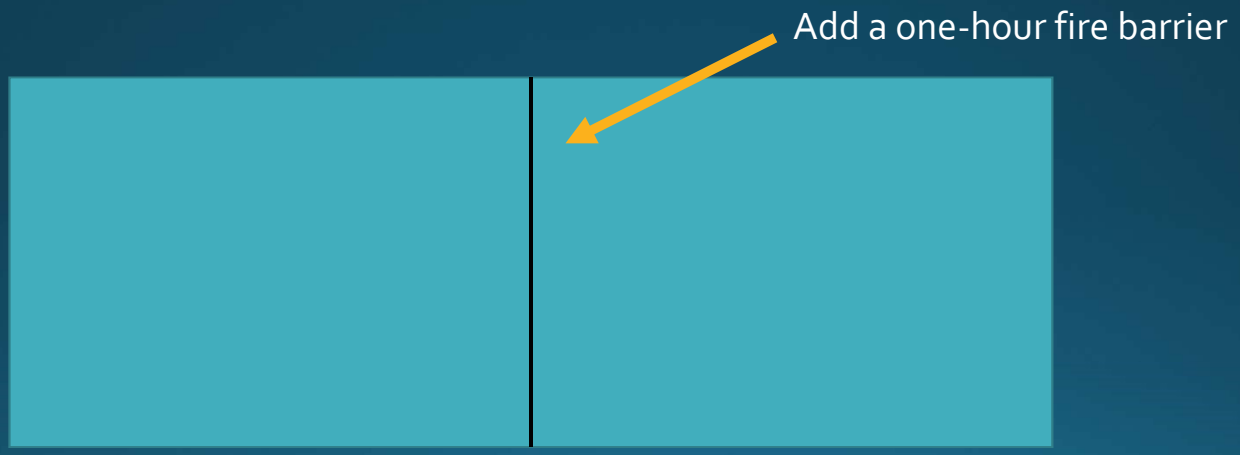
Control Areas

- 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

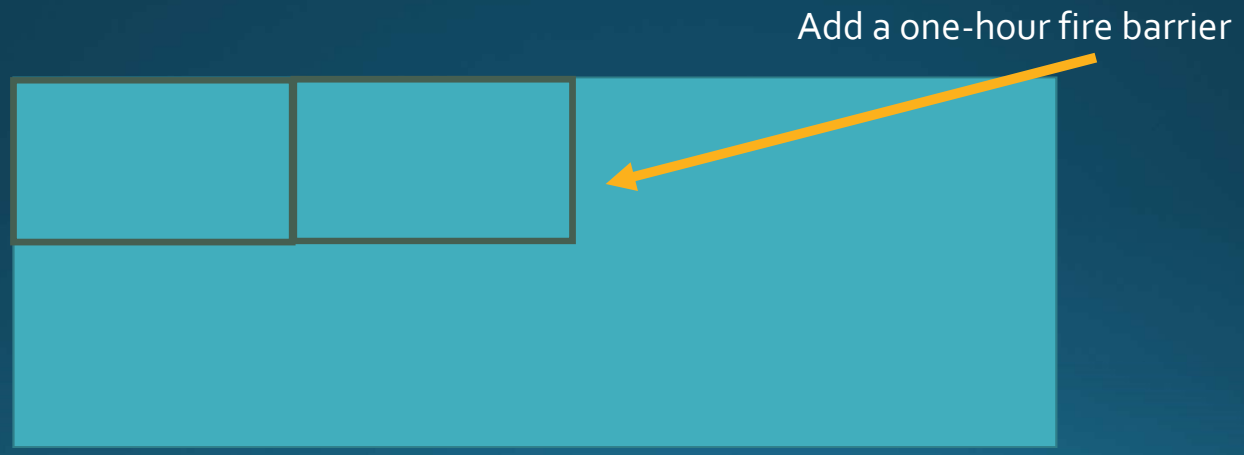


TWO CONTROL AREAS

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

Control Areas

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



THREE CONTROL AREAS

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

Design & Number of Control Areas

TABLE 5003.8.3.2
DESIGN AND NUMBER OF CONTROL AREAS

STORY		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA[a]	NUMBER OF CONTROL AREAS PER STORY	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS[b]
Above grade plane	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 plane	1	75	3	1
	2	50	2	1
	Lower than 2	Not Allowed	Not Allowed	Not Allowed

Do you think you can have unlimited quantity of control areas?

a. Percentages shall be of the maximum allowable quantity per control area shown in Tables 5003.1.1(1) and 5003.1.1(2), with all increases allowed in the footnotes to those tables.

b. Separation shall include fire barriers and horizontal assemblies as necessary to provide separation from other portions of the building.

Example: 1st Floor

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, i]	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

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, i]	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 HAZ

TABLE 5003.1.1(1)
MAXIMUM ALLOWABLE QUANTITY PER CO[illegible] 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	Not	H-2	See Note g	Not	Not	[illegible]	Not	Not	See Note g	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

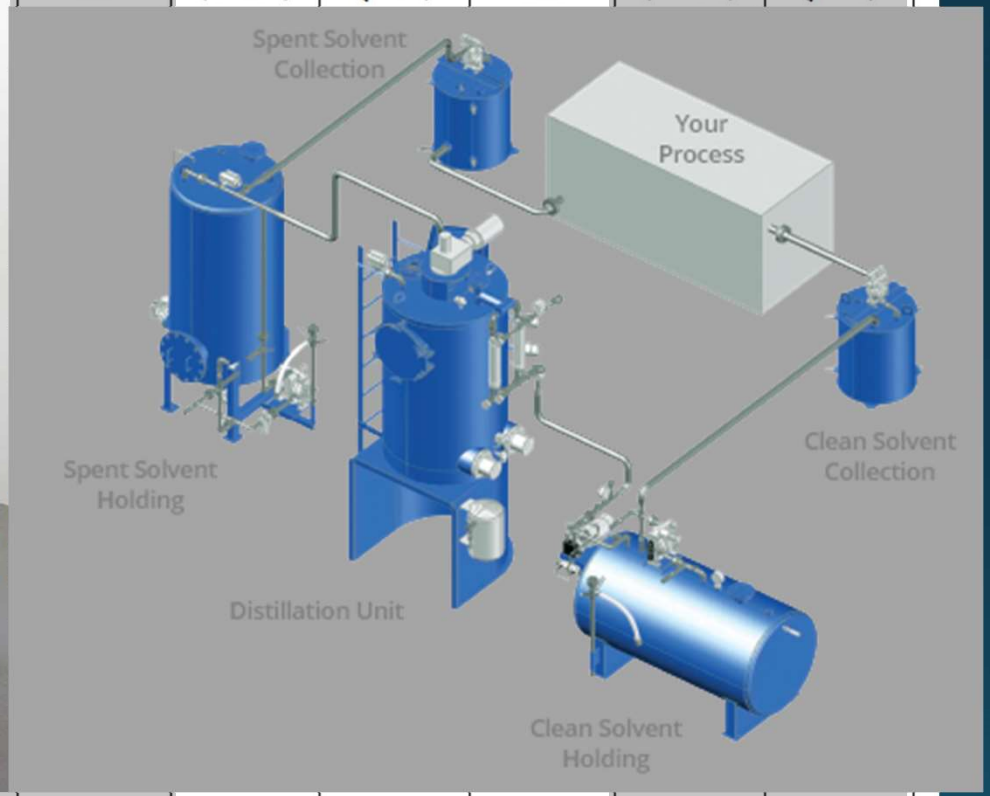
(continued)

INDOOR – PHYSICAL HAZARD

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

MATERIA		GROUP WHEN THE MAXIMUM	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
					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, combinati (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

(continued)



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HAZAR

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
Flammable liquid[c]	IB and IC	or H-3	Not Applicable	120[d, e]	Not Applicable	Not Applicable	120[d]	Not Applicable	Not Applicable	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
Cryogenic	Liquefied	Not	Not	Not	Not	Not pplicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Organic per						Not pplicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Oxidizer						0.25[g] 1[d] 50[d] 12 t Li t Li	(0.25)[g] (1)[d] (50)[d]	Not	0.25[g] 1[d] 10[d]	(0.25)[g] (1)[d] (10)[d]
Oxidizing g						0.2 2 25 4,0 Ap				
Pyrophoric						1				
Unstable (r						0.2 1 50[d] t Limited	(50)[d] Not Limited	250[d, e] Not Limited	10[d] Not Limited	(10)[d] Not Limited
Water reactive	2 1	H-3 Not Applicable	50[d, e] Not Limited	(50)[d, e] Not Limited	Not Applicable	5[d] 50[d] Not Limited	(5)[d] (50)[d] Not Limited	Not Applicable	1[d] 10[d] Not Limited	(1)[d] (10)[d] Not Limited

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.

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

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.

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

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]

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. Containir

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*.

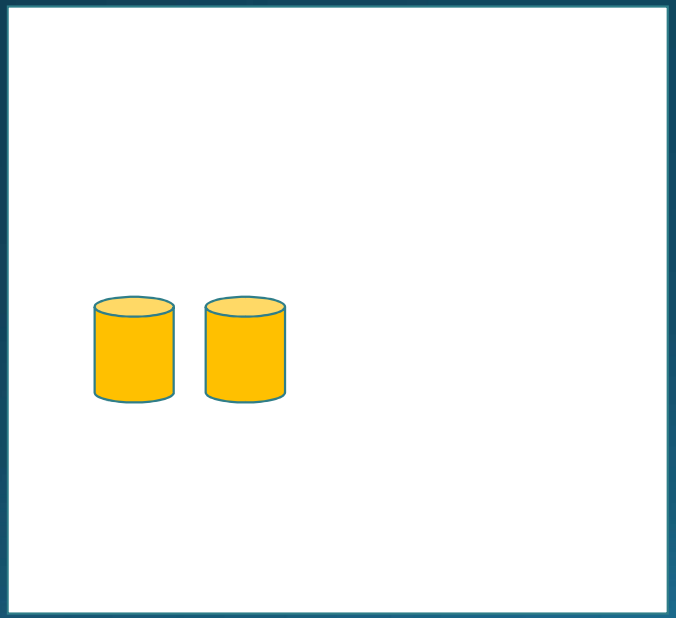
q. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.7.2.

Footnote d & e are applied accumulatively

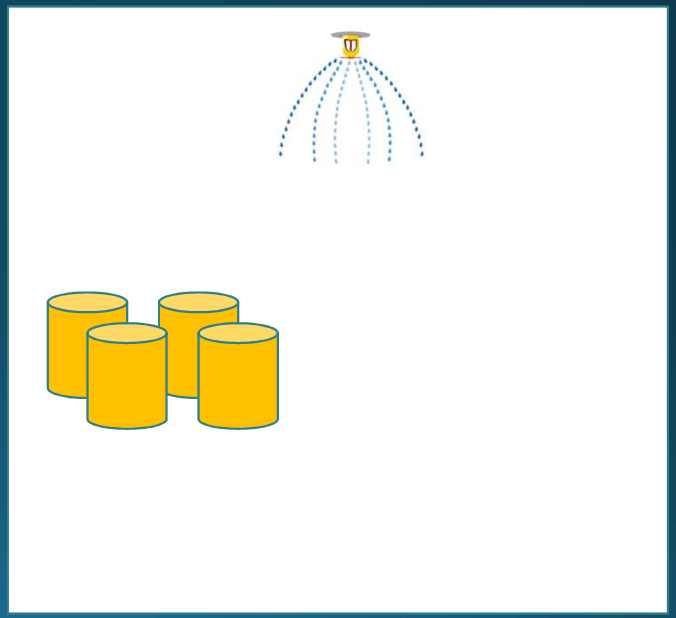
Example

INDOOR – PHYSICAL HAZARD

Acetone
Flammable Class IB
MAQ – 120 gallons



One control area
2 – 55 gallon drums maximum

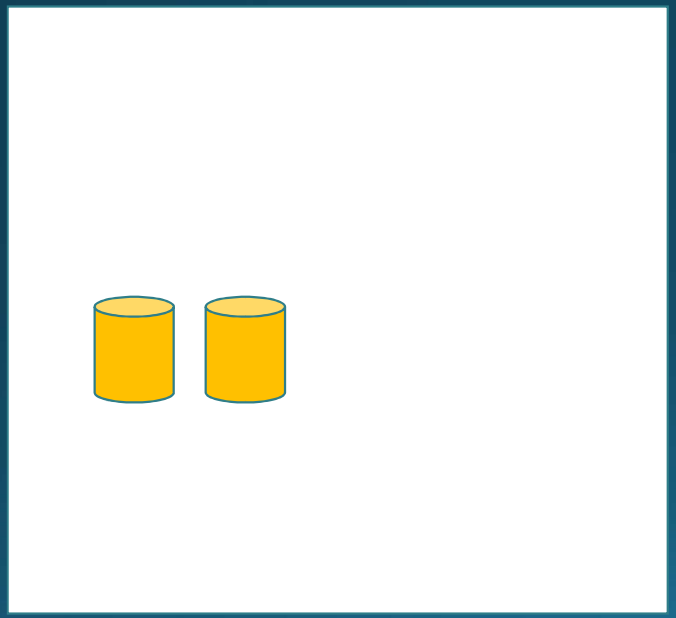


One control area
4 – 55 gallon drums maximum

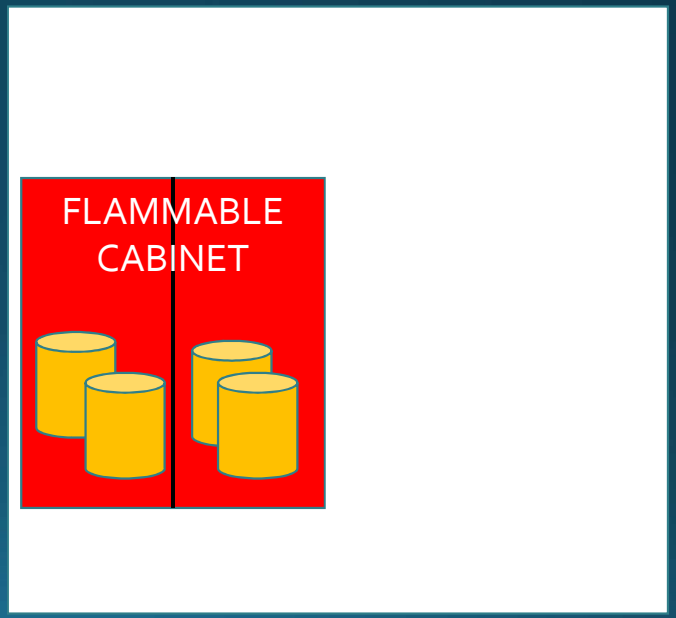
Example

INDOOR – PHYSICAL HAZARD

Acetone
Flammable Class IB
MAQ – 120 gallons



One control area
2 – 55 gallon drums maximum

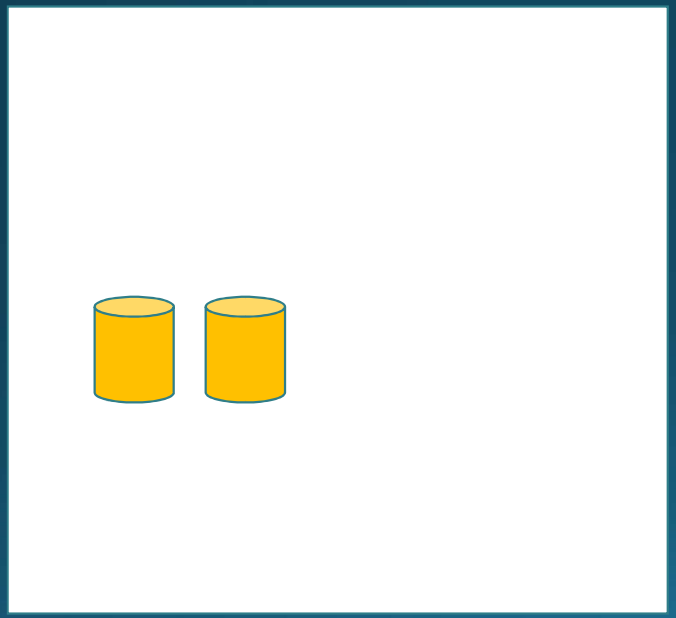


One control area
4 – 55 gallon drums maximum

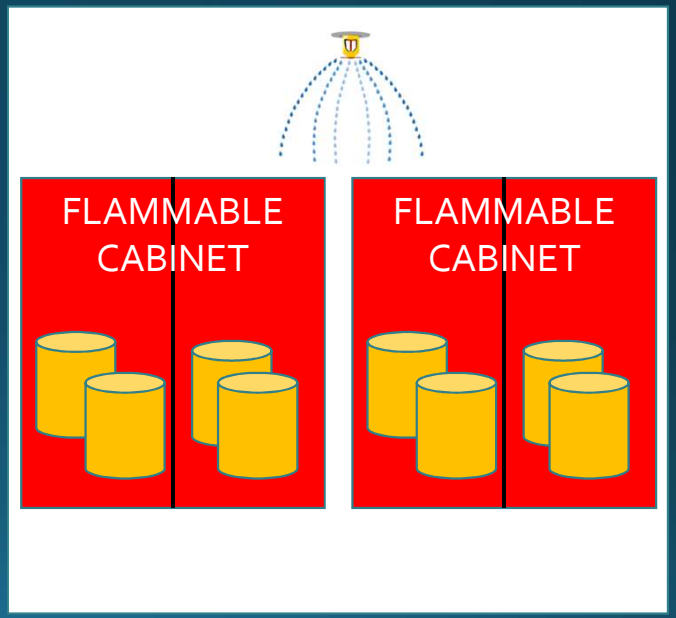
Example

INDOOR – PHYSICAL HAZARD

Acetone
Flammable Class IB
MAQ – 120 gallons



One control area
2 – 55 gallon drums maximum



One control area
8 – 55 gallon drums maximum

Example permit conditions

Scope:

Storage of Flammable Class IB (Acetone) inside not to exceed 120 gallons

Reference:

Ch 50, 2022 CFC

Conditions:

- Acetone shall be stored and dispensed in an approved flammable storage cabinet
- Facility shall maintain an approved automatic sprinkler season
- Storage above MAQ subject to compliance with hazardous occupancy (CBC, CFC)

Approved

Acceptable for the fire code official

Containers, cylinders, tanks and other means used for containment of hazardous materials shall be of an approved type. CFC 5003.2.1

How Can The Permit Process Enhance Facility Safety?

Permits Allow An Agency To Be Proactive

- Contain prescriptive language
- Are facility specific
- Can address specific hazards inherent in processes or installations (e.g. separation of incompatible materials)

Separation of Incompatible Materials

5003.9.8 Separation of Incompatible Materials

Incompatible materials in storage and storage of materials that are incompatible with materials in use shall be separated where the stored materials are in containers having a capacity of more than 5 pounds (2 kg), 0.5 gallon (2 L) or any amount of compressed gases. Separation shall be accomplished by:

Segregating incompatible materials in storage by a distance of not less than 20 feet (6096 mm).

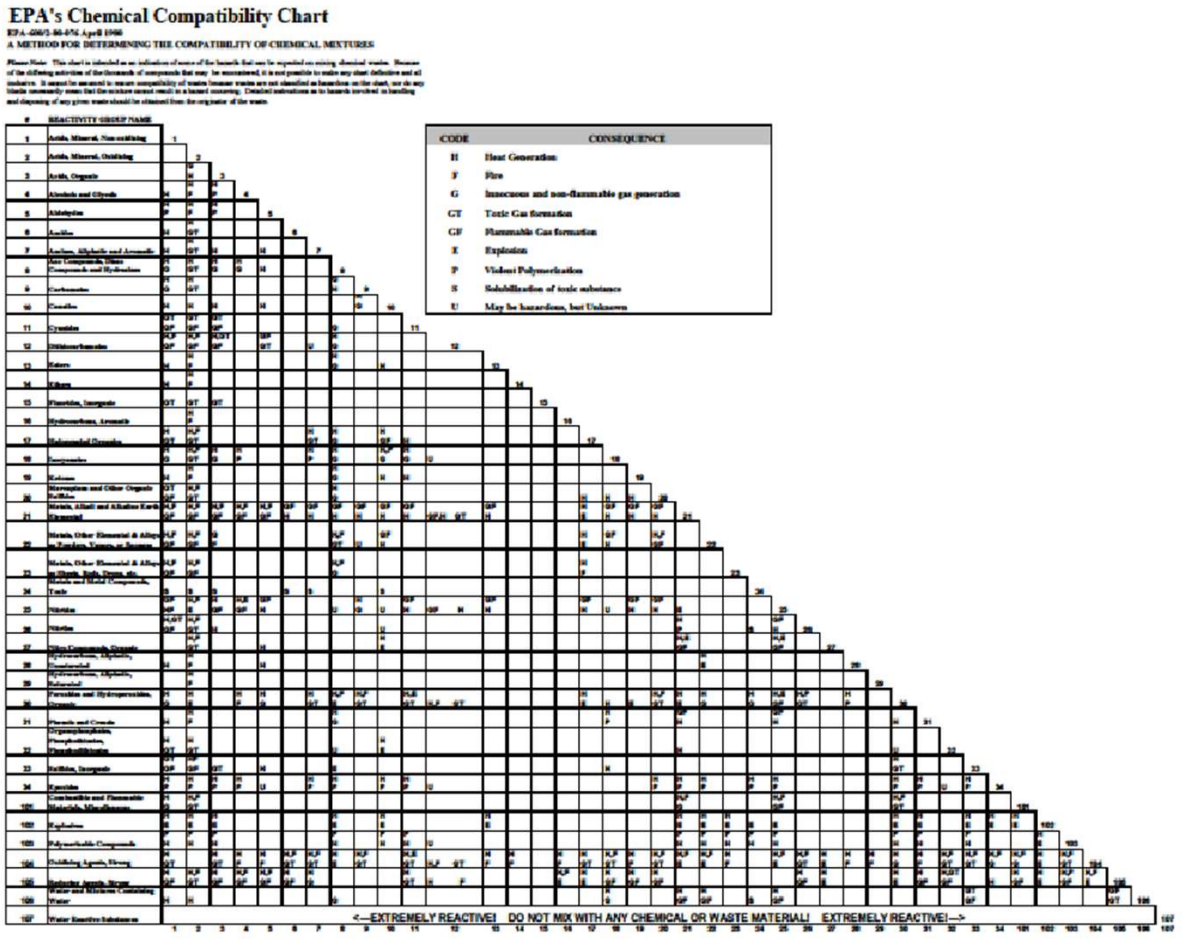
Isolating incompatible materials in storage by a noncombustible partition extending not less than 18 inches (457 mm) above and to the sides of the stored material.

Storing liquid and solid materials in hazardous material storage cabinets.

Storing compressed gases in gas cabinets or exhausted enclosures in accordance with Sections 5003.8.5 and 5003.8.6.

Materials that are incompatible shall not be stored within the same cabinet or exhausted enclosure.

Incompatible Chemicals



Incompatible Storage

#	REACTIVITY GROUP NAME	1	2	3	4	5	6	7	8	9	10
1	Acids, Mineral, Non-oxidizing										
2	Acids, Mineral, Oxidizing										
3	Acids, Organic		G H								
4	Alcohols and Glycols	H	H F	H P							
5	Aldehydes	H P	H F	H P							
6	Amides	H	H GT								
7	Amines, Aliphatic and Aromatic	H	H GT	H		H					
8	Azo Compounds, Diazo Compounds and Hydrazines	H G	H GT	H G	H G	H					
9	Carbamates	H G	H GT						G H		
10	Caustics	H	H	H		H				H G	

CODE	CONSEQUENCE
H	Heat Generation
F	Fire
G	Innocuous and non-flammable gas generation
GT	Toxic Gas formation
GF	Flammable Gas formation
E	Explosion
P	Violent Polymerization
S	Solubilization of toxic substance
U	May be hazardous, but Unknown

Incompatible Storage

- Lots of Tools
- Always consult SDS
  - Section 10 – Stability and Reactivity

SECTION 10: Stability and reactivity

Reactivity: Exothermic reactions including polymerization may occur in contact with amines, strong acids, strong bases, alcohols, strong oxidizing agents and excessive heat.

Chemical stability: This product is stable.

Possibility of hazardous reactions: Hazardous polymerization will occur. This product will autopolymerize at very high temperatures.

Conditions to avoid: Excessive heat and ignition sources.

Incompatible materials: Avoid strong acids, bases, and oxidizing agents. Avoid contact with amines.

Hazardous decomposition products: Thermal decomposition may produce smoke, carbon monoxide, carbon dioxide, aldehydes and other products of incomplete combustion. Phenolics.

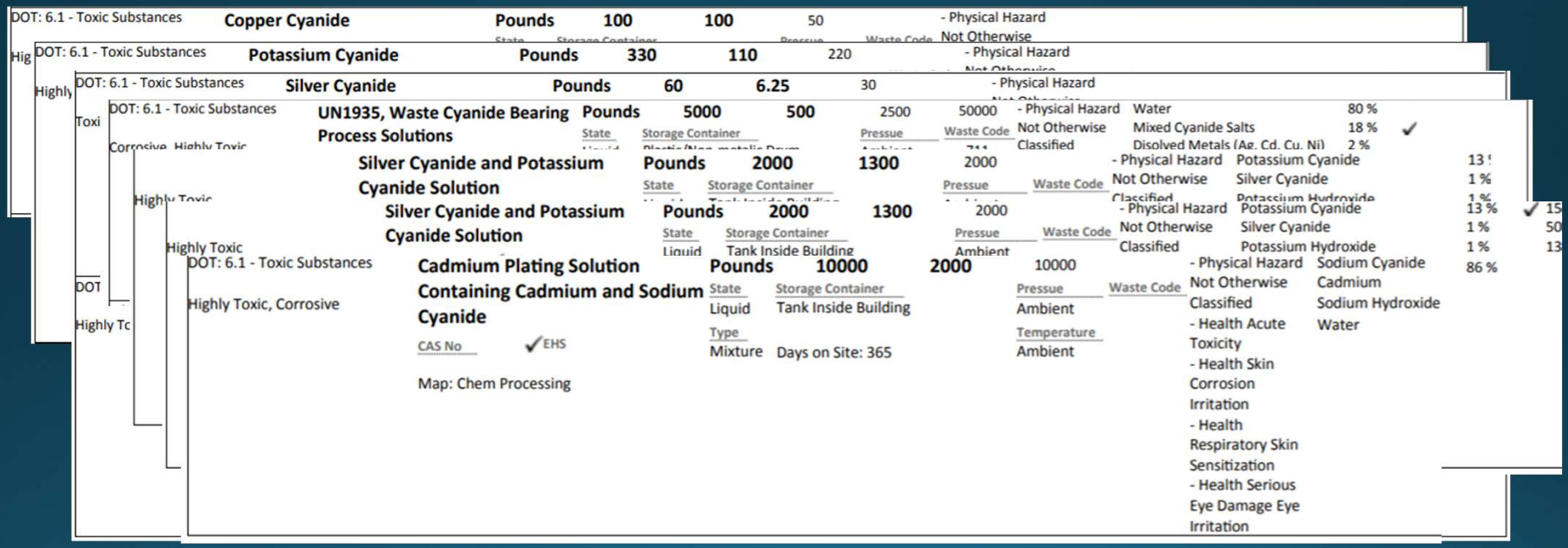
Guide to Chemical Incompatibility by Hazard Class

	Acids,	Acids,	Acids,	Alkalis	Oxidizers	Toxics	Toxics	Water	Organic
Toxics organic	X	X	X	X	X	X	✓	✓	✓
Water-reactives	X	X	X	X	X	X	✓	✓	✓
Organic solvents	X	X	✓	X	X	X	✓	✓	✓

WISER
Wireless Information System for Emergency Responders

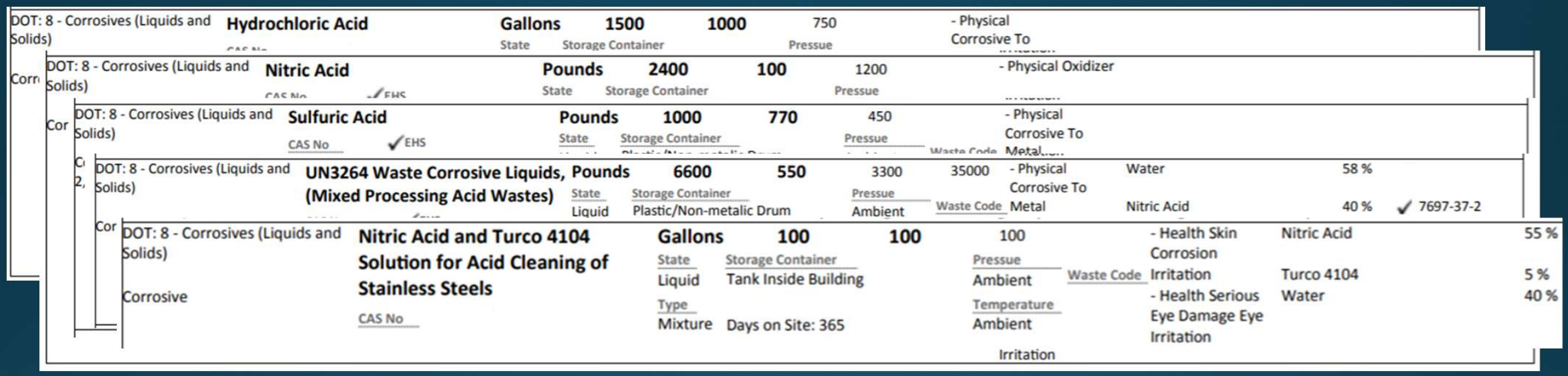
Metal Plating Shop Fire, Brea CA

What chemicals are in play?



Did you count?
What other hazmat is in the building?

What chemicals are in play?

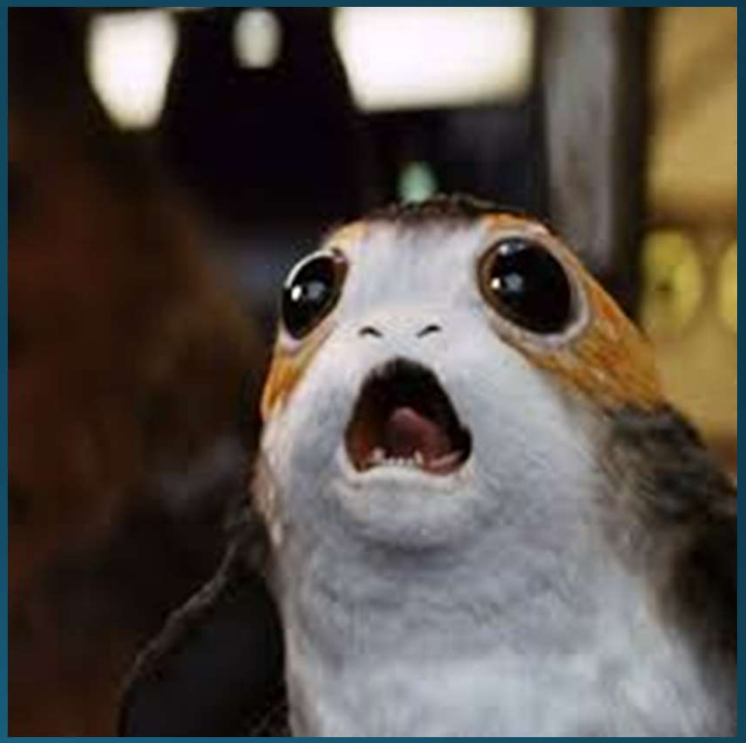


Permit ? MAQ ?

What do you think?

What permit?
What are permit conditions?

What is MAQ?
What is likely building class?

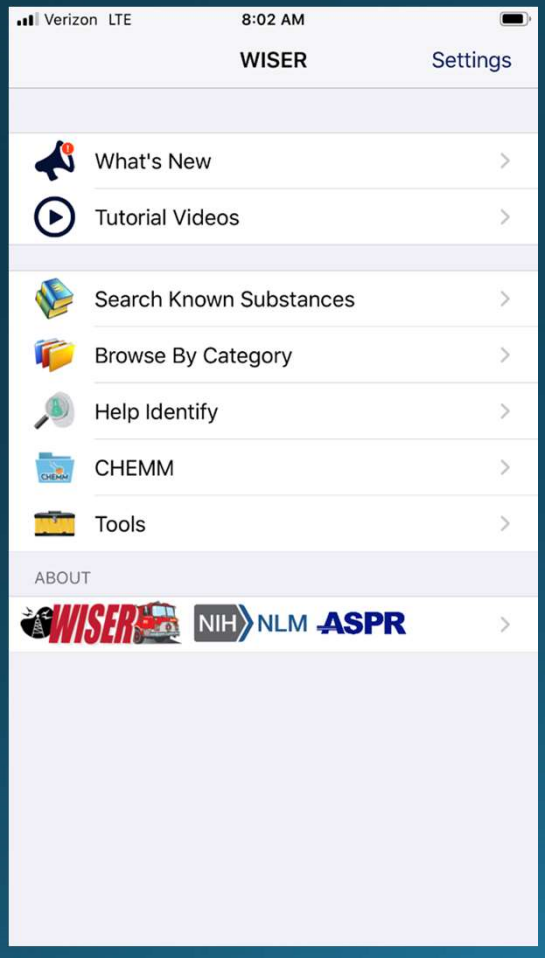


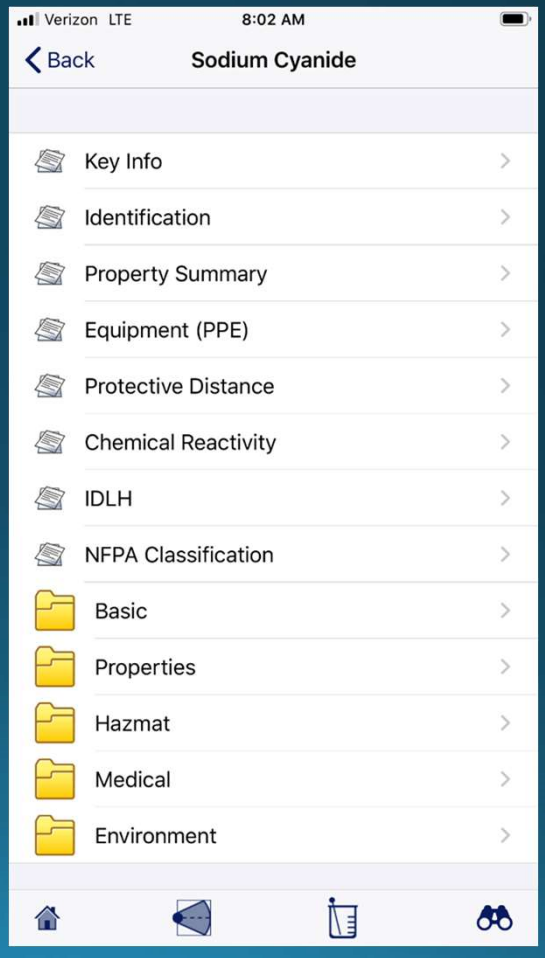
How will the firefighters use this information?

What tools can we use?

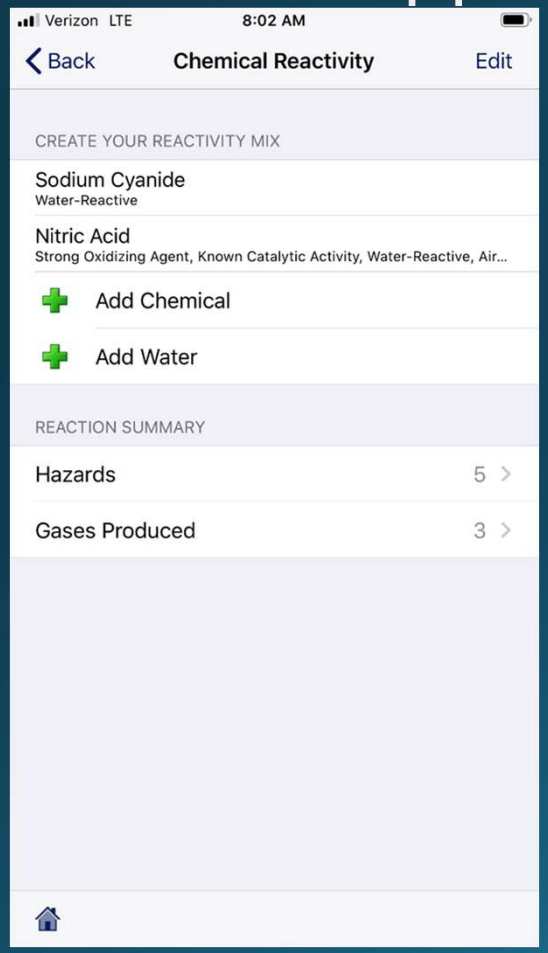
- How do we apply our tools…
  - MAQ
  - Control areas
  - Incompatibility
  - Signage/704
  - Listed/approved
  - SDSs
  - Wiser

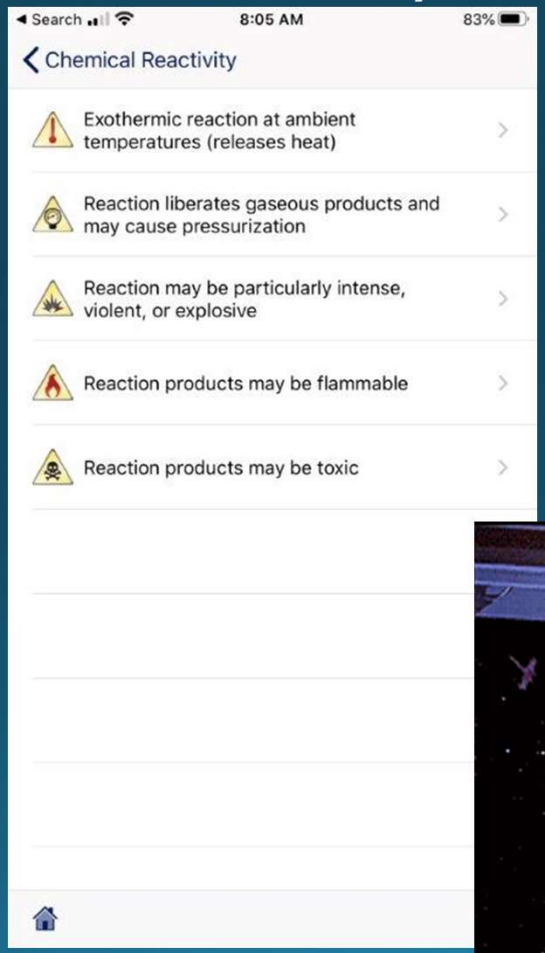
Using Wiser to check for possible reactions

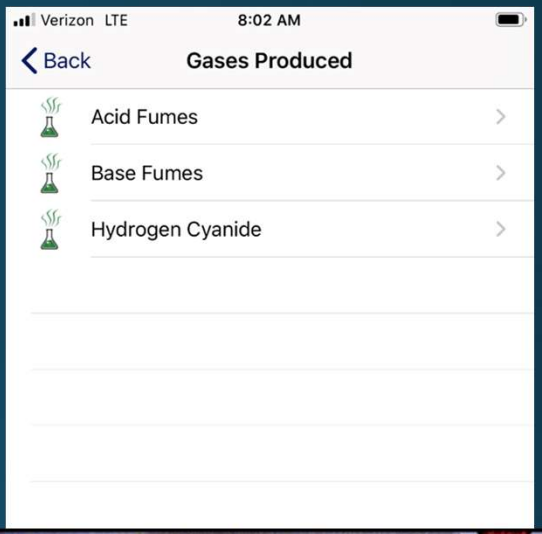




What happens if Sodium Cyanide meets acid?

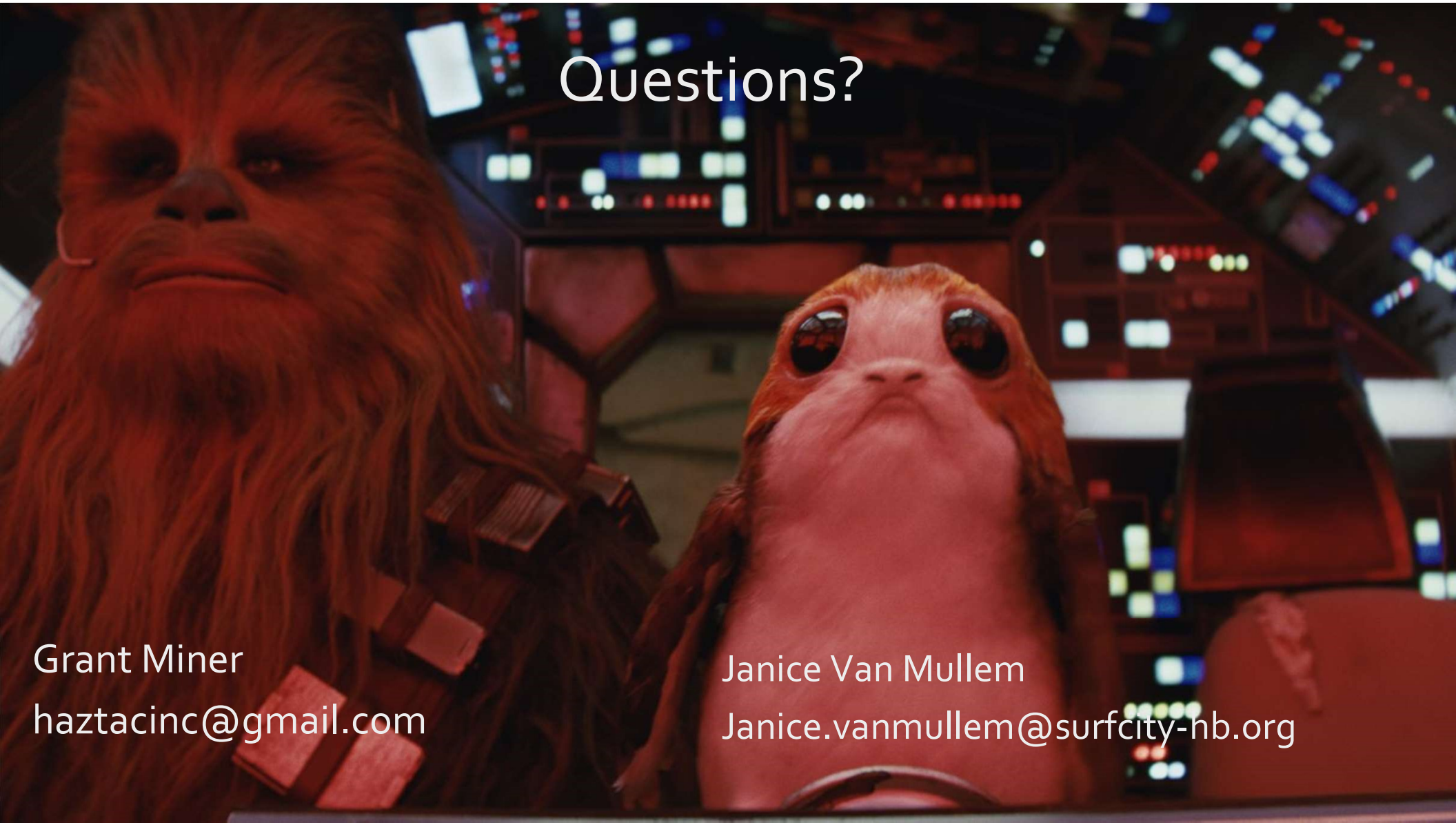






Conclusions

- Fire Code operational permits may be based on the nature of the material or the nature of the operation
- Operational permits can contain prescriptive language
- Operational permits are specific to the facility, the material, and/or the operation
- Permits allow an agency to proactively regulate HazMat at a facility and can be useful aids to inspectors and responders


Questions?
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