

PROCEDURE 16 - Flammable and Combustible Liquid Storage

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Synopsis

The purpose of this procedure is to provide guidelines to reduce potential exposure from hazards associated with the use and storage of flammable and combustible liquids in the workplace. This procedure applies to all NWS facilities and work locations where flammable and combustible liquids are used and/or stored and to all NWS employees involved with the usage and/storage of flammable and combustible liquids.

Initial Implementation Requirements:

- **Analyze Site Operations versus Requirements of the Procedure**
 - Evaluate storage areas for compliance with the procedure. *(16.3.1, 16.5.2b)*
 - Assess the adequacy of ventilation in the area of stored Flammable/Combustible Materials. *(16.3.2c)*
- **Develop/Obtain Documentation/Information required for Site**
 - Develop an inventory of Flammable and Combustible Materials. *(16.3.1d.2)*
 - Obtain compatibility chart to be used when storing Flammable/Combustible Materials. *(16.3.1g)*
 - Obtain Material Safety Data Sheets (MSDS) for Flammable/Combustible Materials. *(16.3.2g)*
- **Designate Person to Administer Flammable and Liquid Storage Procedure Requirements**
- **Inventory Material/Equipment (Procure as required)**
 - Spill Kits. *(16.5.2c, 16.3.2e)*
 - Flammable Storage Cabinets. *(16.5.2c, 16.3.1b)*
 - Metal Containers for Combustible Waste Materials. *(16.5.2c, 16.3.5c)*

Recurring and Annual Task Requirements:

- **Perform Inspection/Assessments/Testing**
 - Conduct periodic assessment for adequacy of flammable/combustible materials use and storage. *(16.5.2b)*
- **Review/Update Documentation/Information required for Site**
 - Maintain an inventory of Flammable and Combustible Materials. *(16.3.1d.2)*
 - Obtain MSDS for new materials used. *(16.3.2g)*
- **Inspect/Replace/Maintain Material/Equipment**
 - Spill Kits Replenishment. *(16.5.2c, 16.3.2e)*
 - Flammable Storage Cabinets. *(16.5.2c, 16.3.1b)*
 - Metal Containers for Combustible Waste Materials. *(16.5.2c, 16.3.5c)*

Flammable and Combustible Liquid Storage Checklist

Requirements	Reference	YES	NO	N/A	Comments
Is initial and annual review of this procedure conducted and documented?	16.4.2				
Are flammable/combustible materials storage areas in compliance with requirements of this procedure?	16.3.1 16.5.2b				
Are storage cabinets available for storage of flammable/combustible liquids and are labeled "Flammable-Keep Fire Away"	16.3.1b(1)				
Are combustible waste materials (e.g., oily rags) stored in covered metal containers and removed from the work place promptly?	16.3.5c				
Are flammable/combustible liquid materials storage rooms provided with adequate ventilation to prevent accumulation of vapors?	16.3.2c				
Are adequate aisles provided and maintained to ensure unobstructed movement of personnel and access to the fire protection equipment?	16.3.5d				
Are all flammable liquids kept in closed containers when not in use?	16.3.1d(1)				
Are "NO SMOKING" signs posted in areas where flammable/combustible materials are used or stored?	16.3.1h				
Are spill kits available for cleanup of flammable/combustible materials spills?	16.3.2e				
Are fire extinguishers available at the locations where	16.3.1i				

Requirements	Reference	YES	NO	N/A	Comments
flammable/combustible materials stored or used?					
Are grounds around building and work areas in which flammable materials are stored or used kept free of trash, weeds or other combustible materials?	16.3.5e				

16 FLAMMABLE AND COMBUSTIBLE LIQUID STORAGE

16.1 Purpose and Scope

As part of its goal to provide a safe and healthful workplace, the National Weather Service (NWS) is promulgating this procedure related to hazards associated with the use and storage of flammable and combustible liquids in the workplace. This procedure applies to all NWS facilities and work locations where flammable and combustible liquids are used and/or stored and to all NWS employees involved with the usage and/storage of flammable and combustible liquids.

16.2 Definitions

Closed Container. A container sealed by means of a lid or other device that neither liquid nor vapor will escape from at ordinary temperatures.

Combustible Liquid. Any liquid having a flashpoint at or above 100°F (37.8°C). Any mixture that is composed of any components with flashpoints of 200°F (93.3°C) or higher which make up 99 percent or more of the total volume of the mixture shall not be covered by this procedure. Combustible liquids are divided into the following two primary classes:

Class II liquids include those with flashpoints at or above 100°F (37.8°C) and below 140°F (60°C). An example would be diesel fuel.

Class III liquids include those with flashpoints at or above 140°F (60°C). Class III liquids are further subdivided into two subclasses, Class IIIA and Class IIIB.

Class IIIA liquids include those with flashpoints at or above 140°F (60°C) and below 200° F (93.3°C). An example would be kerosene.

Class IIIB liquids include those with flashpoints at or above 200°F (93.3°C). An example would be cooking oil, transformer oil and lubricating oil.

Flammable Liquid. Any liquid having a flashpoint below 100°F (37.8°C). Any mixture that is made up of any components with flashpoints of 100°F (37.8°C) or higher which make up 99 percent or more of the total volume of the mixture shall be considered a combustible liquid. Flammable liquids are known as Class I liquids. Class I liquids are divided into three classes:

Class IA includes liquids having flashpoints below 73°F (22.8 °C) and having a boiling point below 100°F (37.8°C). An example would be gasoline.

Class IB includes liquids having flashpoints below 73°F (22.8°C) and having a boiling point at or above 100°F (37.8°C). An example would be acetone.

Class IC includes liquids having flashpoints at or above 73°F (22.8°C) and below 100°F (37.8°C). An example would be amyl acetate (banana oil).

Flammable Storage Cabinet. Flammable Storage Cabinet must meet NFPA Standard 251 “Standard methods of Fire Tests of Building Construction and Materials. Generally, the cabinet is approved by Underwriters Laboratory (UL) or Factory Mutual (FM).

Field Office. A Field Office may include the following: Weather Forecast Office (WFO), River Forecast Center (RFC), Weather Service Office (WSO), and a Data Collection Office (DCO).

Flashpoint. The minimum temperature at which a liquid gives off vapor within a test vessel in sufficient concentration to form an ignitable mixture with air near the surface of the liquid.

Office Occupancy. The occupancy or use of a building or structure or any portion thereof for the transaction of business or the rendering or receiving of professional services.

Operating Unit. For the purpose of this procedure, Operating Unit includes the National Centers for Environmental Prediction (NCEP), National Data Buoy Center (NDBC), NWS Training Center (NWSTC), National Reconditioning Center (NRC), Radar Operations Center (ROC), or the Sterling Field Support Center (SFSC).

Safety Can. An approved container of not more than 5 gallons capacity having a spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure.

Station Manager. For the purpose of this procedure, the Station Manager shall be either the NWS Regional Director; Directors of Centers under NCEP (Aviation Weather Center, NP6; Storm Prediction Center, NP7; and Tropical Prediction Center, NP8); Directors of the NDBC, NWSTC, and Chiefs of NRC, ROC and SFSC facilities; or Meteorologist in Charge (MIC), Hydrologist in Charge (HIC), or Official in Charge (OIC).

Ventilation. For the purpose of this procedure, ventilation is the movement of air into and out of an area by natural or mechanical means and is used to help prevent fires and/or explosions. Ventilation is considered adequate if it is sufficient to prevent an accumulation of significant quantities of vapor-air mixtures in a concentration over one-fourth of the lower flammable limit.

16.3 Procedure

16.3.1 Storage of Flammable and Combustible Liquids. Flammable and combustible liquids (including flammable aerosols) used at NWS facilities must be stored in accordance with the following requirements:

- a. Flammable liquids shall only be stored in containers approved under the guidelines of National Fire Protection Association, NFPA 30, "Flammable and Combustible Liquids Code."
- b. Storage cabinets must meet the requirements of 29 CFR 1910.106 "Flammable and Combustible Liquids" as listed below:
 - (1) Must be clearly and legibly labeled "Flammable - Keep Fire Away."
 - (2) No more than 60 gallons of a Class I liquid or no more than 120 gallons of a Class II liquid shall be stored in a single storage cabinet.

- (3) Shall be designed and constructed to limit the internal temperature to not more than 325°F when subjected to a 10-minute fire test as set forth in NFPA 251, “Standard Methods of Fire Tests of Building Construction and Materials.”
- c. Flammable or combustible liquids, or cabinets for same, shall not be stored/placed so as to limit use of exits, stairways or areas normally used for the safe egress of people.
- d. Storage of flammable or combustible liquids outside of flammable storage cabinets or storage rooms in office areas shall be prohibited except for the minimum amount of products necessary for the work being done (e.g., maintenance and operation of the building, operation of equipment, etc.) provided that the storage and handling of flammable liquids is accomplished in the smallest container size possible and the container used is appropriate for material stored.
- e. Storage of flammable or combustible liquids shall be prohibited in sumps. The volume of the sump would be changed to allow the possibility of a leak to the environment.
- f. Leaking containers shall be removed to a storage room or taken to a safe location outside the building and the contents transferred to an undamaged container.
- g. A compatibility chart shall be obtained and consulted when storing flammable and combustible liquids.

<p>NOTE: Attachment A: “Common Flammable and Combustible Liquids in Use at a Weather Forecast Office” lists some flammable and combustible liquids normally found in NWS facilities.</p>

- h. “No Smoking” signs shall be posted near all flammable and combustible liquids storage areas.
- i. Fire extinguishers shall be available at the locations where flammable and combustible materials stored or used. At least one portable fire extinguisher having a rating of not less than 12-B units shall be located outside of, but not more than 10 feet from, the door opening into any room used for storage.

16.3.2 Usage of Flammable and Combustible Liquids. The following guidelines shall be followed when using flammable and combustible liquids at NWS facilities or workplaces:

- a. Areas in which flammable or combustible liquids are transferred from one tank or container to another container shall be separated from other operations in the building by adequate distance or by construction having adequate fire resistance.
- b. Drainage into a collection tank or sump or other means such as curbing or dikes shall be provided to control spills.
- c. Adequate natural or mechanical ventilation shall be also provided to prevent the accumulation of vapors in the area.
- d. Flammable liquids shall be kept in covered containers when not actually in use.

- e. Where flammable or combustible liquids are used or handled, except in closed containers, a means shall be provided to promptly and safely contain leakage or spills. An example of this would be absorbent material such as kitty litter or absorbent pads and pillows. A means must also be provided for disposal of material used to absorb spilled liquids.
- f. Class I “Flammable” liquids shall be used only where there are no open flames or other sources of ignition within the possible path of vapor travel.
- g. The Material Safety Data Sheets (MSDS) shall be obtained and reviewed by chemical users prior to use.

16.3.3 Sources of Ignition. Adequate precautions shall be taken to prevent the ignition of flammable vapors.

- a. 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.
- b. Hot work such as welding or cutting operations, use of spark-producing power tools and chipping operations shall be permitted only under supervision of an individual in charge. The individual in charge shall make an inspection of the area to be sure that it is safe for the work to be done and that safe procedures will be followed for the work specified.

16.3.4 Grounding. Class I liquids shall not be dispensed into containers unless the nozzle and container are electrically interconnected. This can be accomplished by bonding, by means of a wire, the fill stem to the container into which the liquid is being dispensed.

16.3.5 Housekeeping. The following requirements shall be followed to prevent the accumulation of flammable and combustible liquids in the workplace.

- a. Maintenance and operating practices shall be followed in order to control leakage and prevent the accidental escape of flammable or combustible liquids.
- b. Spills shall be cleaned up promptly.
- c. Combustible waste material and residues in a building or work area shall be kept to a minimum, stored in covered metal receptacles and disposed of daily unless the amount of material does not exceed half the quantity of the receptacle.
- d. Adequate aisles shall be maintained to allow for unobstructed movement of personnel and so that fire protection equipment can be readily brought to bear on any part of a flammable or combustible liquid storage or usage area.
- e. The ground around buildings and work areas in which flammable or combustible liquids are stored or used shall be kept free of weeds, trash or other unnecessary combustible liquids.
- f. Combustible liquids shall not be stored on top of storage cabinets.

- g. Any hazardous waste that is considered regulated under U.S. EPA 40 CFR Part 261.21 “Characteristic of Ignitability,” shall be disposed of properly depending on the characteristic of the material.

16.4 Quality Control

16.4.1 Regional or Operating Unit Environmental/Safety Coordinators

- a. Shall perform an annual assessment of the regional headquarters facilities or operating unit to monitor and promote compliance with the requirements of this procedure.
- b. Shall perform assessments or designate personnel to perform assessments of all field offices to monitor and promote compliance with the requirements of this procedure every two years.

16.4.2 Station Manager

Shall review or delegate review, of this procedure on an annual basis to ensure that the facility is complying with its requirements. Confirmation of this review shall be forwarded to the Regional or Operating Unit Environmental/Safety Coordinator.

16.4.3 NWS Headquarters (NWSH)

- a. The NWS Safety Office shall perform an annual assessment of the NWSH facilities to ensure that the facilities are in compliance with this procedure.
- b. The NWSH Safety Office shall periodically perform an assessment of the regional headquarters and field offices to ensure compliance with this procedure. The frequency of these regional and field office assessments shall be determined by the NWSH Safety Office.
- c. Requests for clarification concerning this procedure shall be directed to the NWSH Safety Office.

16.5 Responsibilities

16.5.1 Regional or Operating Unit Environmental/Safety Coordinators*

- a. Shall monitor and coordinate to promote compliance with the requirements of this procedure for the regional headquarters, and field offices or operating units.
- b. Shall ensure flammable and combustible liquids are used and stored according to the requirements of this procedure.

16.5.2 Station Manager*

- a. Shall have oversight over the implementation of this procedure, and ensure that the requirements of this procedure are followed by individuals at the NWS facility.
- b. Shall ensure flammable and combustible liquids are used and stored according to the requirements of this procedure.

- c. Shall ensure that initial and periodic inventory of spill kits, flammable storage cabinets and other safety equipment is accomplished and adequate stock is maintained.

16.5.3 Safety or Environmental/Safety Focal Point*

Shall ensure that any responsibilities delegated to them by the Station Manager are implemented in accordance with the requirements of this procedure.

16.5.4 Employees

- a. Individual employees affected by this procedure are required to read, understand and comply with the requirements of this procedure.
- b. Report unsafe or unhealthful conditions and practices to their supervisor or safety focal point.

NOTE: * - Reference NWS PD 50-11 for complete list of responsibilities http://www.weather.gov/directives/050/pd05011c.pdf
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16.6 References

Incorporated References. The following list of references is incorporated as a whole or in part into this procedure. These references can provide additional explanation or guidance for the implementation of this procedure

- 16.6.1 National Fire Protection Association, NFPA 30, "Flammable and Combustible Liquids Code."
- 16.6.2 National Fire Protection Association, NFPA 251, "Standard Methods of Fire Tests of Building Construction and Materials."
- 16.6.3 U.S. Department of Labor, Occupational Safety and Health Administration, CFR 1910.106, "Flammable and Combustible Liquids."
- 16.6.4 U.S. Environmental Protection Agency 40 CFR Part 261.21, "Characteristic of Ignitability."

16.7 Attachments

Attachment A: Common Flammable and Combustible Liquids in Use at a Weather Forecast Office

Attachment B: Flammable/Combustible Liquids Storage (WFO Springfield, MO)

ATTACHMENT A

Common Flammable and Combustible Liquids in Use at a Weather Forecast Office

Product Name	Chemical Ingredients
WD-40	Mineral oil, Petroleum oil
Spray Paint Enamel Aerosol	Acetone, Toluene, Xylene
Windex Blue	Isopropyl alcohol, Ethanol
Contact Cement	Toluene, Methyl ethyl ketone
Invisible Shield	Ethyl alcohol, Sulfuric acid
Round Up Grass and Weed Killer	Glycine, Ethomeen
Oatey All-Purpose Cement	Tetrahydrofuran, Methyl ethyl acetone, Cyclohexanone
Kit Paste Wax	Ammonia, Formaldehyde
Plastic Welder Activator	Methyl ester, Methacrylic acid
Lacquer Thinner	Isobutyl isobutyrate, Acetone, Methanol, Toluene
Magnetic Tape Head Cleaner	Xylene, Ethane, Benzene
Liquid Solder Flux	Isopropyl alcohol, Volatile organic compound
Defthane Satin	Petroleum, Solvent naphtha
Isopropyl Alcohol	Pure mixture
Diesel Fuel	Organic petroleum liquid

ATTACHMENT B**Flammable/Combustible Liquids Storage (WFO Springfield, MO)**

January 20, 2000

The following flammable/combustible materials are stored or/and used on site (List diesel fuel tanks, heating oils, gasoline, hydrogen, solvents, etc.):

Name	Quantity	Type of Container	Location
Isopropyl Alcohol	16 oz.	16 oz. bottle	County Warning
Laquer Thinner	32 oz.	32 oz. can	County Warning
#2 Diesel Fuel	1000 gallons	1000 gallons	Generator Building
Isopropyl Alcohol	2 gallon	1 gallon containers	Generator Building
Lacquer thinner	32 oz.	32 oz. container	Generator Building
Spray Laquer	16 oz.	16 oz. can	Generator Building
Spray Paint	10 oz.	10 oz. can	Generator Building
Spray Paint	12 oz.	12 oz. can	Generator Building
Spray Paint	12 oz.	12 oz. can	Generator Building
Spray Paint	24 oz.	12 oz. cans	Generator Building
Torn-Lable	8 oz.	8 oz. can	Generator Building
Truck and Van Paint	11 oz.	11 oz. spray can	Generator Building
Daal Magnetic eye	4oz.	4oz. bottle	On site office
Head Cleaner	2oz.	2oz. bottle	On site office
Klear Clean	6 oz.	6 oz. bottle	On site office
Park Horse	8oz.	8oz. spray can	On site office
Spray paint	33 oz.	11oz. cans	On site office
StatFree Spray	96 oz.	32oz. bottles	On site office
Staticide	1qt.	1qt. bottle	On site office
WD-40	12.9 oz.	12.9 oz. can	On site office
#2 Diesel Fuel	500 gallons	250 gallon tank	RDA Shelter
Isopropyl Alcohol	1pt.	1pt. bottle	RDA Shelter
Krylon	12 oz.	12 oz. spray can	RDA Shelter
Paint	1pt.	1pt. can	RDA Shelter
Parks	32 oz.	32 oz. spray bottle	RDA Shelter
WD-40	11oz.	11oz. Spray can	RDA Shelter
WD-40	9 oz.	9 oz. spray can	UAIB
Propane	250 Gallon	250 gallon tank	WXJ-61Avilla, MO