

Indoor Tanks for Operation and Manufacturing

- Joseph E. Mentzer P.E.
- Standards Engineer
- Steel Tank Institute





Why an Indoor Tank?

- To facilitate equipment operation
- To allow access by workers
- To protect process from exposure to weather
- To secure sensitive materials



8000 GAL

WD-40 CONCENTRATE



#112

8000 GAL
WD-40 CONCENTRATE



#111

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CONTAIN
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Challenges of indoor tanks

- Access for Emergency Responders
- Fire fighting
- Controlling spills
- Proximity to Structure
- Hazard to Building Occupants

Indoor tanks can Serve Various Purposes

- Mix Tanks
- Dip Tank
- Accumulator tanks
- Flow through process Tanks
- Transformers
- Diesel engines (not the fuel tank)
- Heat Exchangers

Tanks for Operations:

- These tanks are not for consumptive use at the location, they often hold product that is recirculated as part of equipment operation
- Proximity to equipment is important for proper equipment operation
- Operations tanks are not normally filled, product is only added as part of repair.
- The working fluid can be oil based, or some other mixture

Manufacturing Tanks

- Receive product via piping from a remote storage tank, or are filled with ingredients brought to the tank.
- The contents of the tank can be used (i.e. dip tank) or the contents can be processed and ingredients added to make another product (i.e. mix tank).
- The tank can then be emptied to a storage tank via piping, or product packaged for transfer.
- Location facilitates monitoring of process and control of environment



Regulations that May Apply

- Building Code
- Fire Code like NFPA 30, IFC
- NFPA 32 Standard for Dry-cleaning Plants
- NFPA 34 Standard for Dipping, Coating and Printing Processes Using Flammable and Combustible Liquids
- NFPA 35 Standard for the Manufacture of Organic Coatings
- NFPA 36 Standard for Solvent Extraction Plants
- 40 CFR 112 (SPCC Regulations)

Building Code Requirements

- Building code sets the amount of flammable and combustible liquids that can be present in an area with a given classification
- If the amount of flammable and combustible liquids exceeds a threshold quantity the area will then be classified as a “hazardous occupancy” and additional engineering and administrative controls will be required.
- Threshold amount are based on the building code in place.

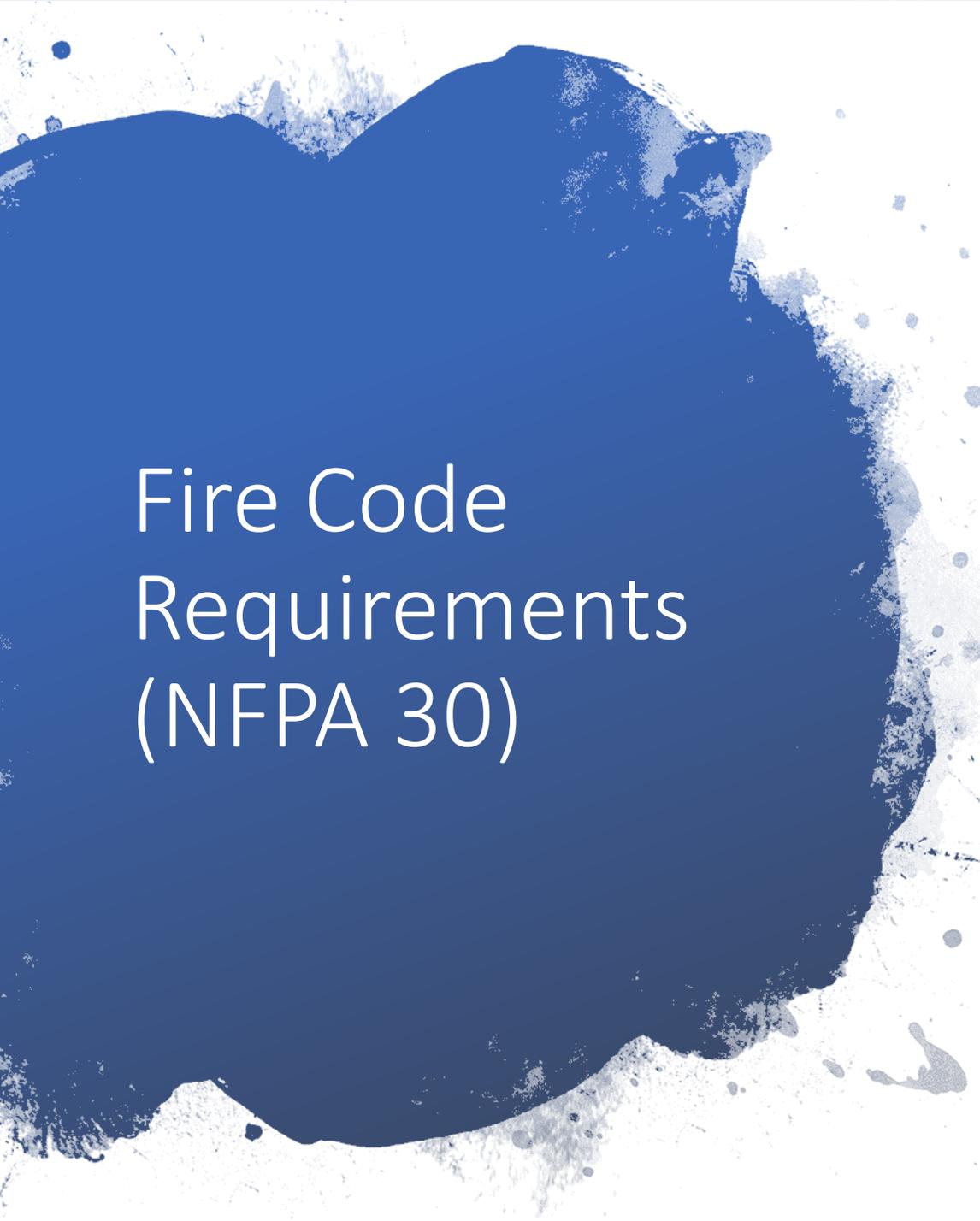
Example of Threshold Amounts that Can be Stored Without “Hazardous Occupancy”

Flammable Liquids

- Class 1A 30 gallons
- Class 1B 120 gallons

Combustible Liquids

- Class II 120 gallons
- Class IIIA 330 gallons
- Class IIIB 13,200 gallons



Fire Code Requirements (NFPA 30)

- NFPA Chapter 17 covers “Processing Facilities”
- Regulations start at 275 gallons for flammable and combustible liquids in processing areas
- The general requirements of NFPA 30 align well with building code, but number can vary by which code is used

Building Code Requirements

- Building codes limit the maximum allowable quantity of flammable and combustible material that can be stored in a “control area”
- The limit is based on the class of the material
- Once the MAQ is reached then another control area must be created
- Control areas are separated by engineered barriers
- Control areas have different classifications depending on the amount of material housed, but the more material stored the more complex the control area construction



Hazard or “H” Occupancy Classifications

- Hazardous classifications range from H1 to H5
- The smaller the number the greater the hazard
- H1 is the most stringent, H5 is the least stringent
- Operations involving flammable and combustible liquids usually operate as an Occupancy H2 or H3

Occupancy Group H2

- Flammable or combustible liquids which are used or stored in normally open containers or systems or in closed systems operating at more than 15PSI.

Occupancy Group H3

- Class 1, II and IIIA Liquids stored in closed containers operating at less than 15 PSI.

Setbacks

- Fire code can include setbacks to property line for vessel, and between buildings that house a tank
- Building code does include setback between buildings and property lines

Vessel Construction

- Vessel construction must be appropriate for purpose
- Often for operational equipment the tanks are supplied by the equipment manufacturer
- Mix vessels are often built to recognized standards or must have some supporting documentation
- Some equipment built overseas has vessels built to standards in place at location of manufacture (European standards)

Vessel Installation for Operations

- For operational equipment the vessel should be installed per manufacturers recommendations.
- These vessels are often located in equipment rooms or manufacturing areas.
- Vessel will need venting, most often vented indoors as working fluid is a Class 3B combustible.
- Other classes of liquid will need to vent outdoors.
- The vessel piping should have an isolation valve to contain product if the tank has an opening below liquid line

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Vessel Installation for Manufacturing

- For manufacturing equipment the installation is often regulated by building code and fire codes
- Chapter 167 of NFPA “Processing Facilities”
- The vessel will need to be located in a properly constructed room or area.
- Proper ventilation will need to be provided as well as proper electrical classification

Elements of Proper Hazardous Area

- Building shall be located properly setback from property lines and shall incorporate walls with minimum 2 hour fire rating
 - Setback will be based on hazard class of area
 - 4 hour fire wall can reduce setbacks
- Construction shall be according to code and can include non combustibile material construction or fire suppression system
- Building supports will be protected from exposure to fire from released material via remote impounding, or sprinklers or protective coatings
- Can include blast walls

Elements of Proper Hazardous Area

- Control area will be equipped with emergency exits to the exterior
- The maximum amount of liquid allowed in the control area will be based on the area size, the liquid stored and the protections in place.
- Proper fire prevention equipment will be in place
- Proper ventilation will be present
- The access to the area is properly marked and placarded so that emergency responders will be informed of hazards

Containment of Release

- The building will incorporate mechanism to direct the release of material being processed and of fire fighting water to a safe location such as remote impoundment or internal containment.
- Released material and fire water will be prevented from entering sewer systems via the use of traps or separators.

Ventilation Requirements

- Ventilation will be required to prevent the accumulation of vapors from class 1 liquids or class II and III liquids used at temperatures above flash point
- Ventilation not required if container is “closed” and properly vented to the outside
- Ventilation will keep vapor level at less than 25% of lower flammable limit
- Ventilation will also keep vapors from accumulating in low spots in the building.

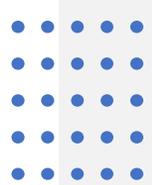
Administrative Elements

- Facilities that process flammable and combustible liquids (except for fuel tanks and storage tanks) shall perform a review of operations to ensure that explosion hazards resulting from a release are considered and appropriate written fire prevention plans are in place
- These hazard evaluations and written plans will be reviewed and updated whenever changes occur to the process, the equipment used or the materials used.

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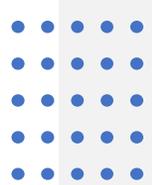
SPCC (40 CFR
112) Regulations
also Identify these
types of tanks as
“Oil Filled
Equipment”

- Oil filled operational equipment
- Oil filled manufacturing equipment



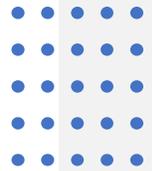
Oil Filled Operational Equipment (SPCC)

- Oil is present solely to facilitate the operation of the equipment
- Not used consumptively
- The material stored is usually a working fluid to transfer heat or energy or provide lubrication.



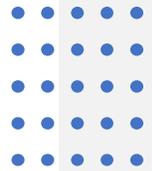
Oil Filled Manufacturing Equipment (SPCC)

- Stores oil as an ancillary element of performing a chemical or mechanical operation to create an intermediate or finished product.
- The ingredients may be subject to other actions like mixing, heating, cooling or change in pressure
- The product is not stored in the vessel after the process is complete
- Secondary containment may be required if the tank contains product when it is not attended.



Oil Filled Equipment Requirements

- SPCC does not require secondary containment
- The equipment must be properly constructed
- SPCC does require that the unit be inspected for leaks
- A mechanism must be in place to address leaks
- This can include equipment not owned by the site (transformer)



Indoor Vessels
can be Done,
but:

- Once a quantity threshold is passed significant restrictions can apply
- These restrictions are based on several factors
- Restriction can include administrative controls
- Proper design documentation must be present to confirm compliance with code(s)