

# BULLETIN

Risk Control

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March 2009

## Flammable Liquid Handling And Storage

### Flammable Liquid Handling And Storage

One of the major risks in an industrial setting is the potential for fire and explosion by the mishandling and improper storage of flammable materials; usually liquids, but may also include flammable dusts, such as flour, grain, carbon, and sawdust. The focus of this article is liquids, and mainly the use of small containers, under five-gallons.

The degree of danger in handling a flammable or combustible liquid is determined mainly by its flash point; but also the amount of vapors in the air (within the flammable range), and the temperature of the ignition source, enough to cause ignition.

#### Flash Point

As defined by OSHA, DOT, and (National Fire Protection Association Standard) NFPA 30, a flammable liquid is any liquid



having a flash point (closed cup) below 100 degrees Fahrenheit (F), and a vapor pressure below 40-pounds per square inch (psi). Liquids with flash points above 100 degrees F are considered combustible. Gasoline for example, gives off enough vapors to burn at (minus) -50 degrees F. As a comparison, kerosene and No. 1 fuel oil have flash points above 110 degrees F. and at room temperature, would not normally give off enough vapors to burn, unless heated.

#### Vapors

Vapor density is also of concern, whether the liquid will evaporate and dissipate or accumulate, and even travel along the ground like gasoline to an ignition source. Check the MSDS for vapor density and evaporative rate. The vapor density of gasoline is 3 - 4, much heavier than air.

In buildings where an accumulation of flammable vapors may occur, proper classified (explosion proof) electrical devices should be utilized. This can be detected by the use of a flammable gas meter, such as those used for confined space entry. Proper classifications can be found in CFR, Title 8, Section 5530.

#### Container Filling or Transfer

Sparks from static electricity can occur when mixing, pouring, or pumping from one vessel to another. It can also occur from a build-up of static electricity between personnel and a grounded object. This is especially hazardous in an atmosphere filled with flammable vapors.

#### Bonding and Grounding

Although the terms are often used interchangeably there is a difference between them. Bonding occurs between objects to equalize the static charge. This can be done by actual contact of two conductive containers, attachment of a conductor such as a bonding wire, or metal transfer pipeline.

Grounding occurs by attaching a charged object to the earth by a grounding strap or wire to dissipate the charge to the earth. It is best to have both bonding and grounding occur to prevent accidental ignition.

When filling a gas can, it should be placed on the ground, not in a pickup truck bed. Because of the insulation factor of the tires a static charge can build-up on the container when filling.

#### Storage

A maximum of 25-gallons of gasoline can be stored indoors outside of a flammable liquids cabinet. They need to be stored in leak tight, approved, and properly labeled containers, under five-gallons each. Maximum volumes will vary for other liquids, but can be found in CFR Title 8, Section 1930.

Procedures and specification for larger containers such as drums and tanks can be found in CFR Title 8, Subchapter 7, Group 20; NFPA 30, and NFPA Fire Protection Handbook.

### Gas (Safety) Cans

The basic purpose of a safety can is to control flammable vapors; while providing a safe and convenient means of carrying, dispensing, and storing of liquids. These may not necessarily be the same cans you would purchase at your local department store.



### Safety Cans:

- ✦ May be a maximum of five-gallons each;
- ✦ Plastic (heavy) or metal construction;
- ✦ Spring, self-closing spout, and flame arrester;
- ✦ Automatically vent vapor (between 3 and 5 psi.) to prevent rupture (or explosion in event of fire);
- ✦ Type 1 cans have one spout;
- ✦ Type 2 cans have one spout and a fill opening;
- ✦ Need to meet OSHA and NFPA specifications, and be UL, (or FM) approved. DOT approved cans are required when transporting flammable liquids (gasoline) on public roads; and
- ✦ DOT cans have a frame around the top to protect the devices on the top.

### Summary

- ✦ Use only approved containers. Many of the containers seen at worksites are normal household variety, and do not meet OSHA, NFPA, and/or DOT specifications. Look for those approvals when purchasing. These can be expensive but not necessarily so. Shop around.
- ✦ Keep no more than 25-gallons of gas inside of a building, in approved leak tight containers, unless inside of an approved flammable liquids cabinet. Always comply with the maximum capacity of the flammable liquid cabinet, rated for its size, and type of liquid.

- ✦ Keep containers bonded and grounded when filling or transferring. Keep safety cans on the ground when filling not on a vehicle.
- ✦ Do not allow flammable vapors to accumulate. Fill and store containers in a well ventilated area, 25-feet away from ignition sources, including smoking.
- ✦ Keep fire extinguishers nearby.

### **Sources:**

Justrite Guide-Red Book [www.justritemfg.com](http://www.justritemfg.com)  
NFPA 30, Section 9-3 and 9-4  
CFR Title 8, Section 1930; and Subchapter 7, Group 20.  
NFPA Fire Protection Guide.

## Lewellyn Technology Seminar

Lewellyn Technology provides NFPA 70E seminars to improve workplace safety and performance.

Lewellyn Technology is hosting FREE "Understanding NFPA 70E and Arc Flash Hazards" seminars in California in 2009.



Topics to be covered include conducting an Arc Flash Analysis, and answering questions concerning 70E compliance. These events are for decision makers and are by invitation only, so please, serious inquiries only. Visit their website for seminar locations and dates.

Please register to attend by going online at: [www.lewellyn.com/schedule.html](http://www.lewellyn.com/schedule.html). (Limit three registrations per company)

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