

FLAMMABLE AND COMBUSTIBLE LIQUID STORAGE	Identifier: PRD-2201
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Subcontractors	Program Requirements Documents	For Additional Info: http://EDMS	Effective Date: 06/02/03
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Manual: Subcontractor Requirements

Change Number: 99736

1. PURPOSE

This document provides requirements for controlling flammable and combustible liquids, to minimize the threats to employees, the public, DOE property, and the environment.

This document highlights requirements referenced in the “Source Documents” section, as well as **BBWI** requirements. Any applicable regulatory or **BBWI** requirements must be followed, with the most stringent requirement being met.

2. SCOPE AND APPLICABILITY

This document applies to all subcontractors working at the INEEL who store or handle flammable or combustible liquids, as specified by their contract with **BBWI**. Stricter requirements may be imposed by subcontractors upon their employees or subtier contractors. The requirements of this document must be followed by subcontractors; however, the means of implementation may vary as determined by the subcontractor.

3. REQUIREMENTS

3.1 General Requirements

- 3.1.1 Subcontractors shall safely store and handle flammable and combustible liquids. See Appendix A for technical requirements for storing and using flammable and combustible liquids.
- 3.1.2 Only approved or listed equipment and procedures shall be used for storing, transporting, and dispensing flammable and combustible liquids. **All piping, valves and fittings will be capable of withstanding working pressures and stresses compatible with the type of liquid stored and will be maintained in a manner to prevent leaks.**
- 3.1.3 Personnel shall use proper techniques for the safe storage, handling, dispensing, and use of flammable and combustible liquids.
- 3.1.4 As necessary, subcontractors shall request assistance and recommendations for unique hazard potentials from the **BBWI Point of Contact (POC; see def)**.
- 3.1.5 Storage areas and work activities that involve flammable or combustible liquids shall be periodically inspected.

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3.2 Storage

- 3.2.1 Subcontractors shall establish and maintain flammable and combustible liquid storage areas.
- 3.2.2 An adequate quantity of approved equipment, storage cabinets, and containers shall be provided to safely store and handle flammable and combustible liquids.
- 3.2.3 Flammable and combustible liquids shall be stored in the established flammable and combustible liquids storage areas.
- 3.2.3.1 Any flammable liquid storage cabinets that are purchased for use at the INEEL shall have doors that are well fitted, self-closing, and equipped with a latch.
- NOTE:** *Existing flammable liquid storage cabinets do not need to be replaced, however, they do need to be UL-listed or FM-approved and need to be in good condition with latches and self-closing devices (if provided) in working order.*
- 3.2.4 The BBWI POC shall be notified of major changes in flammable and combustible liquids storage including:
- A. adding new (not listed on the current inventory list) flammable and combustible liquids to the inventory in a storage area
 - B. deleting flammable or combustible liquids from the inventory list in a storage area
 - C. relocating storage areas or cabinets.
- 3.2.5 Good housekeeping shall be maintained in and around areas where flammable and combustible liquids are used and stored.
- 3.2.6 Flammable or combustible liquids shall not be stored or used beyond their shelf life.
- 3.2.7 Flammable or combustible liquids shall not be stored with incompatible chemicals.
- 3.2.8 Materials other than flammable or combustible liquids shall not be stored in a flammable or combustible liquids storage area.
- 3.2.9 All fixed and portable fire protection equipment associated with flammable and combustible liquid storage areas shall be operable and shall be tested per NFPA standards.

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3.3 Transportation and Use

- 3.3.1 All vessels used to transport flammable and combustible liquids shall meet appropriate NFPA code requirements.
- 3.3.2 Appropriate training shall be provided to personnel who will use or handle flammable or combustible liquids.
- 3.3.3 Cutting, welding, and other hot work shall be prohibited near designated storage areas for flammable and combustible liquid until a safety evaluation of the proposed work area is made.
- 3.3.4 Flammable liquids will not be used for cleaning.
- 3.3.5 Fuel lines will be equipped with valves capable to stopping the fuel at the source and will be located and maintained to minimize fire hazards. This does not apply to fuel lines in self-propelled equipment.

3.4 Servicing and Refueling Areas

- 3.4.1 Flammable and combustible liquids shall be stored in approved closed containers.
- 3.4.2 The dispensing nozzle and hose shall be approved and have an approved automatic-closing type nozzle without a latch-open device.
- 3.4.3 Power shut off switches will be clearly identified and located in a remote area from the dispensing device.
- 3.4.4 Smoking or open flames will not be allowed in areas used to dispense fuel and or transfer flammable or combustible liquids. The area will be posted “No Smoking or Open Flames”.
- 3.4.5 The motors of all equipment being refueled shall be shut down during refueling operations.
- 3.4.6 Each service or refueling area shall be provided with at least one fire extinguisher having a minimum rating of 20-B:C located within 75 ft. of the dispenser.

4. DEFINITIONS

See the Glossary, LST-27, for definitions of the following terms:

BBWI Point of Contact.

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Page: 4 of 10**5. REFERENCES****5.1 Source Documents**[1994 Uniform Fire Code 7902](#)

29 CFR 1910.106, Flammable and Combustible Liquids

NFPA 30, Flammable and Combustible Liquids Code

5.2 Related Requirements

The following documents may also contain requirements that apply to this activity:

PRD-2101, Hazard Communication

6. APPENDICES

Appendix A, Technical Requirements for the Storage and Use of Flammable and Combustible Liquids

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APPENDIX A

Technical Requirements for the Storage and Use of Flammable and Combustible Liquids

1. GENERAL SAFETY MEASURES

- 1.1 NFPA 30 shall be the basic standard for flammable and combustible liquids. Each subcontractor shall have a system for control of storage and use of flammable substances to ensure compliance with this procedure. Definitions in this Appendix shall be as in NFPA 30.

2. IDENTIFICATION REQUIREMENTS FOR FLAMMABLE AND COMBUSTIBLE LIQUIDS

- 2.1 Flammable and combustible liquid storage tanks, valves, and piping shall be conspicuously identified. If storage tank contents have a health or reactivity storage degree of hazard >2 or a flammability rating of 4, the NFPA 704 marking system shall apply. This marking need only be readily seen and easily identified and does not have to be attached directly to the tank.
- 2.2 Flammable and combustible liquids storage cabinets shall be marked in a conspicuous manner.
- 2.3 All portable dispensing flammable liquid containers shall be of the approved type and labeled to allow ready identification of the contents.

3. STORAGE REQUIREMENTS

- 3.1 Flammable or combustible liquids, and flammable compressed gas cylinders shall not be stored in unapproved areas of a facility.
- 3.2 All portable dispensing flammable liquid containers shall be FM/UL-approved, and be labeled to allow quick identification of the contents. (NFPA-45 shall be used for guidance in handling of flammable liquids container in a laboratory setting.)
- 3.3 Flammable/combustible liquid storage cabinets shall not be used for storage of materials other than flammable/combustible liquids.
- 3.4 In all facilities, not more than a 1-day supply of flammable/combustible liquid may be stored in a single fire area outside of an approved flammable liquid storage cabinet; or not more than 25 gallons of Class I liquids in containers and 120 gallons of Class IB, IC, II, or III liquids in containers. No modifications shall be made to storage cabinets to void the FM/UL rating.

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- 3.5 If quantities of liquids exceeding the above limits are required, they shall be stored in approved flammable liquid storage cabinets. These cabinets shall be UL-listed or FM-approved.
- 3.6 When flammable liquid storage cabinets are used, not more than 120 gallons of Class I, II, and IIIA liquids may be stored in a single cabinet. Of this total, not more than 60 gallons may be of Class I and II liquids.
- 3.7 When flammable liquid storage cabinets are used, not more than three cabinets may be located in a single fire area. In industrial facilities, additional cabinets (limited to a maximum group of three) may be located in the same fire area, provided the groups of cabinets are separated by at least 100 feet.
- 3.8 When flammable liquid storage cabinets are used, the vent openings are to be sealed with properly fitted metal bungs. When the cabinets are required to be vented, consult the [BBWI](#) POC for direction.
- 3.9 Flammable liquid storage rooms designed in accordance with NFPA 30 and the Uniform Building Code (UBC) are required when quantities of flammable or combustible liquids in use, dispensing, or mixing operations exceeds the quantities allowed in control areas for use-open conditions per NFPA 30 and the UBC. These rooms shall be isolated from other facilities by either two-hour or one-hour rated construction, or as required by the NFPA 30.
- 3.10 Portable tanks (61 to 660 gallons) shall be prohibited inside facilities.
- 3.11 Class IA and IB liquids may be stored in glass containers of not more than 1 gallon, if required for liquid purity or to avoid excessive corrosion of metal containers.
- 3.12 The storage of liquids shall not obstruct corridors, aisles, or exit doors, and liquids shall not be stored in exit enclosures (e.g., stairwells).
- 3.13 The quantities of flammable and combustible liquids listed above may be exceeded in a paint spray or dipping facility which meets all requirements of NFPA 33, 29 CFR 1910.103, appropriate FM data sheets, and the UBC; provided a one [day](#) supply is not exceeded. The quantity involved in a one [dayday](#) supply shall be clearly established and posted within the area.

4. STATIONARY ABOVE GROUND CONTAINERS (TANKS)

- 4.1 Level indication shall be accomplished by a method other than a standard sight glass or similar equipment subject to breakage.

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- 4.2 Tanks shall be diked to hold 125% of the capacity of the largest tank plus 20 minutes of fire water discharge with overflow to a safe location; outside where possible in accordance with the UBC.
- 4.3 Containers (tanks) that are automatically refilled shall be provided with a high level alarm, adequate ventilation, and an overflow pipe that discharges to a safe location.
- 4.4 Storable tanks shall be installed in accordance with the requirements of NFPA 30 and applicable environmental regulations.
- 4.5 Service tanks, such as those used for servicing vehicles, fuel storage for building heating systems, fuel storage for internal combustion engines, and similar tanks that are located closer than UBC special requirements to buildings shall be buried or separated by a fire wall.
- 4.6 Above ground tanks may be used for bulk storage of flammable liquids where the size of the tank is such that it is not feasible to bury the tank underground. Tanks of this size are normally used for a facility main storage tank that provides storage for pumping to individual day tanks or bulk plants provided for filling tank trucks. Such tanks shall be constructed, located, diked, and protected with suitable foam fire fighting equipment in accordance with NFPA 30, NFPA 31, and NFPA 11. Dikes shall contain 125% of the spill of the largest tank plus 20 minutes of fire suppression discharge. Pneumatic or gravity discharge should not be used.
- 4.7 Storage tank construction shall follow American Petroleum Institute API 650 Guidelines.

5. OUTDOOR STORAGE

- 5.1 Outside storage shall be maintained an adequate distance from important buildings and/or structures. Quantities of <500 gal should be stored a minimum of 50 ft from facilities. Quantities of >500 gal should be a minimum of 100 ft from any facility.

6. GENERAL USE AND HANDLING OF FLAMMABLE AND COMBUSTIBLE LIQUIDS

- 6.1 Transferring liquid by means of pressurizing the container with air is prohibited unless exempted by a Facility Fire Protection Engineer.
- 6.2 When transferring Class I liquids in laboratories from containers of less than 5-gallon capacity, the transfer shall be made in one of the following manners:

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- 6.2.1 With the use of a laboratory hood, or
- 6.2.2 In an area provided with ventilation to prevent the accumulation of a flammable vapor/air mixture.
- 6.3 When transferring Class I liquids in laboratories from containers of 5-gallon capacity or more, the transfer shall be made in one of the following manners:
 - 6.3.1 From a separate area outside the building.
 - 6.3.2 In a separate, inside storage room that complies with the requirements of NFPA 30 and/or 29 CFR 1910.106.
- 6.4 When dispensing from drums, the drums shall be equipped with Underwriters Laboratories, Inc., (UL) listed or Factory Mutual (FM) approved dispensing devices.
- 6.5 When transferring Class 1 flammable liquids between conductive containers, the containers shall be bonded with a wire. The bonding wire or one of the containers shall be grounded in accordance with the OSHA 1910. Portable containers of five gallon capacity or less need not be bonded nor are flammable liquid cabinets required to be bonded or grounded unless liquids are dispensed from the cabinet.
- 6.6 The loading, unloading, and onsite transportation of bulk quantities of flammable and combustible liquids shall be in accordance with NFPA 30 and NFPA 385.
- 6.7 When flammable liquids are to be used in unusual circumstances, a “Safe Work Permit” control system or other hazard evaluation shall be used to establish safe working conditions.
- 6.8 When the use of hand tools is required in areas where flammable gases or liquids are present, such use shall be limited to approved, non-sparking tools.
- 6.9 If entry is required into any confined space (tank, vat, tank car, pit, etc.) that has contained any flammable or combustible liquid, then all of the requirements for entry listed in PRD-2110, A Confined Spaces, shall apply. Special attention shall be given to the additional provisions required to prevent fire or explosion in accordance with the National Electrical Code 70, Article 500.

7. VENTILATION

- 7.1 The following mechanical ventilation is required where class I flammable liquids are being transferred or dispensed (this does not apply to laboratory areas or those

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areas involving the infrequent transfer of incidental quantities of flammable liquids.):

- 7.1.1 The ventilation flow rate shall be 1 ft³/min/ft² of floor area but in no case less than 150 ft³/min.
- 7.1.2 The intake and exhaust points shall be within 12 inches of the floor and positioned at opposite sides or ends of the room.
- 7.1.3 A flow monitor or equivalent mechanism shall be provided so an audible alarm will sound if the ventilation system fails.
- 7.1.4 Each facility shall maintain or have available adequate test equipment capable of determining the existence of flammable gases (or vapors) of types constituting actual or potential explosion hazards in the facility.
- 7.1.5 Where dispensing is being done in inside rooms, operations shall comply with Chapter 5 of NFPA 30.

8. ELECTRICAL EQUIPMENT

- 8.1 All electrical equipment, wiring, and fixtures located or used in areas in which flammable liquids are stored, used, or handled, shall be UL-approved and of a type, and installed in a manner, complying with requirements of the National Electrical Code Article 500 for such installations.
- 8.2 An electrical inspection, testing, and maintenance program shall be conducted at a frequency sufficient to ensure that ignition of flammable vapor or dust by electrical causes will be minimized per NFPA 70 and NFPA 30.
- 8.3 See NFPA 70 for details of grounding requirements for portable tools and extension cords used in locations where flammable vapors may exist.
- 8.4 The subcontractor shall determine the appropriate hazard classification and shall review plans for approval of electrical installations in flammable liquids, gases, and dust liberating areas.

9. CONTROL OF IGNITION SOURCES

- 9.1 Precautions shall be taken to prevent the ignition of flammable vapors. Sources of ignition include, but are not limited to, open flame, smoking, cutting and welding, electrical and mechanical sparks, spontaneous ignition and radiant heat.
- 9.2 Cabinet storage shall be kept free of open containers of Class I liquids.

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- 9.3 Combustible wastes shall be stored in closed, metal containers for periodic disposal.
- 9.4 Smoking is prohibited in the following government owned or controlled areas:
- 9.4.1 All indoor rooms and offices
 - 9.4.2 All government vehicles
 - 9.4.3 Near hazardous or toxic materials. Welding, cutting, and similar spark producing operations shall not be permitted in flammable liquid areas unless a safe work permit has been issued.
- 9.5 Welding, cutting, and similar spark producing operations shall not be permitted in flammable liquid areas unless a safe work permit has been issued.
- 9.6 Power operated industrial trucks used to move containers of Class I liquids shall be maintained per NFPA 505, “Powered Industrial Trucks, Including Type Designations, Areas of Use, Maintenance, and Operations.”
- 9.7 Good housekeeping and vegetation abatement shall be practiced.