Section III
Hazardous Materials Management

This section of the *Everyday Hazmat User's Training Guide* covers various types of hazardous materials commonly found in the USDA Forest Service. Federal regulations govern the management and transport of hazardous materials. Additional requirements are found in the NFPA and IFC. The guidelines summarize those requirements. However, these guidelines are not intended to be a comprehensive review of all regulations. Be sure to contact managers at your unit if you have questions. Your State or local fire marshal is also an important contact. Nearly every product that is a hazardous material will become a hazardous waste, so refer to section II for more details on properly managing these products when you declare them to be a waste.

Many safety concerns can be avoided by using products that are not hazardous or that do not create hazardous wastes or air or water pollutants—these products are often known as *green* products. Visit the USDA Forest Service Technology and Development Program's Web site for some specific suggestions:
http://www.fs.fed.us/eng/t-d.php?link=everyday_hazmat/green.htm

The guidelines in this section are based on Federal regulations, and IFC and NFPA requirements; your State and local governments may have additional requirements. Your local fire marshal may choose to selectively adopt IFC and NFPA requirements or may have additional requirements.

Corrosives

Corrosives include acids and bases. They can be liquid or solid, and they can destroy human skin or cause other serious problems.

Definitions

Corrosives—What Are They?

Common bases and acids include hydrochloric (also known as muriatic) and sulfuric acids. Some bases you might find include ammonium and sodium hydroxide.

See *Hazardous Product Containers* (page 96).

Corrosives—The Dangers

Corrosives present a health hazard to workers. It is extremely important to refer to the MSDS for a corrosive product to understand the personal protective equipment needed to handle the product, and the actions needed in case of accidents.

Some corrosives also present other hazards (for example, nitric acid is also an oxidizer). Refer to the product MSDS to understand the breadth of dangers for any product.

See *Hazardous Materials Storage Cabinets* (page 94).

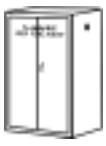
See *Keeping Incompatible Hazardous Materials Separated* (page 100).

See *The Transition to Hazardous Waste* (page 98).

See *Hazardous Product Containers* (page 96).

Storage Cabinets

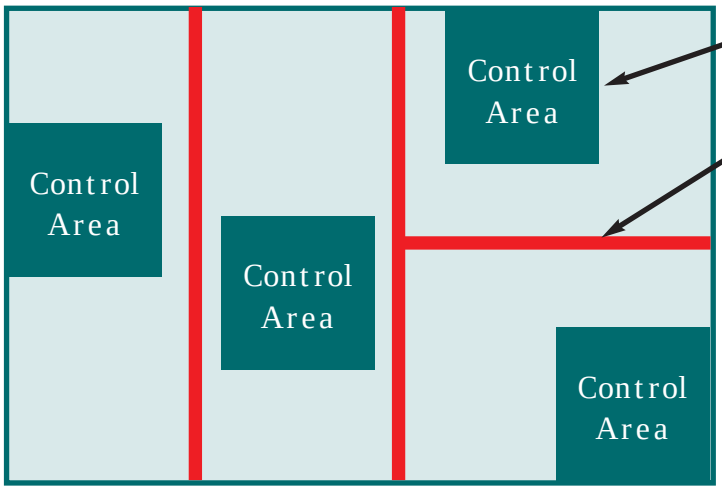
Proper storage cabinets can protect workers and the environment, and can allow you to store more corrosives safely.



See page 94.

Storing corrosive products inside buildings is acceptable as long as certain precautions are taken. These precautions are based on fire code requirements; be sure to check with your local fire marshal because there may be additional restrictions. We will use the concept of a *control area* to clarify storage and use restrictions. Control areas are separate, contiguous areas, where corrosives are to be stored or used. Storing corrosives in USDA Forest Service residences is not recommended.

Indoor Storage



Floor Plan

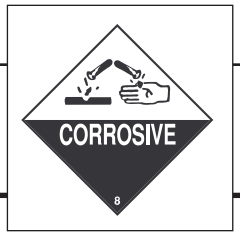
No more than four control areas per structure.

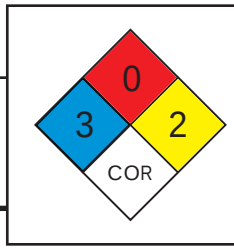
Each control area is separated from other areas by a 1-hour firewall.

No more than 5,000 pounds of solid and 500 gallons of liquid corrosive products can be stored in a control area. The amount can be increased by 100 percent if proper cabinets are used, and by another 100 percent if the area has sprinklers—not to exceed 300 percent of the original volume with both cabinets and sprinklers.

Other Important Requirements

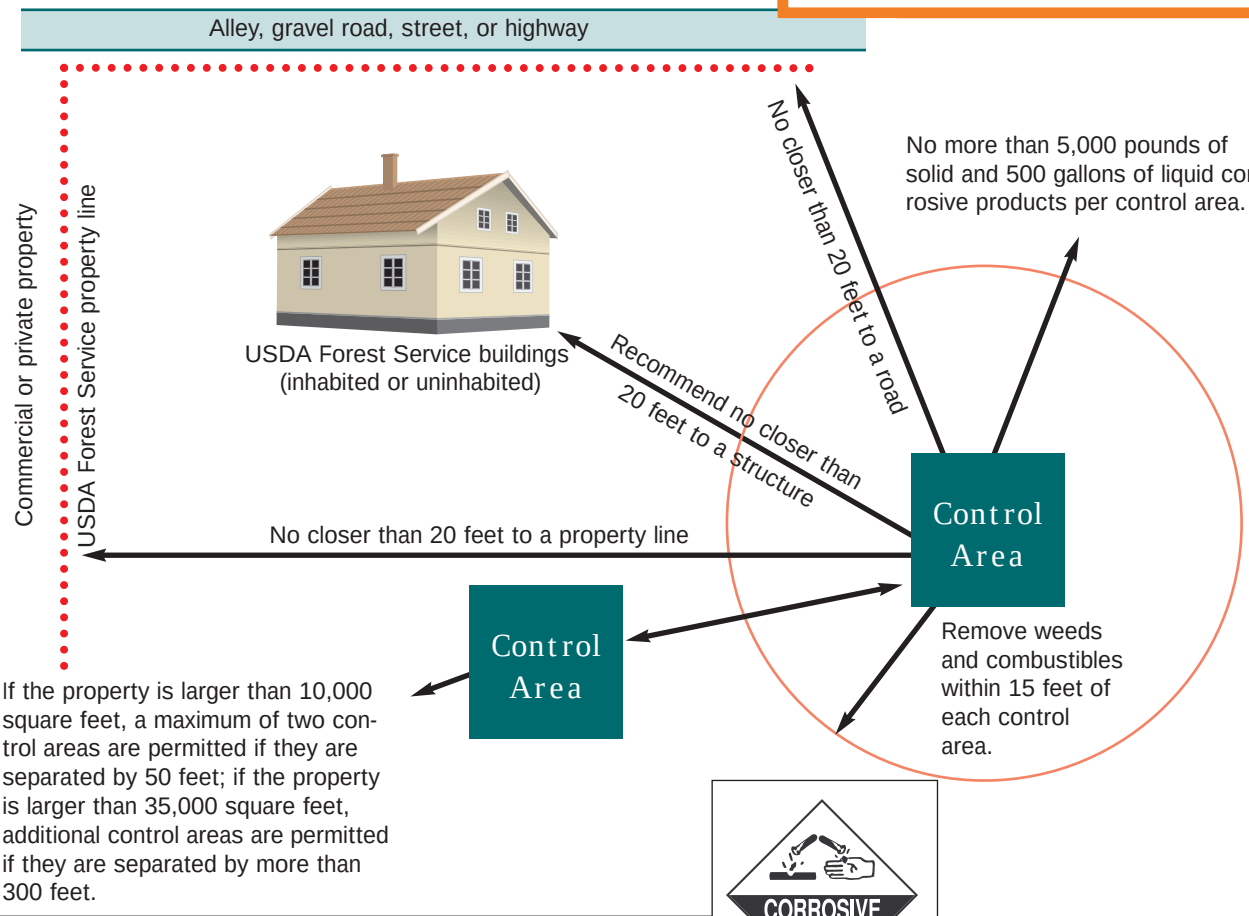
- Control area ventilation is not required, but is recommended.
- Secondary containment is not required, but is recommended; containment material must be compatible with the corrosives.
- All products must have the label for corrosives (see below).
- Each control area must have a *NO SMOKING* sign.
- Each control area must have a hazard identification sign.
- All containers must be sound and tightly closed at all times; if you smell a product in your cabinet or room, either a container is not securely closed or there has been a spill.
- Control areas can be in offices, basements, and garages.





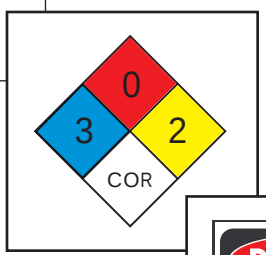
Corrosive products can be stored outside as well as inside, as long as storage does not degrade the quality of the product. You can have up to two control areas, possibly more, but each control area has restrictions. Keep the total corrosive volumes stored below the allowed levels (5,000 pounds of corrosive solids and 500 gallons of corrosive liquids) to avoid more complicated storage requirements.

Outdoor Storage



Other Important Requirements

- Secondary containment is not required, but is recommended.
- All products must have the label for corrosives.
- Each control area must have a *NO SMOKING* sign.
- Each control area must have hazard identification.
- All containers must be sound and tightly closed at all times; if you smell a product in your cabinet or room, either a container is not securely closed or there has been a spill.



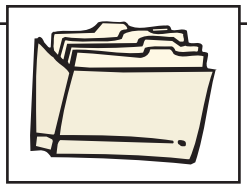
Having more than a minimum quantity of corrosives on USDA Forest Service property may require a permit from your local fire marshal.

Permitting

Permits May Be Required

If you have a *total* of more than 500 pounds of solid corrosives *or* more than 55 gallons of liquid corrosives onsite, in storage, or in use at any one time, regardless of the number of different products, you may need a permit; check with your local fire marshal for more information.

The local fire marshal may not elect to require permits based on quantities of hazardous materials stored; be sure to check with your local fire marshal for specific permitting requirements.



Keep these records in your files.

Regulations restrict the transportation of corrosive products, even on USDA Forest Service property. Check with your local fire marshal and State Department of Transportation (DOT) to see if they may have more restrictive requirements. If you plan to move corrosives by air, refer to the USDA Forest Service *Interagency Aviation Transport of Hazardous Materials*.

Transportation

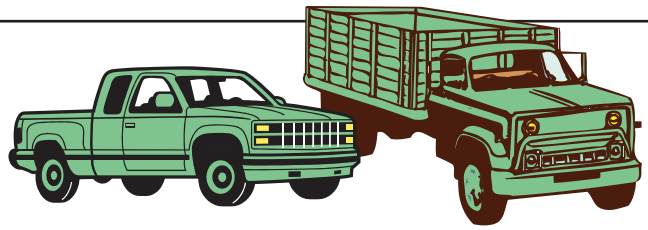
Other Requirements

- No smoking during loading and unloading.
- Keep fire away from the vehicle.
- Prevent the vehicle from moving (set brakes).
- Use tools that will not damage packaging.
- Brace packages to prevent movement.
- Do not ship incompatible materials with corrosives.
- Do not ship nitric acid with other corrosives.
- Have shipping papers in order.
- If the load exceeds 119 gallons or is 1,001 pounds or more, the driver must have a commercial driver's license, hazmat endorsement, medical certificate, and the training required by the DOT.
- Make sure each container is marked with the proper shipping name of the product (as defined by the DOT), identification number for the specific product, and the sender or receiver's name and address. The technical name of the product also may be required.
- All products must have the label for corrosives.

Vehicle Placard

2796

Identification Number (Be sure to select the proper number based on the specific product.)



USDA Forest Service-Operated Pickups and Trucks

- You can avoid placarding and shipping papers by transporting battery acid, muriatic acid, hydrochloric acid, or any combination of these acids in containers that do not weigh more than 66 pounds (including packaging) or hold more than 8 gallons. The total weight of all containers may not exceed 440 pounds. See your hazmat coordinator for details or if you are transporting other acids.
- When batteries are being transported, they should not be carried with other hazardous materials unless they are packaged to prevent them from mixing with or being damaged by these materials. Batteries should be stored in a way that prevents short circuits when they are being transported.
- Regardless of how much hazardous materials are being shipped, the driver *must* be informed of the product types and quantities.
- Remember, to avoid the complexities of shipping papers, placarding, and emergency response training, keep the total weight of *all* hazardous materials *below* 440 pounds.

Examples of Corrosive Products Used in the USDA Forest Service

	UN (United Nations) Identification Number
• Sulfuric acid (battery acid)	2796
• Muriatic acid	1789
• Hydrochloric acid	1789
• Lye or sodium hydroxide solution	1824
• Sodium hypochlorite	1791

Oxidizers

Oxidizers can provide oxygen, allowing other materials to ignite more easily and burn more violently. The classes of oxidizers have specific regulations regarding their storage, use, and disposal. Only NFPA classes I and II are addressed in these guidelines; if you have products in classes III or IV, be sure to check with your unit's hazmat coordinator. Oxidizers in classes III or IV are more dangerous and have additional requirements.

Definitions

Oxidizers—What Are They?

Most USDA Forest Service units have only NFPA class I (for example, ammonium nitrate fertilizers) or class II (for example, potassium permanganate) oxidizers. NFPA class III oxidizers react more violently than those in classes I and II. Class IV oxidizers are explosive and react significantly more violently. Watch for products with chemicals that end in *ite*, *ate*, or *ide*. These endings may indicate oxidizers.

Use the MSDS (page 6) to determine which class of oxidizer you have.

Oxidizers—The Dangers

Oxidizers present a health hazard to workers. Always refer to the MSDS to understand the personal protective equipment needed to handle an oxidizer safely and the actions needed in case of accidents.

See *Hazardous Materials Storage Cabinets* (page 94).

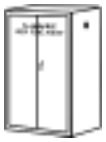
See *Keeping Incompatible Hazardous Materials Separated* (page 100).

See *The Transition to Hazardous Waste* (page 98).

See *Hazardous Product Containers* (page 96).

Storage Cabinets

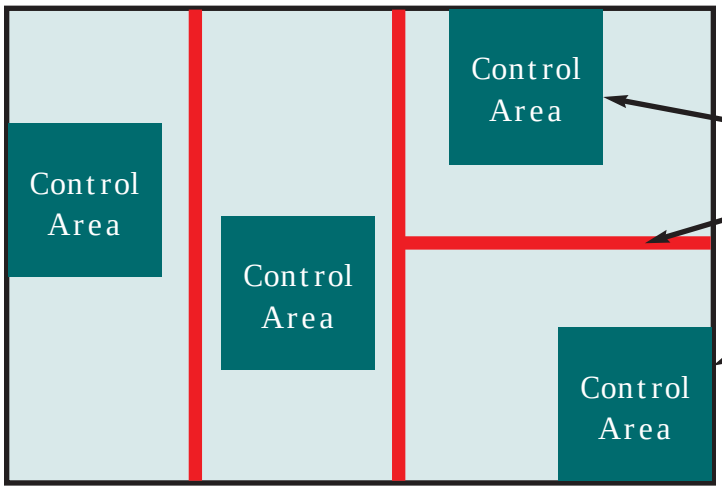
Proper storage cabinets can protect workers and the environment and can allow you to store larger quantities of an oxidizer safely.



See page 94.

Storing class I and II oxidizers inside buildings is acceptable as long as certain precautions are taken; check with your local fire marshal for additional restrictions. We will use the concept of a control area to clarify storage and use restrictions. Control areas are separate areas where oxidizers are stored or used. If you have class III or IV oxidizers, contact your hazmat coordinator for specific guidance.

Indoor Storage



Floor Plan

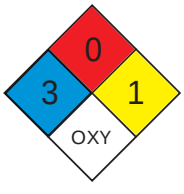
No more than four control areas per structure

Each control area is separated from other areas by a 1-hour firewall.

No more than 4,000 pounds of class I or 250 pounds of class II liquid or solid oxidizers can be stored in a control area. The amount can be increased by 100 percent if proper cabinets are used, and by another 100 percent if the area has sprinklers—not to exceed 300 percent of the original volume with both cabinets and sprinklers.

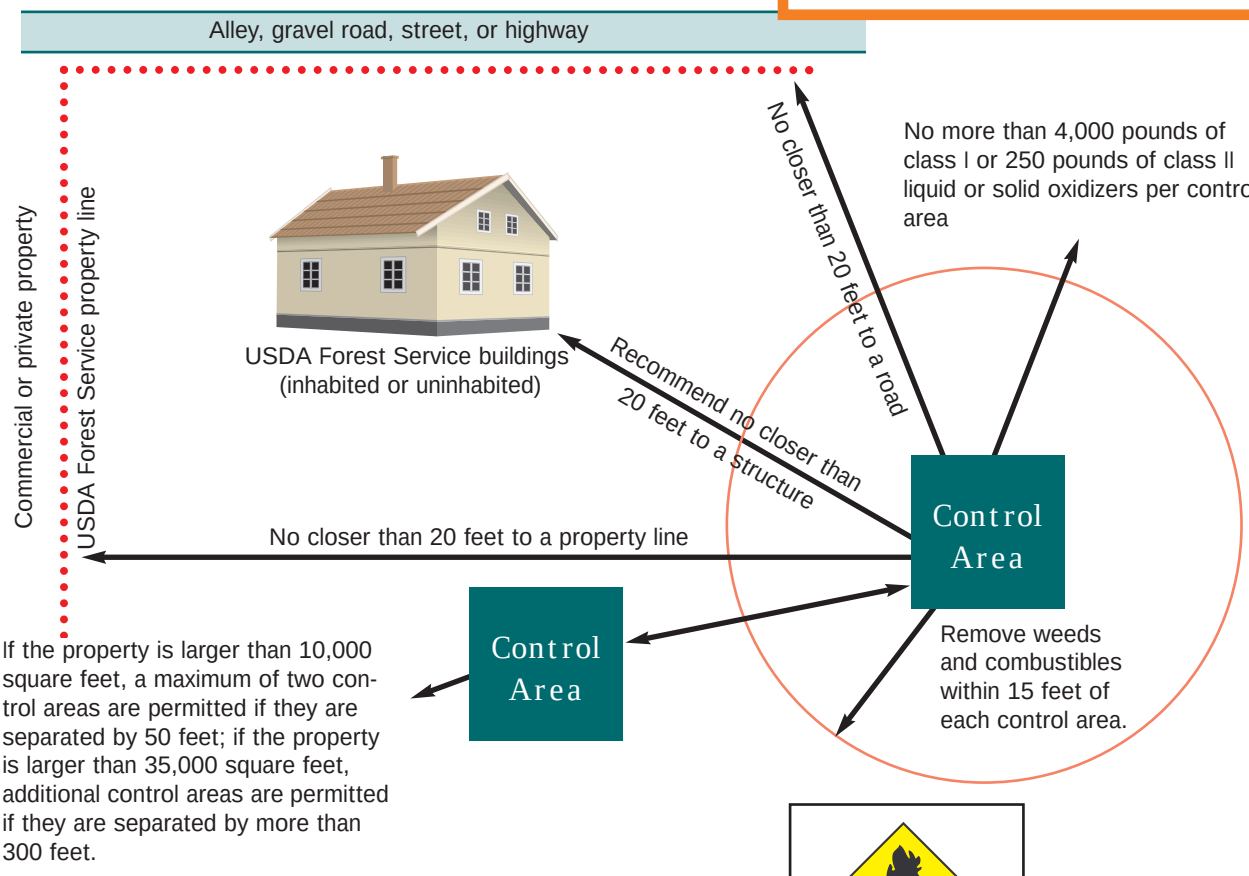
Other Important Requirements

- Control area ventilation is not required, but is recommended.
- Secondary containment is not required, but is recommended.
- Noncombustible shelving and liquid-tight floors are a requirement; you can use wood shelving if the shelving is at least 1 inch thick and coated.
- All products should be labeled with an oxidizer label.
- Each control area must have a *NO SMOKING* sign.
- Each control area must have a hazard identification sign.
- All containers must be sound and tightly closed at all times; if you smell a product in your cabinet or room, either a container is not securely closed or there has been a spill.
- Control areas can be in offices, basements, and garages; storing oxidizers in USDA Forest Service residences is not recommended.
- A maximum of 200 pounds (solid) or 20 gallons of class III oxidizers (for example, calcium hypochlorite) may be stored for maintenance, operations, or sanitation. Storage containers and methods must be approved by the local fire marshal.



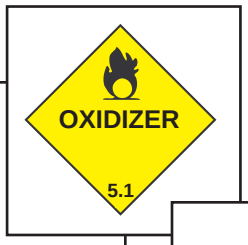
Oxidizers can be stored outside as well as inside, as long as storage does not degrade the quality of the product. You can have up to two control areas, possibly more, but each control area has restrictions. Keeping the total oxidizer volumes stored below the allowed levels (4,000 pounds of class I oxidizers or 250 pounds of class II oxidizers) will avoid more complicated storage requirements.

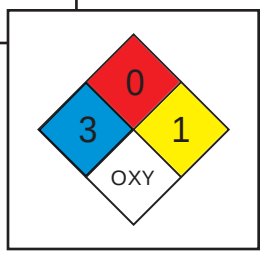
Outdoor Storage



Other Important Requirements

- Secondary containment is not required, but is recommended.
- All products should be labeled with an oxidizer label.
- Each control area must have a *NO SMOKING* sign.
- Each control area must have a hazard identification sign.
- All containers must be sound and tightly closed at all times; if you smell a product in your cabinet or room, either a container is not securely closed or there has been a spill.





Having more than a minimum quantity of oxidizers onsite may require a permit from your local fire marshal.

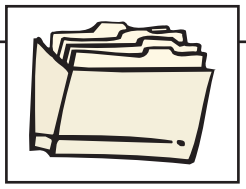
Permitting

Permits May Be Required

If you have in storage, or in use at any one time, a *total* of more than:

- NFPA class I: 55 gallons liquid or 500 pounds solid
- NFPA class II: 10 gallons liquid or 100 pounds solid
- NFPA class III: 1 gallon liquid or 10 pounds solid
- NFPA class IV: Contact your hazmat coordinator

The local fire marshal may not elect to require permits based on quantities of hazardous materials stored; be sure to check with your local fire marshal for specific permitting requirements.



Keep these records in your files.

Regulations restrict the transportation of oxidizers, even on USDA Forest Service property. Check with your local fire marshal and the State Department of Transportation to see if they may have more restrictive requirements. If you plan to move spheres containing potassium permanganate by air, refer to the USDA Forest Service *Interagency Aviation Transport of Hazardous Materials*. These spheres are used as ignition sources in prescribed burning.

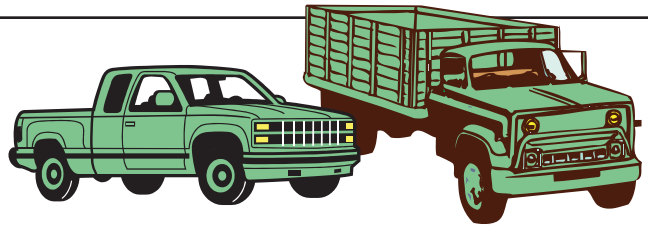
Transportation

Other Requirements

- No smoking during loading and unloading.
- Keep fire away from the vehicle.
- Prevent the vehicle from moving (set brakes).
- Use tools that will not damage packaging.
- Brace packages to prevent movement.
- Do not ship incompatible materials with oxidizers.
- Keep packages dry during shipment.
- Have shipping papers in order.
- If the load exceeds 119 gallons or is 1,001 pounds or more, the driver must have a commercial driver's license, hazmat endorsement, a medical certificate, and the training required by the DOT.
- Make sure each container is marked with the proper shipping name of the product (as defined by the DOT), identification number for the specific product, and the sender or receiver's name and address. The technical name of the product may also be required.
- All products must have an oxidizer label.

Vehicle Placard

Identification Number (Be sure to select the proper number based on the specific product.)



USDA Forest Service-Operated Pickups and Trucks

- You can avoid placarding and shipping papers by transporting ammonium nitrate fertilizer, calcium hypochlorite, potassium permanganate, or any combination of these oxidizers in containers that do not weigh more than 66 pounds (including packaging) or hold more than 8 gallons. The total weight of all containers may not exceed 440 pounds. See your hazmat coordinator for details or if you are transporting other oxidizers.
- Regardless of how much hazardous materials are being shipped, the driver *must* be informed of the types of products and their quantities.
- Remember, to avoid the complexities of shipping papers, placarding, and emergency response training, keep the total weight of *all* hazardous materials *below* 440 pounds.

Examples of Oxidizers Used in the USDA Forest Service

	UN (United Nations) Identification Number
• Ammonium nitrate fertilizer (NFPA Class I)	2071
• Potassium permanganate "Ping-Pong balls" (NFPA Class II)	1490
• Calcium hypochlorite (NFPA Class III)	1748

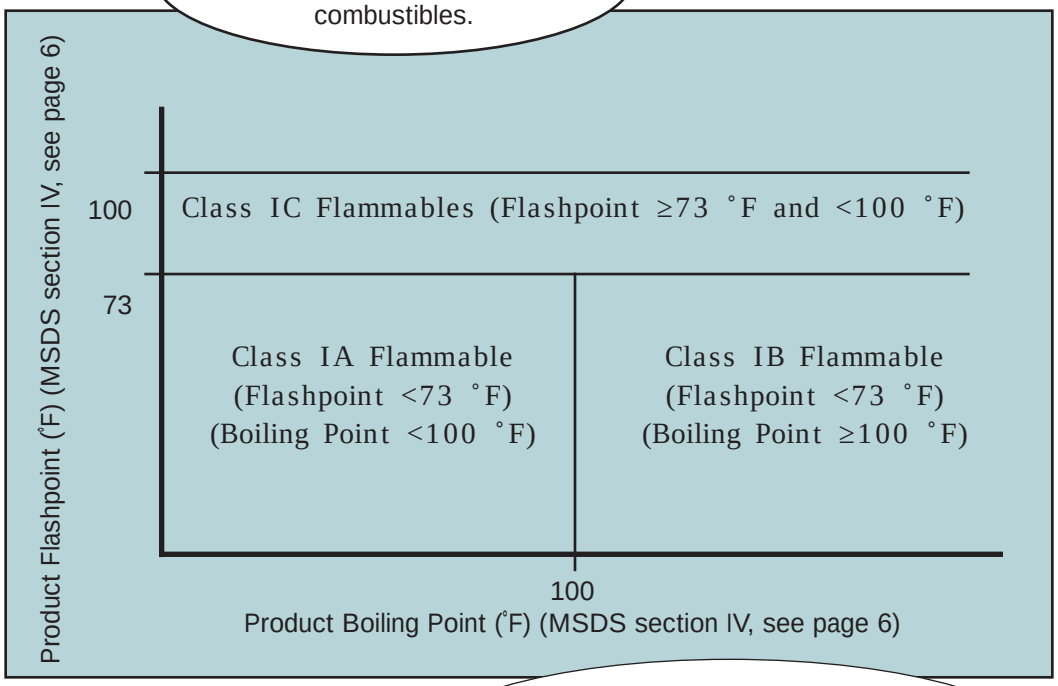
If you have any oxidizers other than those listed above, contact your hazmat coordinator for specific guidance—restrictions and dangers may be significantly greater than for the oxidizers described here.

Flammable Liquids

Flammable liquids and aerosols are very common in the USDA Forest Service. Examples are gasoline, solvents, and janitorial products. The label on the container will say *flammable* or *extremely flammable*; the MSDS will also provide identifying information. Because these products are flammable, they must be labeled, stored, used, and managed according to regulations and USDA Forest Service policy. Any wastes must be considered a hazardous waste.

Definitions

Products with flashpoints equal to or greater than 100 ˚F are combustibles.



See *Keeping Incompatible Hazardous Materials Separated (page 100).*

See *Hazardous Materials Storage Cabinets (page 94).*

See *The Transition to Hazardous Waste (page 98).*

See *Hazardous Product Containers (page 96).*

Storage Cabinets

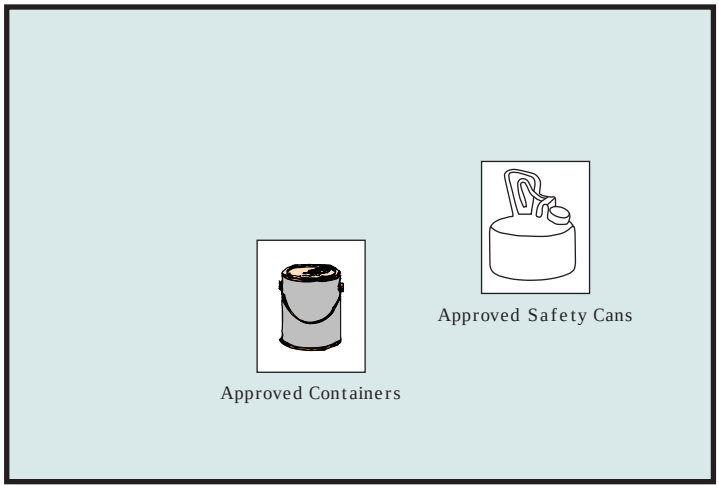
Proper storage cabinets can protect workers and the environment and can allow you to store larger quantities of a flammable liquid safely.

See page 94.

Storage of flammable liquids is strictly regulated for the safety of personnel and facilities. Incidental storage of flammables is permissible as long as the quantity does not exceed the amount allowed, and proper storage containers are used. Permissible quantities differ depending on the occupancy of the structure. Empty containers previously used for flammable liquids must be stored as if they still contain a flammable liquid.

Indoor Storage

Incidental Storage



Floor Plan

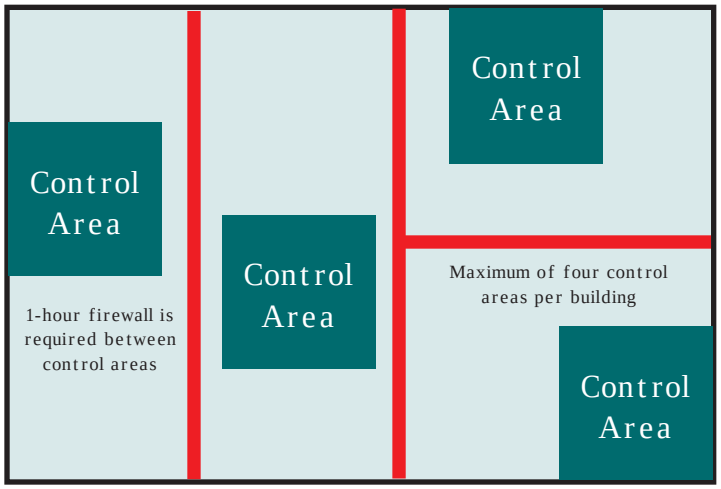
Important Requirements

- No more than 10 gallons of flammable and combustible liquids incidental to the operation and maintenance of equipment, and for demonstration, treatment, and laboratory work, may be stored outside of an approved cabinet.
- Incidental liquids must be stored in approved containers and in a garage or other approved location.
- In offices and educational and institutional facilities, the container size is limited to 1 gallon for class I liquids unless safety cans are used.
- If safety cans are used for incidental class I flammables, the maximum container size is 2 gallons.
- An approved cabinet must be used to store more than 10 gallons of flammable or combustible liquids incidental to the operation and maintenance of equipment and for demonstration, treatment, and laboratory work.

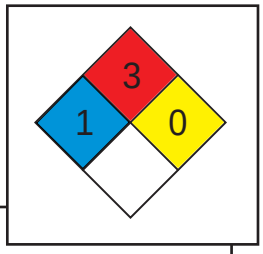
Control areas increase the quantity of flammable liquids you can store. However, there are limits. These quantities can be increased if you use approved cabinets and if the area has sprinklers. Multiple control areas also can be used if they are properly separated. Empty containers previously used for flammable liquids must be stored as if they still contained a flammable liquid.

Indoor Storage

Control Areas



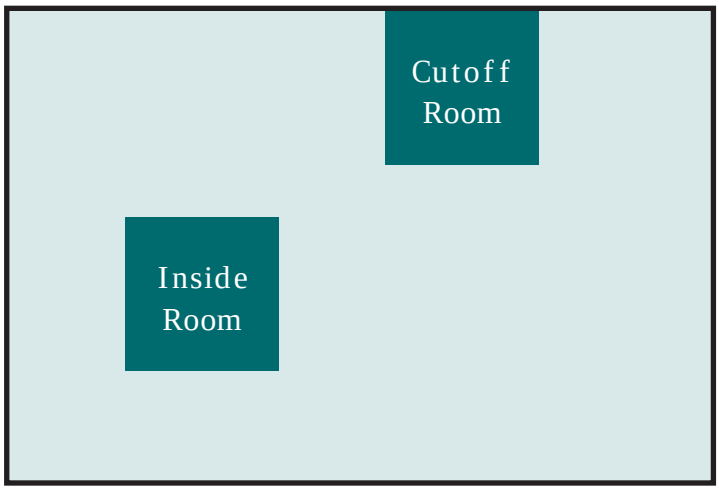
Floor Plan



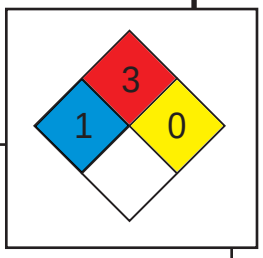
Important Requirements

- Class I liquids may not be stored in basements; avoid storing flammables in basements.
- Containers with a capacity of less than 30 gallons may not be stacked more than two containers or 3 feet high, unless they are on shelving or are otherwise secured.
- Containers with a capacity greater than 30 gallons may not be stacked.
- Containers must be stored in an upright position.
- Combustible commodities must not be stored above flammable and combustible liquids.
- Flammable liquids must be a minimum of 3 feet from beams, girders, or other obstructions.
- Flammable liquids must be a minimum of 3 feet below sprinkler deflectors, discharge orifices, or other overhead fire protection systems.
- Flammable liquids must not be stored in the same rack or group as combustible materials.
- The maximum amount of flammable liquids that can be stored in a control area is: 30 gallons of class IA, 60 gallons of class IB, and 90 gallons of class IC—or 120 gallons of any combination, as long as the limits for any given class are not exceeded.
- Amounts can be increased by 100 percent if proper cabinets are used, and by another 100 percent if the area has sprinklers—not to exceed 300 percent of the original volume with both cabinets and sprinklers.
- Spill control and secondary containment are required if any individual container has a capacity of more than 55 gallons or if the total capacity of all containers exceeds 1,000 gallons.

For larger quantities of flammable and combustible liquids, you can use cutoff and inside rooms. A room with an outside wall is a cutoff room, and a room with no outside walls is an inside room. Empty containers previously used for flammable liquids must be stored as if they still contained a flammable liquid.



Floor Plan

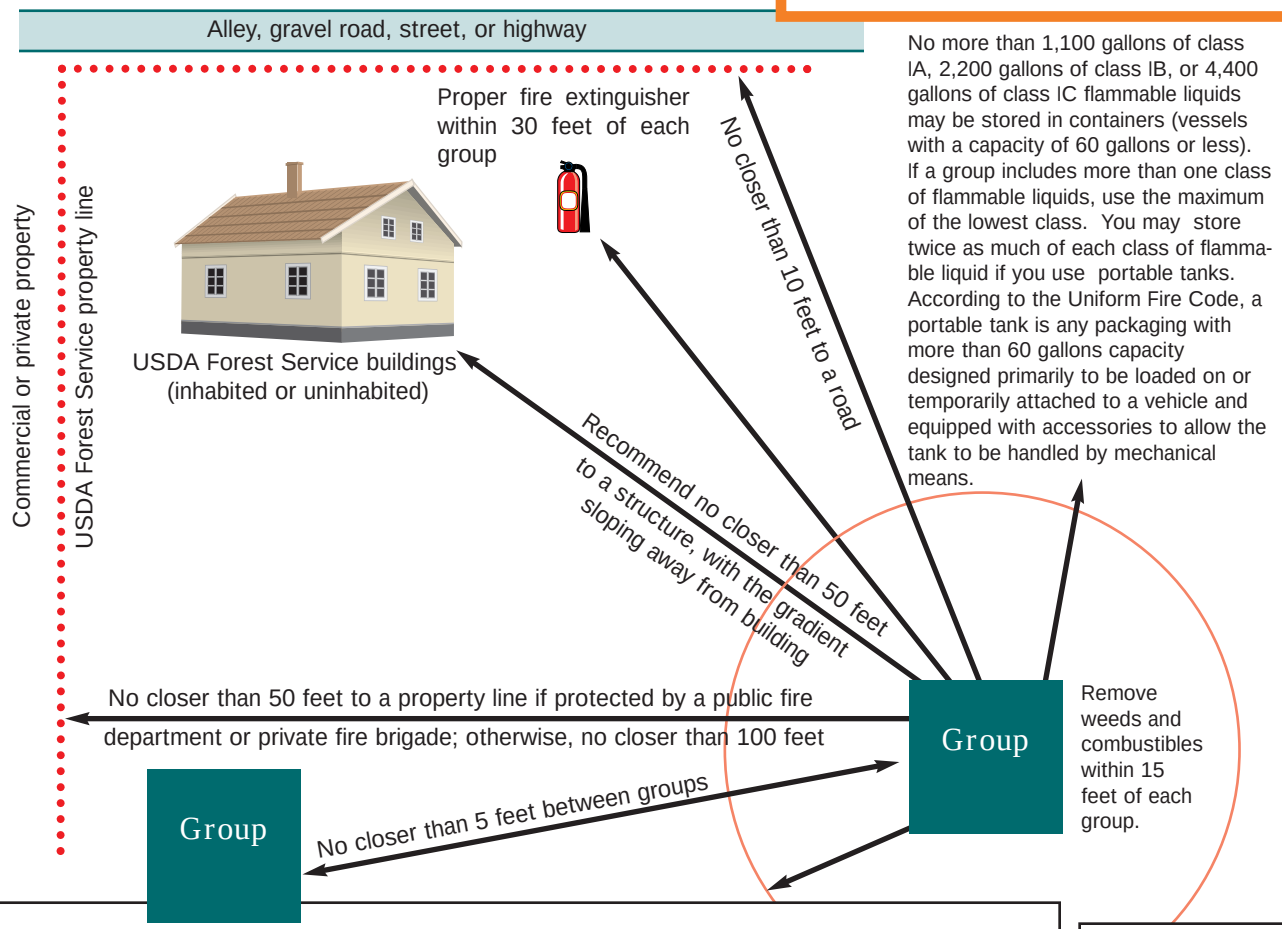


Important Requirements

- Cutoff and inside rooms can be used if more class I, II, and III liquids need to be stored than can be stored as incidentals or within control areas within a building.
- The quantities of class I, II, and III liquids that can be stored in cutoff and inside rooms depend on the size of the building and its structural features.
- Check with your hazmat coordinator for specific structural requirements and safety features before designating an existing room for liquid storage or before constructing a new storage room.
- Spill control and secondary containment are required if any individual container has more than a 55-gallon capacity or if the total capacity of all containers exceeds 1,000 gallons.

USDA Forest Service policy and Federal regulations also determine how to store flammable liquids outside buildings. The primary considerations are the amount of flammable liquids being stored and how close the materials are to structures, property lines, and roads. Empty containers previously used for flammable liquids must be stored as if they still contain a flammable liquid.

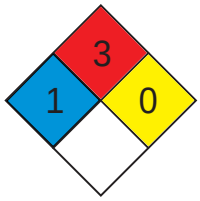
Outdoor Storage



No more than 1,100 gallons of class IA, 2,200 gallons of class IB, or 4,400 gallons of class IC flammable liquids may be stored in containers (vessels with a capacity of 60 gallons or less). If a group includes more than one class of flammable liquids, use the maximum of the lowest class. You may store twice as much of each class of flammable liquid if you use portable tanks. According to the Uniform Fire Code, a portable tank is any packaging with more than 60 gallons capacity designed primarily to be loaded on or temporarily attached to a vehicle and equipped with accessories to allow the tank to be handled by mechanical means.

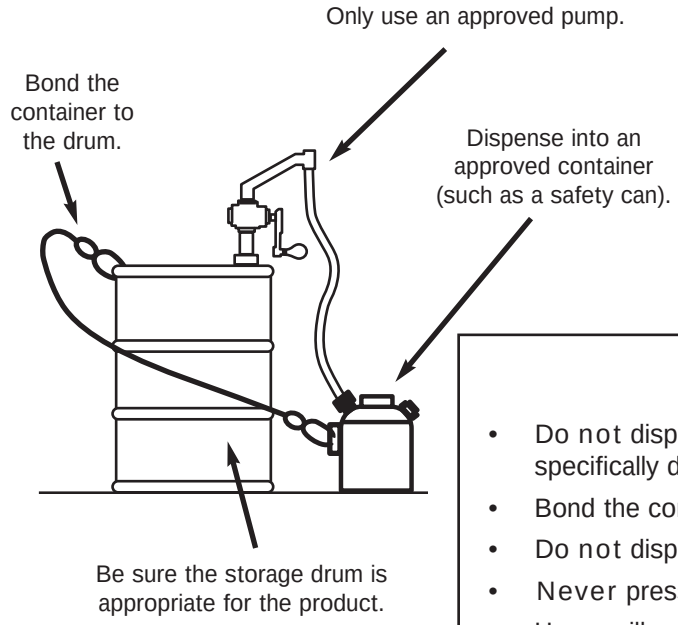
Other Important Requirements

- Spill control and secondary containment are required if any individual container has more than a 55-gallon capacity, or if the total capacity of all containers exceeds 1,000 gallons.
- All drums and portable tanks *must* be properly labeled.
- Each storage area must have a *NO SMOKING* sign.
- All containers must be sound and tightly closed at all times.
- Drums must be protected from the weather.
- Each group must be protected from tampering; use guard posts to prevent stored materials from being damaged by vehicles.
- If a canopy or roof is used, the walls and supports must not restrict more than 25 percent of the perimeter of the storage area, or the configuration must be considered an inside storage area. The canopy and roof must be constructed of noncombustible materials.
- Access must be available for firefighting equipment to reach each group.



Dispensing class IA, IB, and IC flammable liquids can be dangerous, especially in enclosed areas. Follow the regulatory restrictions on dispensing all flammable products and check with your local fire marshal to see whether your area may have more restrictive requirements.

Dispensing



Other Important Requirements

- Do not dispense flammable liquids inside a building unless the building is specifically designed for indoor dispensing.
- Bond the container to the drum before dispensing.
- Do not dispense fuels into a container in a plastic-lined truck bed.
- Never pressurize the drum to aid in dispensing flammable liquids.
- Have spill containment and cleanup materials readily available.
- Have the MSDS on hand.
- Use personal protective equipment as specified by the MSDS.
- Use secondary containment for drums when dispensing.
- Do not dispense flammable liquids within 25 feet of any ignition source.
- Do not dispense flammable liquids near open flames or *hot* work.
- Post *NO SMOKING* signs in areas where you are dispensing flammable liquids.
- Do not dispense flammable liquids within 25 feet of building openings, property lines, alleys, or public ways.
- All but class IA liquids can be gravity dispensed through a self-closing or automatic-closing valve.
- Spill control and secondary containment are required if:
  - Flammable liquid is dispensed into a container exceeding 1.1 gallons.
  - Any container exceeds 55 gallons.
  - The total capacity of all containers inside a building exceeds 100 gallons.
  - The capacity of all containers outdoors exceeds 5.3 gallons.

Requirements for flammable liquids depend on the amount of liquids being transported. The requirements include placarding, the type of vehicle that can be used, and the types of roads that can be traveled. Transportation by aircraft must be coordinated with the aircraft's owners/operators. If you plan to move flammable liquids by air, refer to the USDA Forest Service *Interagency Aviation Transport of Hazardous Materials*.

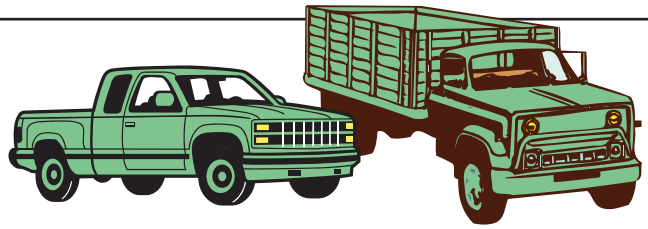
Transportation

Other Requirements

- No smoking during loading and unloading.
- Keep fire away from the vehicle.
- Prevent the vehicle from moving (set brakes).
- Use tools that will not damage packaging.
- Brace packages to prevent them from moving.
- Keep packages dry during shipment.
- Have shipping papers in order.
- If the load exceeds 119 gallons or is 1,001 pounds or more, the driver must have a commercial driver's license, hazmat endorsement, a medical certificate, and the training required by the DOT.
- Make sure each container is marked with the proper name, shipping name, and identification number.

Vehicle Placard

Identification Number
(Be sure to select the proper number based on the specific product.)



USDA Forest Service-Operated Pickups and Trucks

- You can avoid placarding and shipping papers by transporting gasoline in containers that do not weigh more than 66 pounds (including packaging) or hold more than 8 gallons. The total weight of all containers may not exceed 440 pounds. See your hazmat coordinator for details or if you are transporting other flammable liquids.
- Regardless of how much hazardous materials are being shipped, the driver *must* be informed of the types of products and their quantities.
- Remember, to avoid the complexities of shipping papers, placarding, and emergency response training, keep the total weight of *all* hazardous materials *below* 440 pounds, and the weight of each compressed gas cylinder *below* 220 pounds.
- Do not transport materials that are incompatible with each other.
- Fuel may be carried in the tanks of powered equipment such as ATVs, snowmobiles, and chain saws. All powered equipment must be carried outside the passenger compartment.