

Model Safety Program

DATE: _____

SUBJECT: Flammable and Combustible Liquids Safety Program

REGULATORY STATUTE: OSHA - 29 CFR 1910.106

OVERALL RESPONSIBILITY: The (YOUR COMPANY) Safety Officer is _____. He/she is solely responsible for all facets of this program and has full authority to make necessary decisions to ensure success of the program. The Safety Officer is the sole person authorized to amend these instructions and is authorized to halt any operation of the company where there is danger of serious personal injury.

SUPERVISOR'S RESPONSIBILITY: Supervisors control the work environment. This standard practice instruction will be adhered to by all supervisors. If proper workplace controls are not enforced, the storage and dispensing of flammable and combustible liquids can be extremely dangerous. To prevent catastrophic results, supervisors are required to strictly enforce these procedures.

***Decision Point** The flammable and combustible liquids standard is extremely complex. We have endeavored to provide you with a written program which summarizes the primary areas where a safety officer would like to address specific hazards and provide policy on the safe storage and dispensing of these liquids in a plant environment. It must be understood that detailed assessments of each area must be conducted first. Once the assessments are conducted then these procedures may be amended to reflect accurately the results of such assessments. If you have any suggestions for improvement please let us know. Please delete this paragraph after it has been read.

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(YOUR COMPANY) Flammable and Combustible Liquids Safety Program

1. Written Program. The company will review and evaluate this standard practice instruction:

- On an annual basis.
- When changes occur to 29 CFR 1910.106, that prompt revision of this document.
- When facility operational changes occur that require a revision of this document.
- When there is an accident or close-call that relates to this topic.

This written program will be communicated to all personnel. It encompasses the total workplace, regardless of number of workers employed or the number of work shifts. It is designed to establish clear goals, and objectives.

1.1 Emergency instructions.

1.1.1 Written instructions. All storage and dispensing locations will have detailed written emergency instructions for each location. Each instruction will detail the emergency actions to be taken in the event of fire, spill, leak, power failure, failure of any safety system (including detection/monitoring and ventilation systems) and any other emergency condition affecting the safe operation of the area.

1.1.2 Posting locations. Written emergency instructions will be posted at the entrance to all storage and dispensing location, or in a conspicuous manner in the area.

2. Related Written Programs. The following safety programs/company policies relate to this topic. These programs should be read and understood by all personnel affected by this program. Understanding the related programs will allow you to better understand the requirements outlined in this program.

- Electrical Safety
- Fire Prevention
- Forklifts/Powered Industrial Trucks
- Hazard Communication
- Hazardous Waste Operations and Emergency Response (HAZWOPER)
- Job Hazard Analysis
- Power Tools Safety
- Process Safety
- Protective Clothing Selection Policy
- Protective Clothing/Equipment
- Welding and Cutting safety

3. Classes of Flammable and Combustible Liquids. The following information is provided to ensure that users of this document are aware of the classes of flammable and combustible liquids.

3.1 Flammable liquid is defined as any liquid having a flashpoint below 100 deg. F. (37.8 deg. C.), except any mixture having components with flashpoints of 100 deg. F. (37.8 deg. C.) or higher, the total of which make up 99 percent or more of the total volume of the mixture. Flammable liquids are known as Class I liquids. Class I liquids are divided into three classes as follows:

- Class IA includes liquids having flashpoints below 73 deg. F. (22.8 deg. C.) and having a boiling point below 100 deg. F. (37.8 deg. C.).

- Class IB includes liquids having flashpoints below 73 deg. F. (22.8 deg. C.) and having a boiling point at or above 100 deg. F. (37.8 deg. C.).

- Class IC includes liquids having flashpoints at or above 73 deg. F. (22.8 deg. C.) and below 100 deg. F. (37.8 deg. C.).

2.2 Combustible liquid is defined as any liquid having a flashpoint at or above 100 deg. F. (37.8 deg. C.) Combustible liquids are divided into two classes as follows:

- Class II includes liquids with flashpoints at or above 100 deg. F. (37.8 deg. C.) and below 140 deg. F. (60 deg. C.), except any mixture having components with flashpoints of 200 deg. F. (93.3 deg. C.) or higher, the volume of which make up 99 percent or more of the total volume of the mixture.

- Class III includes liquids with flashpoints at or above 140 deg. F. (60 deg. C.) Class III liquids are subdivided into two subclasses:

- Class IIIA includes liquids with flashpoints at or above 140 deg. F. (60 deg. C.) and below 200 deg. F. (93.3 deg. C.), except any mixture having components with flashpoints of 200 deg. F. (93.3 deg. C.), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.

- Class IIIB includes liquids with flashpoints at or above 200 deg. F. (93.3 deg. C.). This section does not cover Class IIIB liquids. Where the term "Class III liquids" is used in this section, it must mean only Class IIIA liquids.

4. Facility Assessment. All facilities belonging to company will be assessed for handling, storage, and use of flammable and combustible liquids. The facility assessment process will identify existing hazards and conditions, operations that create hazards, and areas where hazards may develop. This also includes close scrutiny and the tracking of accident records to identify areas that may indicate the development of future workplace hazards.

4.1 The purpose of facility assessment, is to recognize, identify, and correct recognized and potential hazards.

4.2 The objective will be to provide a starting point for finding and eliminating those work techniques, and workplace conditions which may be the source of problems. In addition to analyzing current workplace conditions, planned changes to existing and new facilities, processes, materials, and equipment can be considered to ensure that changes are made to enhance production and reduce or eliminate risk factors. The principles of Industrial Hygiene (Recognition, Evaluation, and Control) apply to facility assessments. Facility assessment is divided into four main elements:

- Gathering information from available sources.
- Conducting departmental surveys to determine handling, use and storage issues.
- Performing hazard analyses of those work areas with identified risk factors.
- After implementing control measures, conducting periodic surveys to evaluate changes.

4.3 Inspections. This employer shall conduct a periodic inspection of storage and dispensing locations on a(n) _____ basis to ensure that the requirements of this instruction are being followed.

4.3.1 The periodic inspection shall be performed by an authorized employee other than the ones(s) working in the area being inspected.

4.3.2 Inspections will be conducted by the following personnel authorized to evaluate storage and dispensing locations:

Duty Title

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

4.3.3 The periodic inspection shall be conducted to identify deviations or inadequacies in the program.

4.3.4 Inspection Report. This employer shall generate an inspection report detailing the findings of the inspection. The report will be distributed to supervisors and employee's in the chain-of-command of the area being evaluated. The report shall as a minimum identify:

4.3.4.1 The location being inspected.

4.3.4.2 The date of the inspection.

4.3.4.3 The employees included in the inspection.

4.3.4.4 The person performing the inspection.

4.3.4.5 A summary of findings.

4.3.4.6 The date when a follow-up inspection will be conducted.

5. Arrangements with Emergency Response Contractors.

*Decision Point If the in-house response capability is limited, consider expanding the following two paragraphs

5.1 (YOUR COMPANY) will make arrangements with qualified outside contractors to serve as Primary and Secondary Emergency Response Contractors who will respond to spills of hazardous materials on a 7 day/week, 24 hour/day basis.

5.2 Letters of Agreement attesting to these arrangements will be maintained in _____ upon receipt.

6. Spill Control Equipment.

6.1 Spill control equipment will be maintained in each area where storage and/or dispensing is conducted. This equipment will include as a minimum:

- Spill Control Brooms
- Chemical Neutralizers
- Personnel Protective Equipment
- Absorbent Pads
- Shovels, Brooms, Mops, Pails

7. Employee Training.

7.1 All employees whose duties involved them with flammable and combustible liquids will receive annual training applicable to their areas of responsibility as outlined in the (YOUR COMPANY) Training Manual.

7.2 Initial Training. This employer shall provide training to ensure that the purpose and function of this program is understood by employees and that the knowledge and skills required for the safe usage of flammable and combustible liquids is acquired by employees. The training shall include the following:

7.2.1 Each affected employee shall be instructed in the purpose and use of these procedures.

7.2.2 Each affected employee shall receive training in the recognition and control of applicable hazards.

7.2.3 Each affected employee shall receive training in the usage of personal protective equipment.

7.2.4 All other employees whose work operations are or may be in an area where storage and dispensing is conducted, shall be instructed about the procedures, and prohibitions relating to usage of flammable and combustible liquids.

7.2 Refresher Training.

7.2.1 Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in equipment or processes that present a new hazard, or when there is a change in these procedures.

7.2.2 Additional retraining shall also be conducted whenever a periodic inspection reveals, or whenever this employer has reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of these procedures.

7.2.3 The retraining shall reestablish employee proficiency and introduce new or revised hazard control methods and procedures, as necessary.

7.3 Certification. This employer shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

8. Handling of Flammable and Combustible Liquids (general requirements).

8.1 Flammable liquids shall be kept in covered containers when not actually in use

8.2 There shall be no open flames or other sources of ignition within the vapor path of any flammable or combustible chemical used on company premises.

8.3 Transfer of liquids shall be accomplished by using a closed piping system, by gravity through a self-closing valve, or by safety cans.

8.4 The quantity of flammable and combustible liquids in any area should not exceed the amount required for one day or one shift or 120 gallons (NFPA 33).

8.5 *NO SMOKING* signs shall be posted in all locations where flammable or combustible liquids are used or stored. Supervisors shall strictly enforce this policy.

8.6 The transfer of flammable liquids shall be done using appropriate bonding and grounding of containers.

8.7 Containers supplying spray nozzles (i.e., spray guns, etc.) shall be kept closed.

8.8 There shall be no sources of ignition (flame or spark producing) in any area where flammable liquids are used, nor within 20 ft. unless separated by a partition.

8.9 Hot surfaces (steam pipes, etc.) shall not be located in areas where combustible residues may accumulate without approved fire protection controls.

8.10 Electrical equipment located within areas where combustible residues may accumulate shall be approved for Class I Div 1 locations. Electrical equipment adjacent to a spraying area in areas where combustible residues may accumulate and not separated by a partition shall be approved for Class I Div 2 locations.

8.11 Portable lamps shall not be used in any spraying area unless it is specifically designed for a maintenance operation. If used for maintenance, they must intrinsically safe and conform to Class I Div 1 locations.

8.12 Areas using Class I liquids shall be ventilated at a rate of not less than one cubic foot per minute per sq. ft. of floor area.

8.13 Maintenance operations involving hot work or the use of spark producing tools may be done if the area has been proven safe (see hot work/welding safety procedures) and the work is supervised.

8.14 Housekeeping, i.e., cleaning of spills and leakage control. These requirements shall be closely monitored. Supervisors shall strictly control housekeeping in areas where flammable and combustible liquids are used or stored.

8.15 Waste or residue shall be stored in approved covered metal containers.

9. Warehousing. Flammable and combustible liquids storage rooms where dispensing does not occur is called Warehousing. Warehousing requirements are extremely complex. Detailed assessments must be conducted to determine safe storage requirements. See NFPA 30, for spacing and quantity requirements. See NFPA 49 and 491M, for chemical compatibility and other fire safety requirements. The following considerations (as a minimum) apply:

- Access Ways to Permit Approach of Fire Control Apparatus
- Alerting/warning systems
- Chemical compatibility
- Emergency evacuation
- Emergency rescue
- Emergency response by firefighters
- Fire suppression systems
- Ingress and Egress
- Intrinsically safe lighting, ventilation, heating and other equipment
- Recovery actions

- Signage
- Sources of ignition
- Spacing and quantity limitations
- Spill containment and control measures
- Written emergency plans and procedures

NOTE: Before applying the above elements, this company will first determine if a flammable storage room is legally necessary. It is allowable to maintain up to 25 gal. of Class IA flammable liquids 120 gals. of Class 1B, 1C, II or III liquids in containers 660 gals. of Class 1B, 1C, II or III liquids in a single portable tank in any one fire area.

10. General Requirements for Inside Storage Rooms. (YOUR COMPANY) will ensure compliance with the following requirements of 29 CFR 1910.106, 107, 108.

10.1 Ensure room is in compliance with the following table:

Fire Protection* Provided	Fire Resistance	Max. Floor Area	Total Allowable Qty Gals/sqft/floor area
YES	2 hr.	500 sq. ft.	10
NO	2 hr.	500 sq. ft.	4
YES	1 hr.	150 sq. ft.	5
NO	1 hr.	150 sq. ft.	2

*Fire protection system shall be sprinkler, water spray, carbon dioxide or other approved system.

10.2 Where openings to other rooms or buildings exist, they shall be provided with noncombustible liquid tight raised sills or ramps at least 4 in. in height or the room shall be 4 in. below the surrounding floor or an open grated trench draining to a safe location shall be used.

10.3 Openings to rooms shall be provided with approved self-closing fire doors. (Doors may be left open during material handling operations if they are designed to close automatically in a fire).

10.4 Windows, if any, will be fire windows and will be designed to close automatically in a fire.

10.5 Wiring and equipment located inside the storage room shall be approved for Class I of flammable or combustible liquid stored.

10.6 The ventilation inside the room will configured to provide at least six air changes per hour. This will be accomplished either by gravity or mechanical exhaust.

NOTE: In general, if no mechanical exhaust is provided, then it is almost certain that the required exchange rate is not being met. All storage rooms will be reviewed to ensure an air inlet exists and additional NFPA guidelines for proper design of ventilation systems are met.

10.7 If mechanical ventilation exists, it will be controlled by a switch located outside the door. The ventilation and lighting fixtures shall be operated by the same switch.

10.8 If Class I flammables are dispensed, a pilot light (indicator light at switch) will be installed adjacent to the switch to confirm live voltage to the circuit.

10.9 An aisle of at least three feet wide will be maintained for ease of ingress and egress, separation of materials, fire safety and movement of materials.

10.10 Containers over 30 gal. capacity will not be stacked one upon the other.

10.11 Dispensing will be accomplished with the use of approved pumps or if by gravity, then through a self-closing valve.

10.12 A fire extinguisher will be suitably located outside the door of the room.

10.13 No smoking or open flames are allowed in flammable and combustible liquids storage areas.

10.14 Water-reactive materials shall not be stored in the same room as flammable and combustible liquids.

10.15 Adequate warning signs will be installed as required.

10.16 Class I flammable liquids shall not be permitted in basement areas

11. Drums Storage.

11.1 General considerations. Accidents may occur during handling of drums and other flammable and combustible liquids containers. Hazards include detonations, fires, explosions, vapor generation and physical injury resulting from moving heavy containers by hand and working around stacked drums, powered industrial trucks and deteriorated drums. While these hazards are always present, proper work practices, such as minimizing handling and using equipment and procedures that isolate workers from such hazardous substances, can minimize the risks to company employees.

11.2 Inspection requirements

11.2.1 The appropriate procedures for handling drums depend on the drum contents. Thus, prior to any handling, drums they should be visually inspected to gain as much information as possible about their hazards. Things to look for include:

a) Symbols, words or other marks on the drum indicating that it contains flammable or combustible liquids.

b) Signs of deterioration such as corrosion, rust and leaks.

c) Signs that the drum is under pressure such as swelling and bulging.

c) Drum type.

c) Configuration of the drumhead.

c) Chemical compatibility with other chemicals in the area.

11.3 Handling drums.

11.3.1 The following procedures can be used to maximize worker safety during drum handling and movement:

a) Personnel should be trained in proper lifting and moving techniques to prevent back injuries.

b) Ensure powered industrial trucks used in the movement of the materials have a rated load capacity high enough to handle the anticipated loads, and make sure the vehicle can operate smoothly on the available road surface.

c) Before moving anything, determine the most appropriate sequence in which the various drums and other containers should be moved. For example, small containers may have to be removed first to permit entry and movement of drums.

d) Ensure that operators have a clear view when carrying drums. Where necessary, have workers available to guide the operator's motion.

11.4 Bulging Drums

11.4.1 Pressurized drums are extremely hazardous. Wherever possible, do not move drums that may be under internal pressure, as evidenced by bulging or swelling.

11.4.2 If a pressurized drum has to be moved, whenever possible handle the drum with a grappler unit constructed for explosive containment. Either move the bulged drum only as far as necessary to allow seating on firm ground, or carefully overpack the drum. Exercise extreme caution when working with or adjacent to potentially pressurized drums.

11.5 Leaking, Open and Deteriorated Drums. If a drum containing a liquid cannot be moved without rupture, immediately contact _____ at _____ to report a potential spill condition. ***AWAIT FURTHER INSTRUCTIONS!***

11.6 Grounding and bonding. Buildup of static electricity charges on containers and people is a dangerous source of sparks that can touch off flash fires wherever flammable liquids are being transferred or used.

11.6.1 Grounding. A readily accessible connection to an earth ground will be installed in all company storage and dispensing areas.

11.6.2 Bonding. A readily accessible connection from a grounded drum to a container being filled will be installed on all drums or bulk containers used to dispense flammable or combustible liquids. This procedure is not necessary when self-bonding containers are used. If it is unclear if the container is self-bonding, use a bonding strap in the dispensing process

11.7 Drip pans. Drip pans should be positioned below each drum faucet to catch spills or any possible drippings from a worn or damaged faucet.

11.8 Drum venting Drums containing flammable or combustible liquids will be vented to relieve pressure buildup due to heat and also to prevent creation of a vacuum when liquid is being drained off or the drum is subjected to sudden cooling.

11.9 Drum faucets. Drum faucets will be of the self-closing type. Non self-closing types will not be used by this company.

12. Bulk Storage. Bulk storage of flammable or combustible liquids requires a hazard assessment be conducted to determine specific requirements. Some general rules for each class of chemical include:

12.1 Class I liquids may be stored in closed containers or in storage tanks above ground outside of buildings or underground and maintained in accordance with OSHA, EPA, NFPA and DOT requirements. A site specific assessment must be made.

12.2 Class II and III liquids may be stored in containers or tanks within buildings or in above- or below-ground tanks outside of buildings and maintained in accordance with OSHA, EPA, NFPA and DOT requirements. A site specific assessment must be made.

12.3 If rooms containing Class I liquids are heated it shall be done by the use of steam or hot water or other approved intrinsically safe method. A site specific assessment must be made.

12.4 Ventilation shall be provided for all pumping and dispensing operations taking place within a room. This applies to Class I liquids only. If natural ventilation is not adequate then mechanical ventilation must be used. A site specific assessment must be made.

13. Aboveground Tanks. Local fire inspection personnel will be consulted when determining aboveground tank placement and fire control configurations.

13.1 Spacing (shell-to-shell) between aboveground tanks.

13.1.1 The distance between any two flammable or combustible liquid storage tanks must not be less than 3 feet.

13.1.2 The distance between any two adjacent tanks must not be less than one-sixth the sum of their diameters. When the diameter of one tank is less than one-half the diameter of the adjacent tank, the distance between the two tanks must not be less than one-half the diameter of the smaller tank.

13.1.3 Where crude petroleum in conjunction with production facilities are located in noncongested areas and have capacities not exceeding 126,000 gallons (3,000 barrels), the distance between such tanks must not be less than 3 feet.

13.1.4 Where unstable flammable or combustible liquids are stored, the distance between such tanks must not be less than one-half the sum of their diameters.

13.1.5 When tanks are compacted in three or more rows or in an irregular pattern, greater spacing or other means must be provided so that inside tanks are accessible for firefighting purposes.

13.1.6 The minimum separation between a liquefied petroleum gas container and a flammable or combustible liquid storage tank must be 20 feet, except in the case of flammable or combustible liquid tanks operating at pressures exceeding 2.5 p.s.i.g. or equipped with emergency venting which will permit pressures to exceed 2.5 p.s.i.g. Suitable means must be taken to prevent the accumulation of flammable or combustible liquids under adjacent liquefied petroleum gas containers such as by diversion curbs or grading. When flammable or combustible liquid storage tanks are within a diked area, the liquefied petroleum gas containers must be outside the diked area and at least 10 feet away from the centerline of the wall of the diked area. The foregoing provisions must not apply when liquefied petroleum gas containers of 125 gallons or less capacity are installed adjacent to fuel oil supply tanks of 550 gallons or less capacity.

13.2 Normal venting for aboveground tanks.

13.2.1 Atmospheric storage tanks must be adequately vented to prevent the development of vacuum or pressure sufficient to distort the roof of a cone roof tank or exceeding the design pressure in the case of other atmospheric tanks, as a result of filling or emptying, and atmospheric temperature changes.

13.3 Normal vents must be sized either in accordance with:

13.3.1 The American Petroleum Institute Standard 2000 (1968), Venting Atmospheric and Low-Pressure Storage Tanks; or other accepted standard; or

13.3.2 Must be at least as large as the filling or withdrawal connection, whichever is larger but in no case less than 1 1/4 inch nominal inside diameter.

13.3.3 Low-pressure tanks and pressure vessels must be adequately vented to prevent development of pressure or vacuum, as a result of filling or emptying and atmospheric temperature changes, from exceeding the design pressure of the tank or vessel. Protection must also be provided to prevent overpressure from any pump discharging into the tank or vessel when the pump discharge pressure can exceed the design pressure of the tank or vessel.

14. Containers And Portable Tanks.

Maximum Allowable Size Of Containers And Portable Tanks

Container type:	Flammable liquids			Combustible liquids	
	Class IA	Class IB	Class IC	Class II	Class III
Glass or approved plastic:	1 pt	1 qt	1 gal	1 gal	1 gal.
Metal (other than DOT drums):	1 gal:	5 gal:	5 gal:	5 gal:	5 gal.
Safety cans:	2 gal:	5 gal:	5 gal:	5 gal:	5 gal.
Metal drums (DOT specifications):	60 gal:	60 gal:	60 gal:	60 gal:	60 gal.
Approved portable tanks:	660 gal:	660 gal:	660 gal:	660 gal:	660 gal.

15. Storage Cabinets.

15.1 Maximum capacity. Not more than 60 gallons of Class I or Class II liquids, nor more than 120 gallons of Class III liquids may be stored in a storage cabinet.

15.2 Fire resistance. Storage cabinets used by this company must be designed and constructed to meet NFPA 251-1969 requirements.

15.3 Labeling. Cabinets must be labeled in conspicuous lettering, "Flammable - Keep Fire Away."

16. Storage of Flammable and Combustible Liquids Inside Buildings.

16.1 General. Storage outside buildings must be in accordance with Table H-14 or H-15, §1910.106

16.2 Egress. Flammable or combustible liquids must not be stored so as to limit use of exits, stairways, or areas normally used for the safe egress of people.

16.3 Containers. The storage of flammable or combustible liquids in containers or portable tanks must comply with 29 CFR §1910.

16.4 Office areas. Storage is prohibited except where required for maintenance and operation of building and operation of equipment. Such storage must be kept in closed metal containers stored in a storage cabinet or in safety cans or in an inside storage room not having a door that opens into that portion of the building used by the public.

16.5 Leaking containers. Leaking containers must be removed to a storage room or taken to a safe location outside the building and the contents transferred to an undamaged container.

17. Storage of Flammable and Combustible Liquids Outside Buildings.

17.1 General. Storage outside buildings must be in accordance with Table H-16 or H-17, §1910.106

17.2 Where quantity stored exceeds 1,100 gallons, a minimum distance of 10 feet between buildings and nearest container of flammable or combustible liquid must be maintained.

17.3 Spill containment. The storage area must be graded in a manner to divert possible spills away from buildings or other exposures or must be surrounded by a curb at least 6 inches high. When curbs are used, provisions must be made for draining of accumulations of ground or rain water or spills of flammable or combustible liquids. Drains must terminate at a safe location and must be accessible to operation under fire conditions.

17.4 Security. The storage area must be protected against tampering or trespassers where necessary and must be kept free of weeds, debris and other combustible material not necessary to the storage.

18. Flammable and Combustible Liquids Warehouses or Storage Buildings. The following conditions apply to storage on company property.

18.1 If the storage building is located 50 feet or less from a building or line of adjoining property that may be built upon, the exposing wall must be a blank wall having a fire-resistance rating of at least 2 hours.

18.2 The total quantity of liquids within a building must not be restricted, but the arrangement of storage must comply with Table H-14 or H-15 §1910.106.

18.3 Containers in piles must be separated by pallets or dunnage where necessary to provide stability and to prevent excessive stress on container walls.

18.4 Portable tanks stored over one tier high must be designed to nest securely, without dunnage, and adequate materials handling equipment must be available to handle tanks safely at the upper tier level.

18.5 No pile must be closer than 3 feet to the nearest beam, chord, girder, or other obstruction, and must be 3 feet below sprinkler deflectors or discharge orifices of water spray, or other overhead fire protection systems.

18.6 Aisles of at least 3 feet wide must be provided where necessary for reasons of access to doors, windows or standpipe connections.

19. Fire Control. Extinguishers. Suitable fire control devices, such as small hose or portable fire extinguishers, will be available at locations where flammable or combustible liquids are stored.

19.1 Portable and special equipment. Portable fire extinguishment and control equipment must be provided in such quantities and types as are needed for the special hazards of operation and storage.

19.2 Water supply. Water must be available in volume and at adequate pressure to supply water hose streams, foam-producing equipment, automatic sprinklers, or water spray systems as the need is indicated by the special hazards of operation, dispensing and storage.

19.3 Special extinguishers. Special extinguishing equipment such as that utilizing foam, inert gas, or dry chemical must be provided as the need is indicated by the special hazards of operation dispensing and storage.

19.4 When 2 or more classes of materials are stored in a single pile, the maximum gallonage in that pile must be the smallest of the 2 or more separate gallonages.

19.5 Within 200 ft. of each portable tank, there must be a 12-ft. wide access way to permit approach of fire control apparatus.

19.6 The distances listed apply to properties that have protection for exposures as defined. If there are exposures, and such protection for exposures does not exist, the distances in column 4 must be doubled.

19.7 When total quantity stored does not exceed 50 percent of maximum per pile, the distances in columns 4 and 5 may be reduced 50 percent, but not less than 3 ft.

19.8 At least one portable fire extinguisher having a rating of not less than 12-B units must be located outside of, but not more than 10 feet from, the door opening into any room used for storage.

19.9 At least one portable fire extinguisher having a rating of not less than 12-B units must be located not less than 10 feet, nor more than 25 feet, from any Class I or Class II liquid storage area located outside of a storage room but inside a building.

19.10 Sprinklers. When sprinklers are provided, they will be installed in accordance with NFPA requirements.

19.11 Open flames and smoking. Open flames, ignition sources and smoking are not be permitted in flammable or combustible liquid storage areas.

19.12 Water reactive materials. Materials which will react with water must not be stored in the same room with flammable or combustible liquids.

19.12.1 Flammable liquids must be kept in covered containers when not actually in use.

19.12.2 Where flammable or combustible liquids are used or handled, except in closed containers, means will be provided to dispose promptly and safely of leakage or spills.

19.12.3 Class I liquids may be used only where there are no open flames or other sources of ignition within the possible path of vapor travel.

19.12.4 Flammable or combustible liquids must be drawn from or transferred into vessels, containers, or portable tanks within a building only through a closed piping system, from safety cans, by means of a device drawing through the top, or from a container or portable tanks by gravity through an approved self-closing valve. Transferring by means of air pressure on the container or portable tanks is prohibited.

20. Drainage.

20.1 Emergency drainage systems will be provided to direct flammable or combustible liquid leakage and fire protection water to a safe location. This may require curbs, scuppers, or special drainage systems to control the spread of fire.

20.2 Emergency drainage systems, if connected to public sewers or discharged into public waterways, will be equipped with traps or separator.

21. Ventilation.

21.1 Class I liquids must be ventilated at a rate of not less than 1 cubic foot per minute per square foot of solid floor area. This must be accomplished by natural or mechanical ventilation with discharge or exhaust to a safe location outside of the building. Provision must be made for introduction of makeup air in such a manner as not to short circuit the ventilation. Ventilation must be arranged to include all floor areas or pits where flammable vapors may collect.

21.2 Equipment used in a building and the ventilation of the building must be designed so as to limit flammable vapor-air mixtures under normal operating conditions to the interior of equipment, and to not more than 5 feet from equipment which exposes Class I liquids to the air.

22. Special Hazards. Where the need is indicated by special hazards of operation, flammable or combustible liquid processing equipment, major piping, and supporting steel must be protected by approved water spray systems, deluge systems, approved fire-resistant coatings, insulation, or any combination of these.

23. Maintenance. All fire protection systems will be adequately maintained and periodically inspected and tested to make sure they are always in satisfactory operating condition, and they will serve their purpose in time of emergency.

24. Sources of Ignition.

24.1 Adequate precautions must be taken by all employee's to prevent the ignition of flammable vapors. Sources of ignition include but are not limited to open flames; lightning; smoking; cutting and welding; hot surfaces; frictional heat; static, electrical, and mechanical sparks; spontaneous ignition, including heat-producing chemical reactions; and radiant heat.

24.2 Grounding. Class I liquids must not be dispensed into containers unless the nozzle and container are electrically interconnected.

25. Housekeeping.

25.1 General. Maintenance and operating practices must be in accordance with established procedures which will tend to control leakage and prevent the accidental escape of flammable or combustible liquids. Spills must be cleaned up promptly.

25.2 Access. Adequate aisles must be maintained for unobstructed movement of personnel and so that fire protection equipment can be brought to bear on any part of flammable or combustible liquid storage, use, or any unit physical operation.

25.3 Waste and residue. Combustible waste material and residues in a building or unit operating area must be kept to a minimum, stored in covered metal receptacles and disposed of daily.

25.4 Clear zones. Ground area around buildings and unit operating areas must be kept free of weeds, trash, or other unnecessary combustible materials.

26. Storage and Dispensing Locations. The following locations have been designated as storage (warehousing) or dispensing locations for flammable and combustible liquids.

	Yes/No	Yes/No
Yes/No	Yes/No	Spill Control Emergency

[illegible]