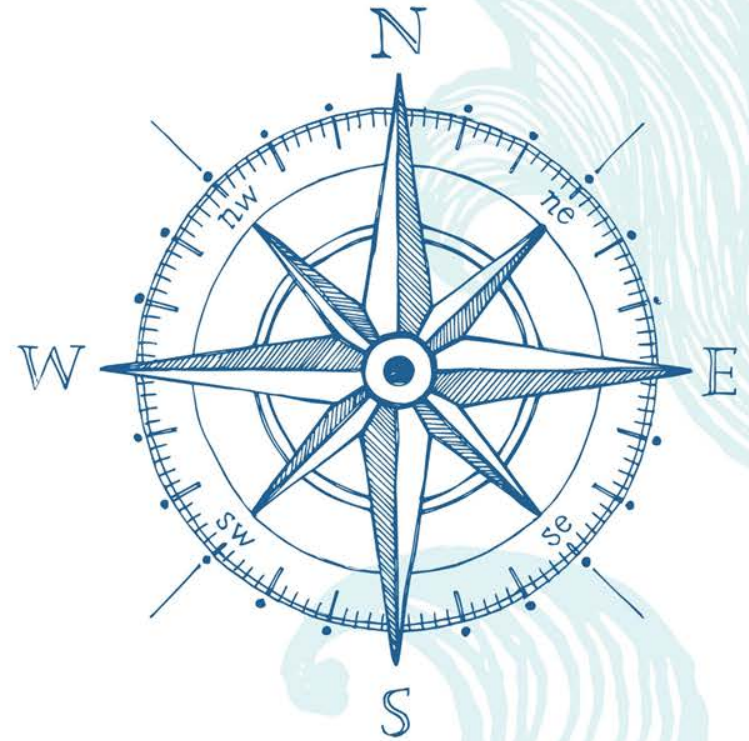
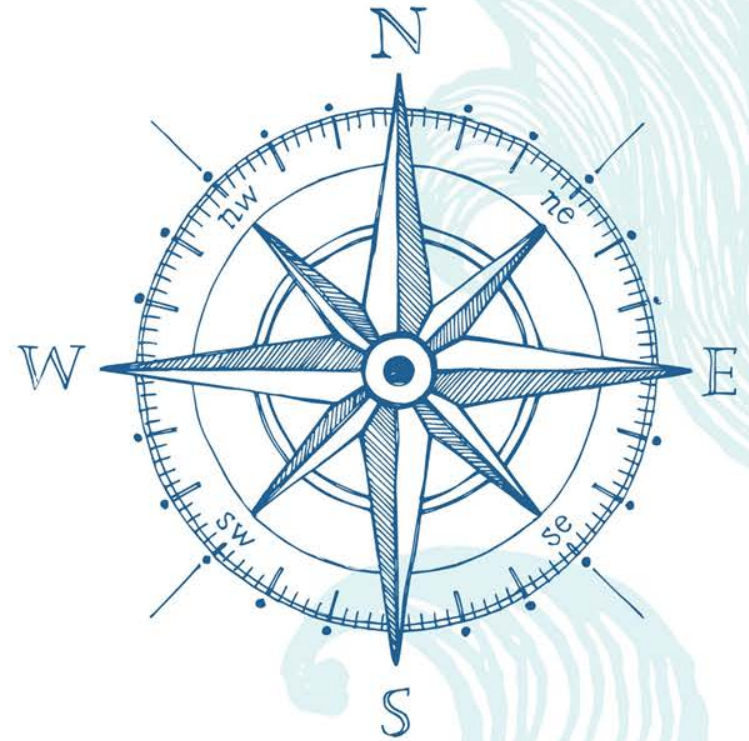


BUILDING COLLABORATIVE COMMUNITIES

NAVIGATING CHALLENGES, CHARTING INNOVATIONS



Hazardous Materials in Buildings: Design, Maintenance, and Decommissioning



Presenters



Jeff Tarter
Chemical Engineer
Integrated Engineering
Services



Diana Cox
Client Manager
Risk & Safety Solutions



Humberto Garcia Jr
EHS Manager
CSU San Marcos



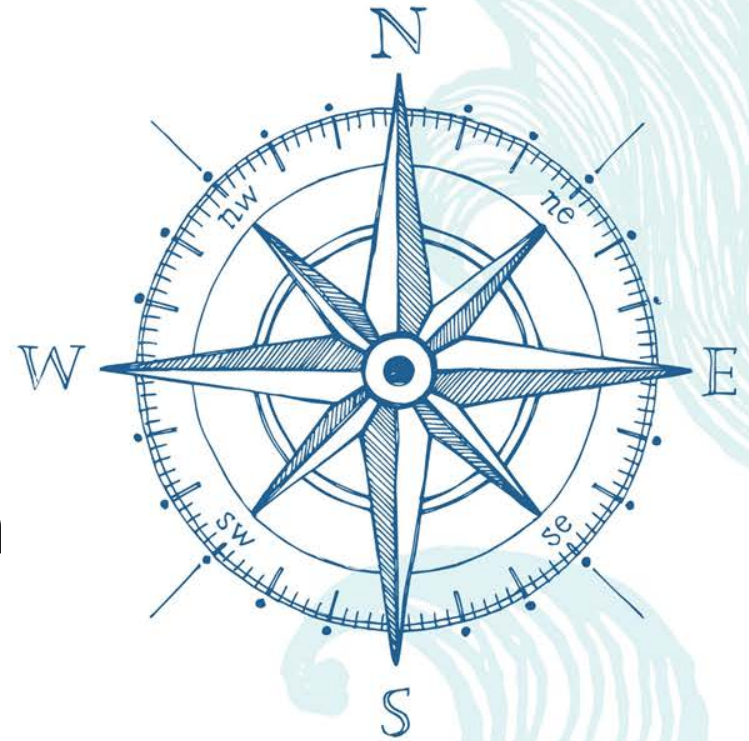
Hazardous Materials in Buildings: Design, Maintenance and Decommissioning

- Understand CFC Fire rated control areas, types of hazards, maximum allowable quantities, and stored chemicals vs in use chemicals.
- Understand the ongoing permitting and inspection processes for hazardous materials.
- Explore tools to support effective management of hazardous materials, particularly as the building use and occupants change over time.
- Identify effective facility closeout processes including chemical disposal and facility/equipment decontamination





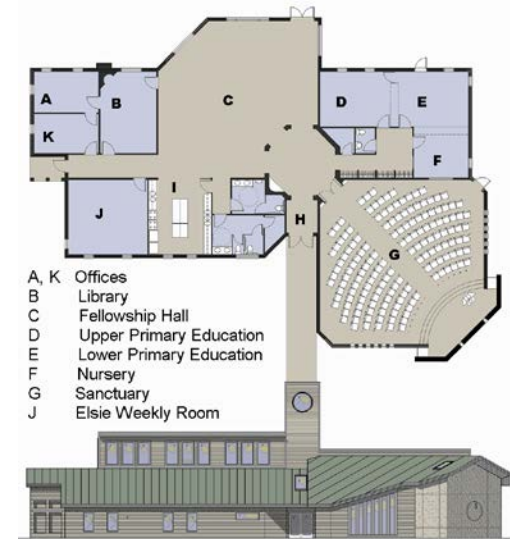
Control Area & Maximum Allowable Quantities of Hazardous Materials



Building Use & Occupancy

All structures or portions of structures shall be classified with respect to occupancy and use in one of more of the following groups:

- 303 – Group A: Assembly
- 304 – Group B: Business
- 305 – Group E: Educational
- 306 – Group F: Factory
- 307 – Group H: High-Hazard
- 308 – Group I: Institutional
- 309 – Group M: Mercantile
- 310 – Group R: Residential
- 311 – Group S: Storage
- 312 – Group U: Utility
- 313 – Group L: Laboratory



Control Area

- Spaces within a building where quantities of hazardous materials not exceeding the maximum allowable quantities (MAQ) of hazardous materials are stored, dispensed, used or handled.
- Hazardous materials not permitted or strictly limited in some occupancies, such as Assembly and Institutional occupancies.
- If quantities of hazardous materials exceed the MAQ, a high hazard H-Occupancy is required.



Maximum Allowable Quantities of Hazardous Materials (MAQ)

- MAQ's based on Material Hazard Class
- According to Storage & Use condition

TABLE 307.1(1)

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD^{a, i, 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	NA	H-2	See Note q	NA	NA	See Note q	NA	NA	See Note q	NA
Combustible fiber ^d	Loose Baled ^o	H-3	(100) (1,000)	NA	NA	(100) (1,000)	NA	NA	(20) (200)	NA
Combustible liquid ^{e, i}	II IIIA IIIB	H-2 or H-3 H-2 or H-3 NA	NA	120 ^{d, e} 330 ^{d, e} 13,200 ^{o, f}	NA	NA	120 ^d 330 ^d 13,200 ^f	NA	NA	30 ^d 80 ^d 3,300 ^f



Material Hazard Class

- The maximum allowable quantities of hazardous materials per Control Area shall not exceed:
 - CBC Table 307.1(1) for Physical Hazards



- CBC Table 307.1(2) for Health Hazards



- Not Limited



Storage & Use Condition

Storage:

- *The keeping, retention or leaving of hazardous materials in closed containers, tanks, cylinders, or similar vessels; or vessels supplying operations through closed connections to the vessel.*

Use:

- *Placing a material into action, including solids, liquids and gases.*



Is it Storage or Use?

- *Storage* is not intended to identify the condition the container is in most of the time, but the intended use of the container.
 - For example, a container may be stored closed 99% of the time, but is opened 1% of the time to dispense to or from.
 - In such instances the normal, or intended condition is for the container to be in use and appropriate control measures provided for such use.



Use-Closed & Use-Open

Closed System:

- *The use of hazardous materials involving a closed vessel or system that remains closed during normal operations where vapors emitted by the product are not liberated outside of the vessel or system and the product is not exposed to the atmosphere during normal operations; and all uses of compressed gases.*

Use:

- *The use of a solid or liquid hazardous material involving a vessel or system that is continuously open to the atmosphere during normal operations and where vapors are liberated, or the product is exposed to the atmosphere during normal operations.*



Is it Closed or Open Use?



- IES' practice is for fume hoods to be considered closed-use:
 - Hood must be provided with spill control,
 - Protected by automatic fire sprinkler system, and
 - Exhaust must be on emergency power.



Design & Number of Control Areas

- CBC Table 414.2.2 identifies:
 - Percent of MAQ allowed per floor
 - The number of control areas permitting per floor
 - Fire resistance rating of control area separations by floor

TABLE 414.2.2
DESIGN AND NUMBER OF CONTROL AREAS

FLOOR LEVEL		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA (a)	NUMBER OF CONTROL AREAS PER FLOOR	FIRE-RESISTANCE RATING FOR FIRE BARRIERS III HOURS (b)
Above grade plane	Higher than 9	5	1	2
	7 to 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

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

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

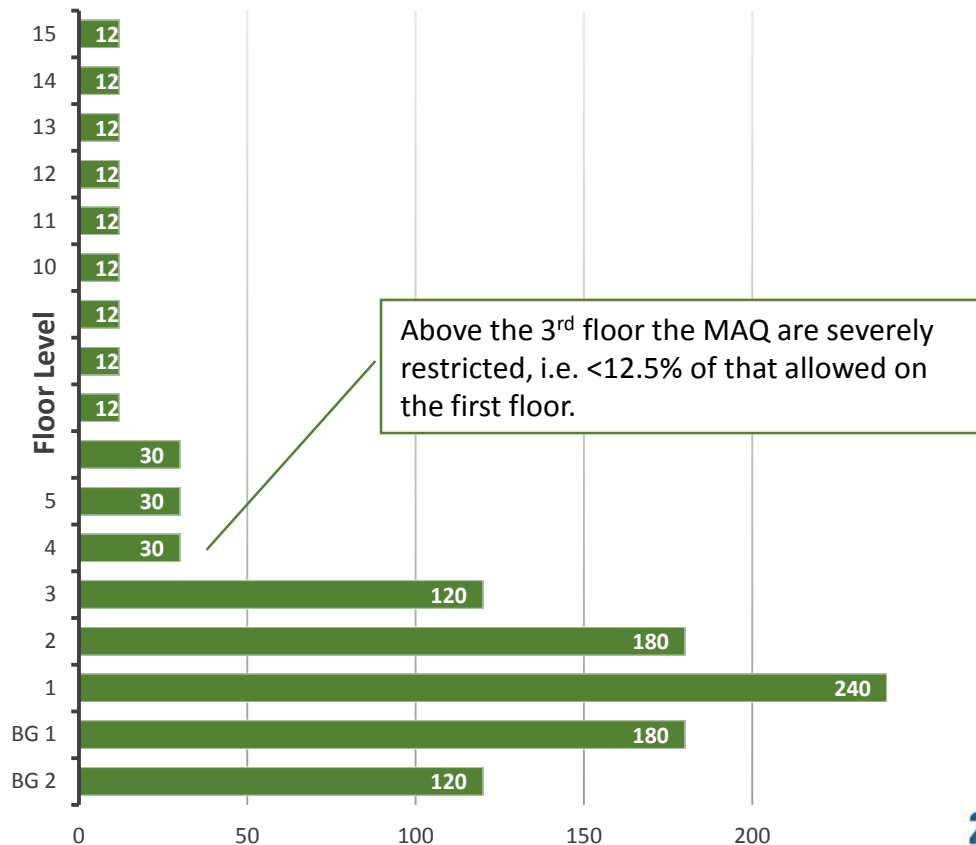


Percent of MAQ per Floor



B-Occupancy Control Area

■ B-Occupancy MAQ per Control Area

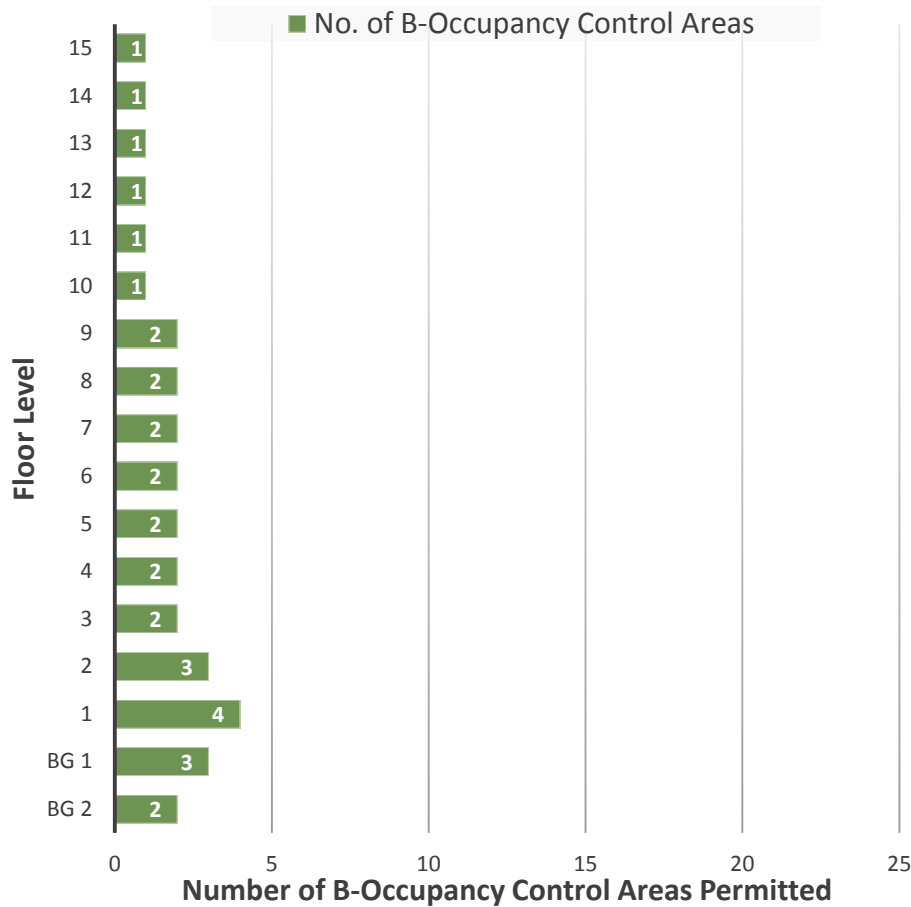


Gallons of FL-1B Stored in a Sprinklered Building
 Quantities may be doubled when stored in approved cabinets.



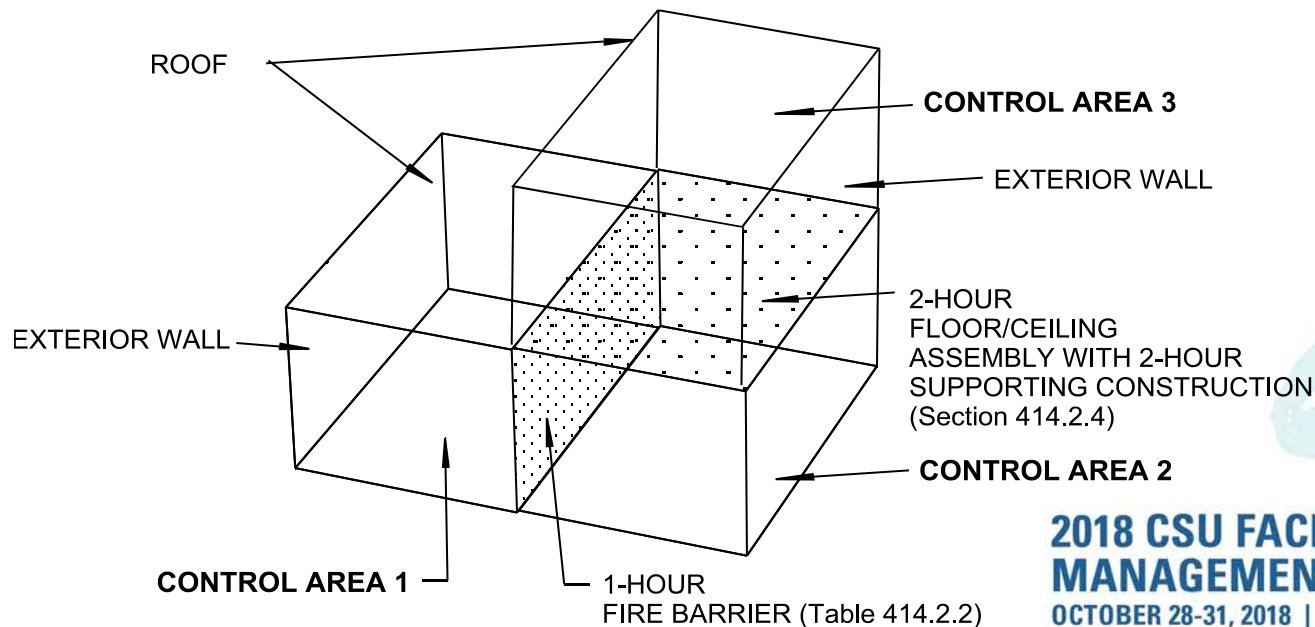
Number of Control Areas per Floor

Number of Control Areas Permitted



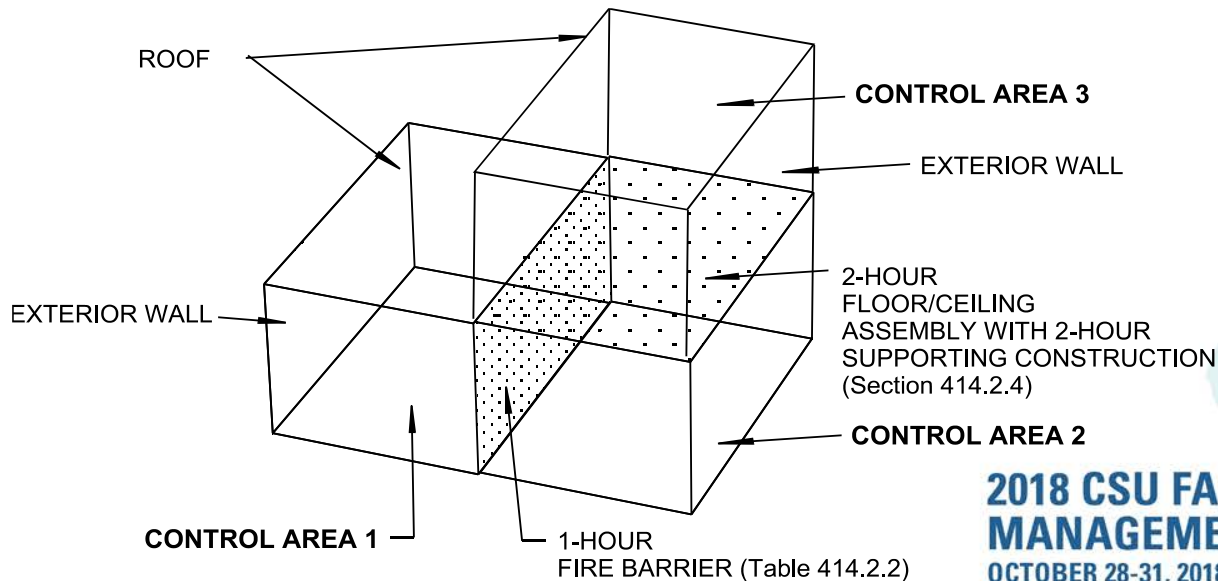
Control Area Separations

- Vertical separations/walls between control areas shall be of fire-resistive construction:
 - 1-hour on the 3rd floor and below
 - 2-hour on the 4th floor and above



Control Area Separations

- Horizontal separations/floor assemblies between control area shall be of fire-resistive construction:
 - 2-hour floor assembly (and supporting structure)
 - Exception: 1-hour if: Type IIA, IIIA, VA construction, Building is fully sprinklered, and Building is 3 stories in height, or less.



Laboratory Occupancy

- Laboratories may be permitted as either:
 - B-Occupancy Control Areas, or
 - L-Occupancy Laboratory Suites



L (Laboratory) Occupancy

- Increases the MAQ's permitted per lab suite.
- Increases the number of lab suites allowed per floor

TABLE 453.7.3.1
HAZARDOUS MATERIALS QUANTITY PER LABORATORY SUITE ||

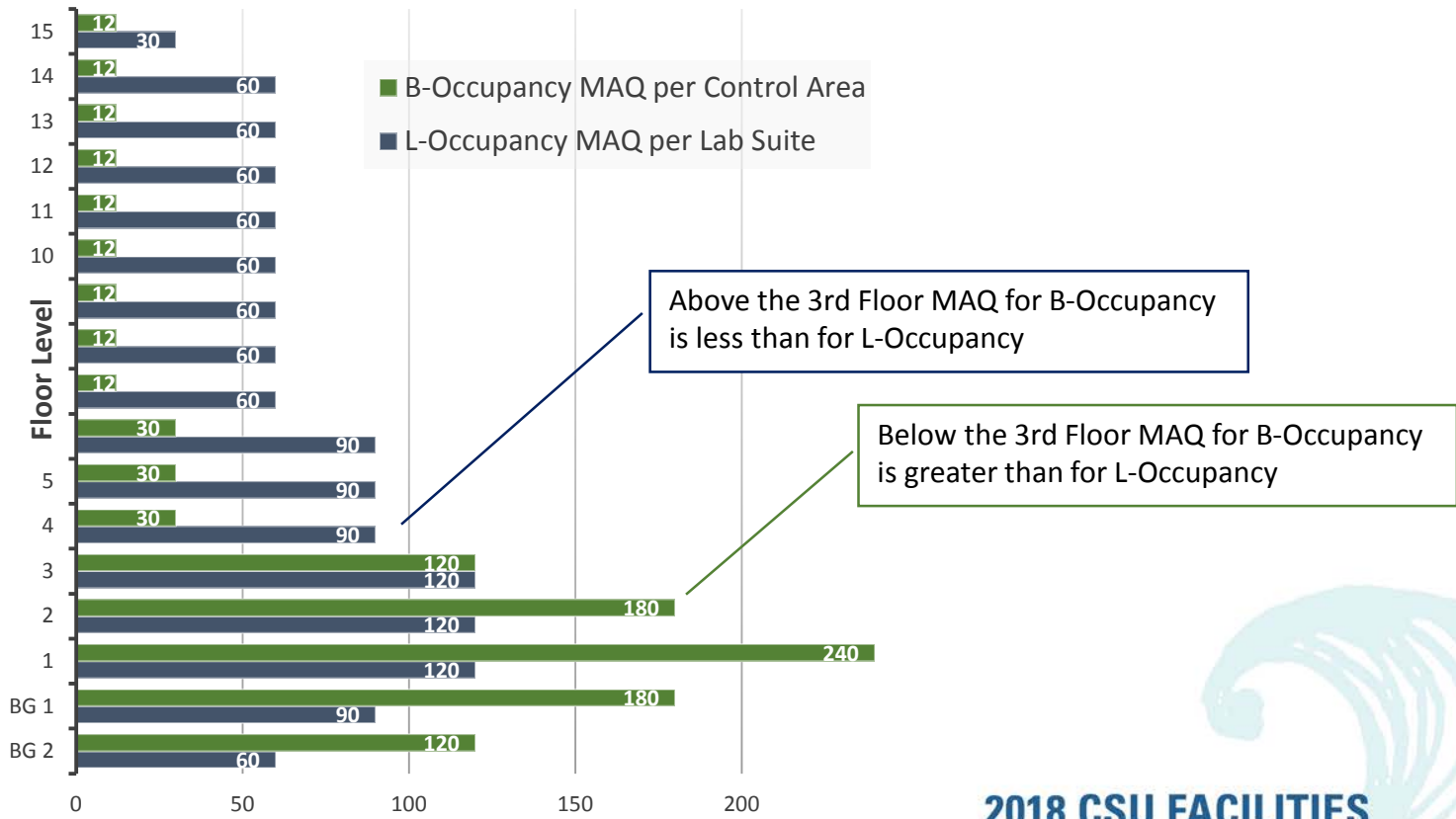
STORY		PERCENTAGE OF MAXIMUM ALLOWABLE QUANTITY PER LABORATORY SUITE ^{a, b}	NUMBER OF LAB SUITES PER FLOOR BASED ON CONSTRUCTION TYPE				
			Type IA	Type IB	Type IIA, IIIA, IV	Type IIB, IIIB, VA	Type VB
Above grade plane	Above 20	0	NP	NP	NP	NP	NP
	15 to 20	25	4	NP	NP	NP	NP
	11, 12, 13, 14	50	8	NP	NP	NP	NP
	7, 8, 9, 10	50	16	NP	NP	NP	NP
	6	75	20	20	NP	NP	NP
	4, 5	75	20	20	20	NP	NP
	3	100	UL	UL	UL	UL	NP
	1, 2	100	UL	UL	UL	UL	UL
Below grade plane	1	75 ^c	10	10	10	10	10
	2	50 ^d	5	5	5	5	5
	3 and below	0	NP	NP	NP	NP	NP

UL = Unlimited, NP= Not permitted



Percent of MAQ per Floor

Percent MAQ Comparison

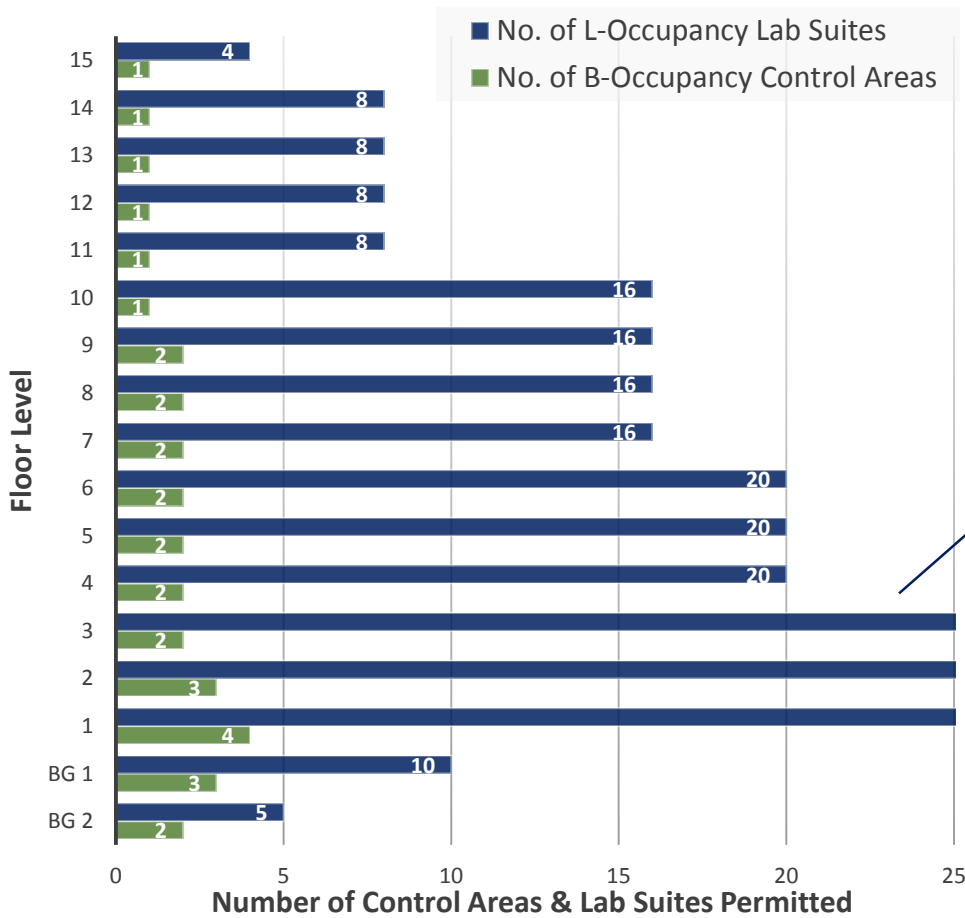


Gallons in Storage in a Sprinklered Building
Quantities may be doubled when stored in approved cabinets.



Number of Lab Suites per Floor

Number of Control Areas / Lab Suites



No. of Lab Suites on 1st, 2nd, 3rd stored are unlimited.



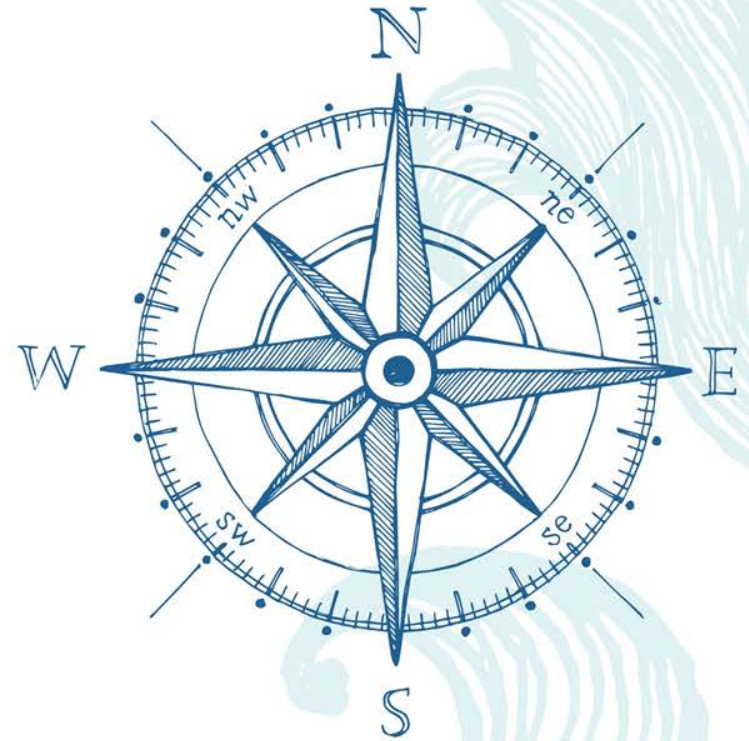
L-Occupancy Requirements

- Construction requirements more restrictive than B-Occupancy:
 - Ventilation required to be on emergency power.
 - Increases when multiple exits are required.
 - Panic hardware required on all exits.
 - “Common path of travel” decreased from 100’ to 75’.
 - Travel distance to an exit reduced from 300’ to 200’.
 - Higher sprinkler density required for the entire building.
 - Fire alarm system required.
 - Fire-rated corridors required.
 - Liquid tight floors required.





Permitting & Inspection Requirements



Permits



- Construction Permits
 - Required to *“install, repair, modify, abandon, remove, place temporarily out-of-service, or close systems and equipment.”*
- Operational Permits
 - Required to conduct an operation or business
 - Cutting and welding, or Hot work
 - Hazardous Materials
 - High-pile storage
- Other Environmental & Regulatory Permits
 - POTW: Wastewater discharge
 - TSDF: Hazardous waste treatment
 - SWPPP: Storm water discharge
 - BAAQMD: Air emissions



Hazardous Materials Inventory

- The Hazardous Materials Inventory Statement (HMIS) is the basis for permitting & inspection:
 - Planning/Zoning Department Review
 - Environmental Impact Report (EIR)
 - California Environmental Quality Act (CEQA)
 - Building/Fire Department review
 - Occupancy Requirement
 - Operational Permits
 - Ca Health & Safety Code (H&SC)
 - Hazardous Materials Business Plan (HMBP)
 - Ca Electronic Reporting System (CERS)



HMIS List for Building Occupancy

Building Occupancy Classification Inventory Form (EXAMPLE)

Plan Check No.: FIR2011-00224 Proposed Occupancy Classification: F-1 Signature of Preparer: _____ Date: 05/17/11

Control Area No.: 3 Floor Level 1 Is the entire area protected by a fire sprinkler system? Yes; No. If H-5 Occupancy Classification indicate floor area: _____ Sq. Ft.

1. Room No.	2. Chemical Name & Concentration <i>(Not Trade Name)</i>	3. CBC Class*		4. Quantity Stored	5. Quantity in Use*				6. Stored in Approved Cabinet
		Physical	Health		Open		Closed		
					<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	
101	Acetone	FL 1B	+Irr	20 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	5 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	0 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
101	Hydrochloric Acid		Cor	55 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	25 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	0 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
101	Sodium Persulfate	Oxy-4		20 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	0 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	20 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
102	Gasoline	FL 1B		10 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	0 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	1 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
103	Tetrahydrofuran	FL 1B +UR-1	+Irr	50 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	0 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	10 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Aggregate 96	TOTALS IN CONTROL AREA	FL 1B		80 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	5 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	11 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> Yes <input type="checkbox"/> No	
85			Irr	70 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	5 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	10 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> Yes <input type="checkbox"/> No	
80			Cor	55 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	25 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	0 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> Yes <input type="checkbox"/> No	
40		Oxy 4		20 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	0 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	20 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> Yes <input type="checkbox"/> No	
60		UR-1		50 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	0 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	10 <input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> Yes <input type="checkbox"/> No	
				<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> gal. <input type="checkbox"/> lbs. <input type="checkbox"/> ft. ³	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Note: This example shows only the page which describes Control Area #3, Floor Area #1; Other areas would be listed on the additional pages (i.e. pages 2-9)
UN-035-3/3 Page 1 of 9 Rev. 03/15/11



HMIS Summary for Building Occupancy

HMIS SUMMARY TABLES

SAMPLE _____ Labs _____ CA-1 _____
 Business Name Location Area



2016 CFC TABLE 5003.1.1(1) / CBC TABLE 307.1(1)

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD^{a,j,m,n,p}

MAQ'S LISTED ARE 100% OF BASE AMOUNT FOR THE 1ST FLOOR PER TABLE 414.2.2, WITH 100% ALLOWABLE INCREASE FOR SPRINKLERS^d

PHYSICAL HAZARDS		STORAGE ^b						USE-CLOSED SYSTEMS ^b						USE-OPEN SYSTEMS ^b			
		Solid Lbs. (Cu.Ft.)		Liquid Gal. (Lbs.)		Gas Cu.Ft. (NTP)		Solid Lbs. (Cu.Ft.)		Liquid Gal. (Lbs.)		Gas Cu.Ft. (NTP)		Solid Lbs. (Cu.Ft.)		Liquid Gal. (Lbs.)	
Material	Class	MAQ	Actual	MAQ	Actual	MAQ	Actual	MAQ	Actual	MAQ	Actual	MAQ	Actual	MAQ	Actual	MAQ	Actual
Combustible Dust	NA	Note ^g	0					Note ^g	0					Note ^g	0		
Combustible Fiber ^h	Loose	(100)	0					(100)	(0)					(20)	(0)		
	Baled ^o	(1000)	0					(1000)	(0)					(200)	(0)		
Combustible Liquid ^{c,i}	II			240 ^{d,e}	5					240 ^d	0					60 ^d	0
	IIIA			660 ^{d,e}	7					660 ^d	0					160 ^d	0
	IIIB			NL ^{e,f}	9					NL ^f	0					NL ^f	1
Consumer Fireworks	1.4G	250 ^{d,j}	0														
Cryogenic, Flammable	NA			90 ^d	0					90 ^d	0					20 ^d	0
Cryogenic, Inert	NA			NL	0					NL	0					NL	0
Cryogenic Oxidizing	NA			90 ^d	0					90 ^d	0					20 ^d	0
Explosives	1.1	1 ^{e,g}	0.00	(1) ^{e,g}	(0.00)			0.25 ^g	0.00	(0.25) ^g	(0.00)			0.25 ^g	0.00	(0.25) ^g	(0.00)
	1.2	1 ^{e,g}	0.00	(1) ^{e,g}	(0.00)			0.25 ^g	0.00	(0.25) ^g	(0.00)			0.25 ^g	0.00	(0.25) ^g	(0.00)
	1.3	5 ^{e,g}	0	(5) ^{e,g}	(0)			1 ^g	0.00	(1) ^g	(0.00)			1 ^g	0.00	(1) ^g	(0.00)
	1.4	50 ^{e,g}	0	(50) ^{e,g}	(0)			50 ^g	0	(50) ^g	(0)			NA	0	NA	(0)
	1.4G	250 ^{d,e,j}	0	NA	NA			NA	NA	NA	NA			NA	NA	NA	NA
	1.5	1 ^{e,g}	0.00	(1) ^{e,g}	(0.00)			0.25 ^g	0.00	(0.25) ^g	(0.00)			0.25 ^g	0.00	(0.25) ^g	(0.00)
	1.6	2 ^{d,e,g}	0.00	NA	NA			NA	NA	NA	NA			NA	NA	NA	NA
Flammable Gas	Gaseous					2000 ^{d,e}	0					2000 ^{d,e}	0				
	Liquefied			(300) ^{d,e}	(0)					(300) ^{d,e}	(0)						
Flammable Liquid ^d	IA			60 ^{d,e}	3					60 ^d	0					20 ^d	0
	IB & IC			240 ^{d,e}	43					240 ^d	4					60 ^d	0
Flammable Liquid, (1A, 1B, 1C)	NA			240 ^{d,e,h}	46					240 ^{d,h}	4					60 ^{d,h}	0
Flammable Solid	NA	250 ^{d,e}	12					250 ^d	0					50 ^d	1		
Inert Gas	Gaseous					NL	0					NL	0				
	Liquefied			NL	(0)					NL	(0)						
Organic Peroxide	UD	1 ^{e,g}	0.00	(1) ^{e,g}	(0.00)			0.25 ^g	0.00	(0.25) ^g	(0.00)			0.25 ^g	0.00	(0.25) ^g	(0.00)
	I	10 ^{d,e}	0	(10) ^{d,e}	(0)			2 ^d	0.00	(2) ^d	(0.00)			2 ^d	0.00	(2) ^d	(0.00)
	II	100 ^{d,e}	0	(100) ^{d,e}	(0)			100 ^d	0	(100) ^d	(0)			20 ^d	0	(20) ^d	(0)
	III	250 ^{d,e}	1	(250) ^{d,e}	(0)			250 ^d	0	(250) ^d	(0)			50 ^d	0	(50) ^d	(0)
	IV	NL	0	NL	(0)			NL	0	NL	(0)			NL	0	NL	(0)
	V	NL	0	NL	(0)			NL	0	NL	(0)			NL	0	NL	(0)

* Quantities reported as "zero" may be present, but in quantities less than significant figures shown (continued)



Other Permit Submission Info

- Provide additional code compliance information on plans such as:
 - Code Compliance Notes
 - LEL Calculations
 - Reactive Vapor Calculations
 - Toxic Vapor Calculations



Code Compliance Notes

Include code compliance notes on drawing in permit package to address code elements impacted by hazardous materials:

- Sprinklers in fume hoods
- Explosion control
 - Classified electrical & Grounding
 - Venting & Ventilation
- Transportation
 - On Carts
 - In Corridors
 - On Elevators



Flammable Vapor Calculations

- CFC §903.2.11 specifies that sprinklers shall be provided in ducts where required by the *California Mechanical Code*.
- CMC §506.6 requires sprinklers in flammable product conveying ducts “having a cross sectional dimension exceeding 10 inches.
- CMC §505 defines flammable product conveying ducts as conveying vapors exceeding 25% of the LEL.



Reactive Vapor Calculations

- CMC §505.1.1 Incompatible materials shall not be conveyed in the same exhaust system.
- Materials of construction compatibility



Toxic Vapor Calculations

- IMC §510.4 ducts conveying hazardous materials in excess of 1% of the LC_{50} shall be classified as a hazardous exhaust system.
- CFC § 606.12.6 and § 6004.2.2.7.2: Exhaust systems shall be designed to reduce the concentration of toxic vapors to less than $\frac{1}{2}$ IDLH at the point of exhaust.



CODE ALTERNATIVES

Alternate Materials and Methods:

- Strict application of the code is impractical
- Is in accordance with the intent of the code
- Does not lessen health, life or fire safety
- Material and method of work is at least equal in quality, strength, effectiveness, fire resistance, durability and safety



CODE ALTERNATIVES

Performance-based Design Alternative:

- Performance-based design alternatives shall be based on providing safeguards to minimize:
 - Risk of unwanted releases, fires or explosions
 - Consequences of unsafe conditions
- Approvals subject to review of:
 - Safeguards
 - Documentation; written plans & procedures, audits, etc.
 - Process hazard analysis
 - Mitigation measures
 - Engineering controls
 - Construction features



Special Inspection

Inspection of construction requiring the expertise of an approved special inspector in order to ensure compliance with this code and the approved construction documents.

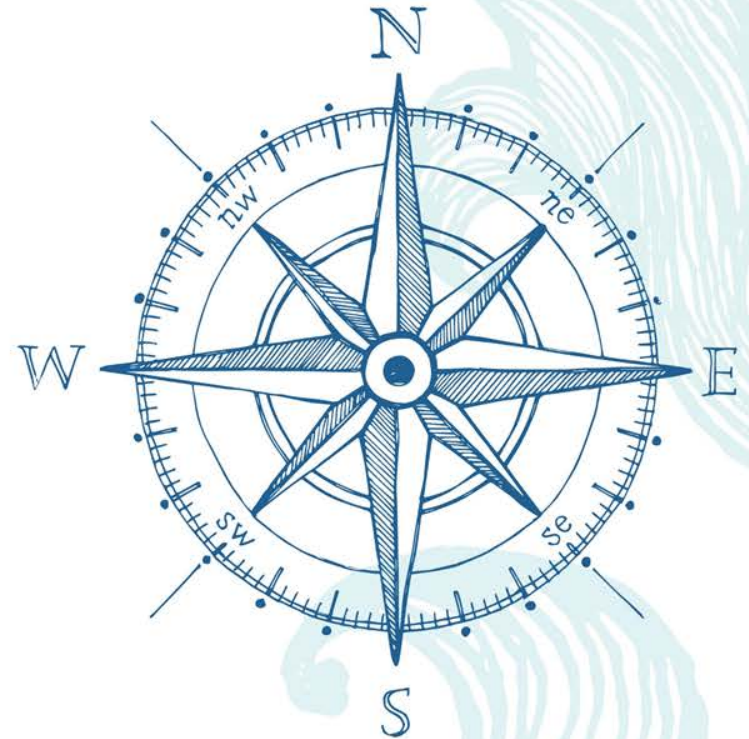
- Concrete & Steel
- Smoke Control Testing
- Chemical Resistant Coatings





Change Management & Hazardous Materials

Tools to support effective management of
hazardous materials















Hazardous Materials Management

- Awareness of storage locations
 - By Hazard Type
 - Fire Code
 - GHS Hazard Codes
 - Particularly Hazardous
 - By Expiration
 - By Quantity
- User access to hazard information
 - GHS Hazard statements
 - Classification Band
 - Fire Code Hazards
- Reporting
 - By User
 - Group
 - Organization
 - By Regulations
 - Agency & Classification
 - By Locations
 - Room
 - Building
 - Facility
 - Institution
 - Track Changes



Hazardous Materials Storage

- Organization into ‘inventories’ allows flexibility with storage locations
- Storage locations collected by hazard types using GHS pictograms
- Storage conditions identified for CERS/CUPA reporting

Sublocations	Print	+
Building A, Room ROOM A1		
Cabinet 2 Barcode: Containers: 0 ambient temperature, ambient pressure	 	⋮
Building B, Room ROOM B1		
Nicole's Stuff Barcode: Containers: 2 ambient temperature, ambient pressure	  	⋮
Building B, Room ROOM B2		
Gas Barcode: Containers: 0 ambient temperature, above_ambient pressure	 	⋮
Building D, Room ROOM E2a		
Caustic Barcode: Containers: 0 ambient temperature, ambient pressure	 	⋮
Building D, Room ROOM E2b		
Oxidizers Barcode: Containers: 2 ambient temperature, ambient pressure	  	⋮

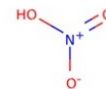


Hazardous Materials Organized by Chemical

- Chemical Name
- Classification Groups
- Structure
- Essential identifiers
 - Chemical Abstracts System Identification Numbers
 - State of matter
 - GHS pictograms
 - NFPA 704

Nitric acid, fuming, 99%+

CFATS : Release
CFATS : Theft
Corrosive
Extremely Hazardous Substance
Oxidizers : Class 3



CAS #

7697-37-2

Molecular Formula

HNO₃

Physical State

liquid



Containers

Location: Building D ROOM E2b - Oxidizers

Container Size: 1 µL

Amount: 1 µL

Type: Glass Bottle

Physical State: Liquid

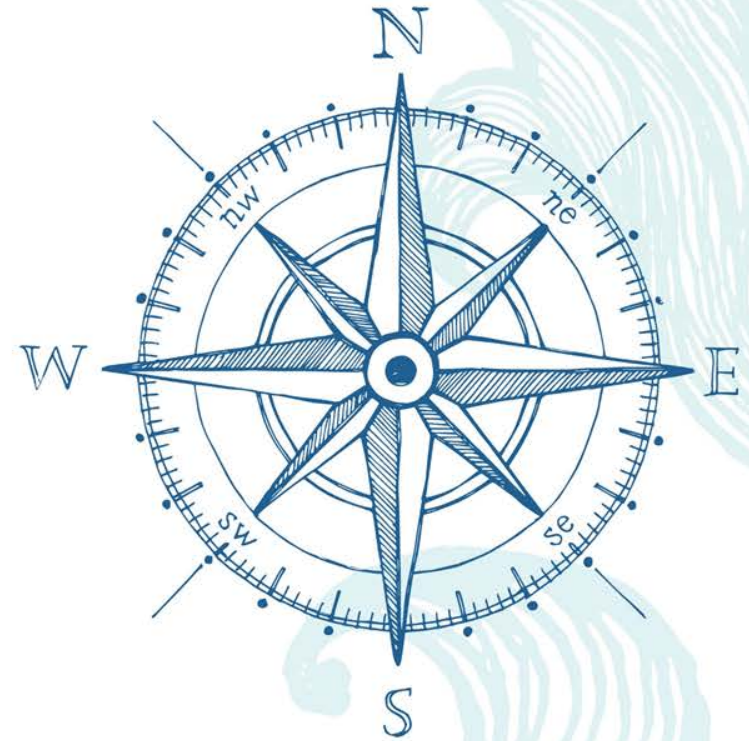
Received: 9/20/2018

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Building Shutdown



Exhaust Shutdown: Closing a Science building for 2 weeks replacement of exhaust fans