



Standard/Safe Operating Procedures Dispensing Flammable Liquids

Revision Date: February 9, 2022

Introduction

Flammable liquids are used in the laboratory in a wide variety of ways, principally as a solvent or reaction vehicle. The greatest hazard, working with flammable (and combustible) liquids is fire. Flammable liquids are defined by their flash point – the temperature at which the liquid gives off enough vapor to ignite. The lower the flash point – the greater the risk of ignition and fire. This SOP applies to the dispensing of Class 1 and Class 2 flammable liquids.

- Note: NFPA 77-1993, "Containers of glass or other non-conductive materials of five gallons or less capacity are usually filled without special precautions.
- Static electrical charge can be generated when two dissimilar materials pass quickly by one another (i.e., liquids flowing through pipes, tubing, even air).
- Failure to follow these procedures for flammable liquid transfer may present an increased fire hazard due to static electricity.

1. Dispensing from 4L Glass Bottles

1. Users will use the gravity method to pour flammable liquids from 4 L (or 1 gallon) glass containers into another glass container
2. Since organic solvents and other flammable liquids can pose a health hazard to the handler, dispensing of these chemicals should be done in chemical fume hoods or in a ventilated solvent room.
3. A funnel, secondary containment and/or other spill control supplies must be used.

2. Dispensing from 20 L Metal Drums – Gravity Method

1. Users may use the gravity method to pour flammable liquids from the 20 L or 5 gal drums into glass containers.
2. The transfer of flammable liquids from 20 L/5 gal drums must be done in a ventilated space, solvent room, or outside due to the inherent health hazard and potential build-up of flammable vapors.
 - Transfer from these large drums should not be performed in the laboratory unless it is equipped with a ventilated space large enough to safely do this.
 - Do not try to do this in a standard fume hood. Hoods are generally not large enough and lifting a heavy 20 L drum can cause injury and increase the likelihood of a spill.
3. Personnel should wear non-synthetic clothing. A fire-retardant lab coat (the blue ones) must be used if in the presence of an open flame or ignition source.
4. A funnel, secondary containment and/or other spill control supplies must be used



Standard/Safe Operating Procedures

Dispensing Flammable Liquids

Revision Date: February 9, 2022

3. Dispensing from Metal Cans to Another Metal Container

It is strongly recommended to transfer flammable and combustible chemicals from glass containers to glassware or from glass container/glassware to plastic not from metal to metal.

- If transferring flammable liquids between metal containers is necessary, then this may only be done in the solvent storage room or other space with bonding and grounding wires in place.
 - Ground and bonding must be used whether using the gravity method or the pump method of transferring flammable liquids from one metal container to another.
1. Ensure that the containers are bonded together and connected to a common ground.
 2. A funnel, secondary containment and/or other spill control supplies must be used.

4. Dispensing from 20 L Metal Drums – Pump Method

1. Users may use a pump to pour flammable liquids from the 20 L or 5 gal drums into glass containers or metal containers.
2. Only hand pumps may be used. Powered pumps require EH&S approval.
3. Only UL 353 listed pumping systems and/or that meet NFPA 77 (Recommended Practice on Static Electricity) may be used.
 - Use an approved metallic suction pump and draw tube.
 - The pump must be electrically grounded when in use.
 - The use of plastic hand pumps must be pre-approved by EH&S.
4. The transfer of flammable liquids from 20 L/5 gal drums must be done in a ventilated space, solvent room, or outside due to the inherent health hazard and potential build-up of flammable vapors.
 - Transfer from these large drums should not be performed in the laboratory unless it is equipped with a ventilated space large enough to safely do this.
 - Do not try to do this in a standard fume hood. Fume hoods are generally not large enough and lifting a heavy 20 L drum can cause injury and increase the likelihood of a spill.
5. Personnel should wear non-synthetic clothing. A fire-retardant lab coat (the blue one) must be used if in the presence of an open flame or ignition source.
6. A funnel, secondary containment and/or other spill control supplies must be used.



Standard/Safe Operating Procedures Dispensing Flammable Liquids

Revision Date: February 9, 2022

Addendum



Example of unit currently used

Roll over image to zoom in



Groz 44133 Steel Safety Pump for use with 5 Gallon pails

[Visit the Groz Store](#)

\$98⁴²

✓prime
& FREE Returns

May be available at a lower price from other sellers, potentially without free Prime shipping.

Size:
5-Gallon Pails

- Steel Construction
- For use with Combustible & Flammable Media
- Built-In Internal Flame Arrestor prevents flame flashback
- Heavy Duty bonding & grounding wires prevent hazardous static charge
- Suitable for 5 Gal Pails

NFPA 77 2019

11.1.3.6 Where liquid is dispensed from a metal container, the container should be grounded.

11.1.3.7 Self-closing metal dispensing valves should be used

11.1.3.7 Where liquid is dispensed from an upright drum, the dip pipe, conductive hose, and pump should be bonded to the drum and grounded

11.1.8.2 Plastic or glass funnels should be used only where essential for compatibility reasons

Class 1A

- Petroleum ether may come in 4 L glass bottles or smaller.
- Ethyl ether is not allowed in containers larger than 2 L. The containers are typically metal. The contents are dispensed into glass or chemical-resistant plastic containers via the gravity method.

11.1.7 Hand-Held Containers Up to 20 L Capacity. The fire risk from static electricity increases with the volume of the container and the volatility of the liquid handled. Thus, the smallest-volume container capable of effectively fulfilling a particular need should normally be selected and should not exceed 20 L.

11.1.7.1 Listed safety cans should be used, especially those types equipped with a flexible metal dispensing nozzle so they can be used without a funnel.

11.1.7.2 Because nonconductive containers cannot be grounded, they should be limited to 2 L for Class IA liquids and 5 L for Class IB and Class IC liquids. An exception is gasoline, for which approved 20 L plastic cans have been widely used for many years with no reported increase in ignition incidents due to static electricity compared with metal cans. That record is due in part to the rapid establishment of rich (above the UFL) gasoline vapor inside the can.

11.1.7.3 The plastic containers specified in 11.1.7.2 should not be used for other flammable liquids without review of the hazards. Unlike gasoline, conductive liquids such as alcohols can become inductively charged by a charged plastic container and give rise to sparks. In addition, the container can contain an ignitable atmosphere.

11.1.8 Nonconductive Containers. Subject to the volume limitations described in 11.1.7, it is common to handle flammable liquids in small glass or plastic containers of 0.5 L capacity or less.