

## Bonding, Grounding, and Pressure Relief of Flammable Liquid Containers

### Introduction

This bulletin provides general guidelines for bonding, grounding and venting of flammable liquid storage drums. Specific requirements may vary by geographic location and, therefore, state and municipal codes should be consulted.

### Static Electricity:

Static electricity is generated when liquids move in contact with other materials. This occurs commonly in such operations as flow-through pipes, and in mixing, pouring, pumping, filtering, or agitating. Under certain conditions, particularly with liquid hydrocarbons and high-velocity flow, static electricity may accumulate. If the accumulation is sufficient, a spark may occur. The occurrence of a spark in the presence of a flammable vapor-air mixture may result in ignition. Therefore, steps must be taken to prevent this from occurring. Although the removal of the vapor-air mixture will eliminate the possibility of ignition, this technical bulletin assumes that the mixture is present and, therefore, only addresses the prevention of sparks through proper grounding.

### Key Terms

**Bonding** – The process of connecting two or more conductive objects together by means of a conductor. The purpose of bonding is to minimize the potential difference between two conductive objects.

**Grounding** – The process of connecting one or more conductive objects to the ground. Grounding is a specific form of bonding which minimizes the potential differences between objects and the ground.

### Grounding Guidelines

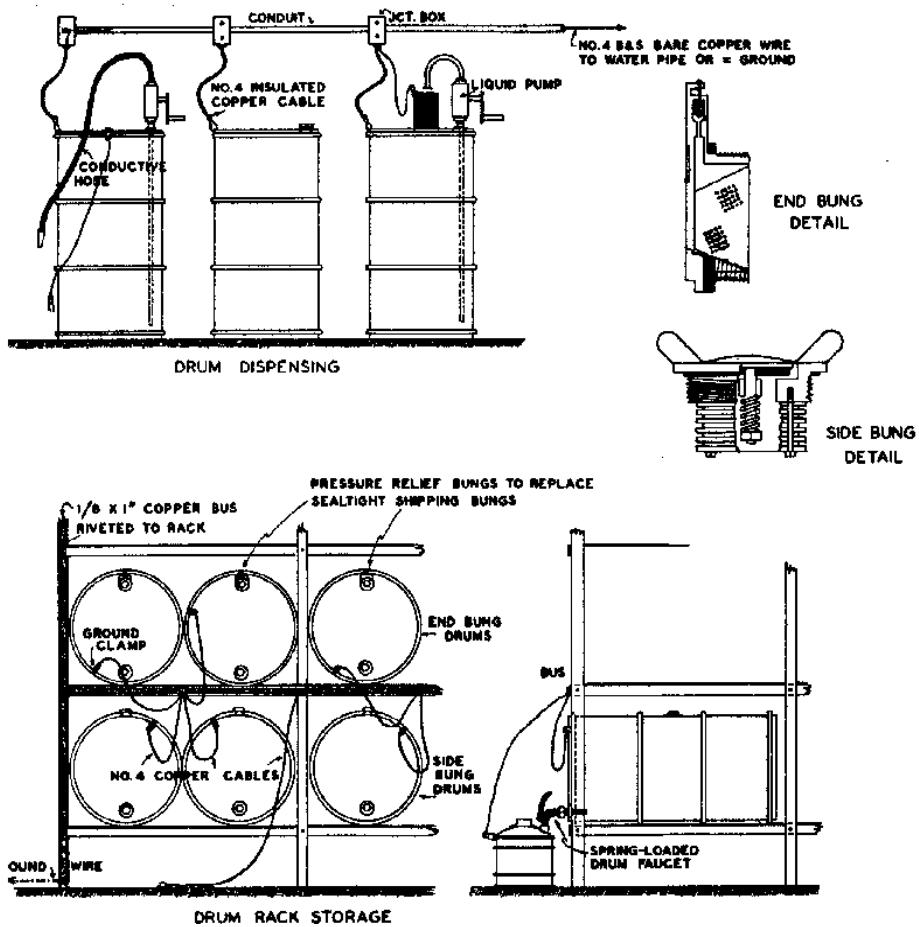
In filling metal cans from drums, the best means for preventing a spark is by connecting a bonding wire between the grounded drum and the can. Although small wires or small strips make satisfactory bonding and grounding connections from an electrical standpoint, copper wire as large as #6 or #4 AWG is advised because of its mechanical strength.

The following sketch shows a preferred grounding arrangement for both drum dispensing and drum rack storage. On the drum dispensing arrangement, each drum is grounded through a common wire and a bonding wire is available for attachment to a can. On the rack storage arrangement, each drum is bonded to the rack and the rack is grounded. There is also a free bonding wire available for attachment to a can.

Products and services are provided by one or more insurance company subsidiaries of W. R. Berkley Corporation. Not all products and services are available in every jurisdiction. Certain coverages may be provided through surplus lines insurance company subsidiaries of W. R. Berkley Corporation through licensed surplus lines brokers. Surplus lines insurers do not generally participate in state guaranty funds and insureds are therefore not protected by such funds. Berkley Life Sciences conducts business in California as Berkley LS Insurance Solutions, LLC, a licensed surplus lines broker (License Number 0H44165).

This material is provided to you for general informational purposes only. Coverage afforded under any insurance policy issued is subject to the individual terms and conditions of that policy as issued. Claims scenarios are hypothetical in nature and for illustrative purposes.

Maintaining safe operations and a safe facility in accordance with all laws is your responsibility. We make no representation or warranty, express or implied, that our activities or advice will place you in compliance with the law; that your premises or operations are safe; or that the information provided is complete, free from errors or timely. We are not liable for any direct, indirect, special, incidental or consequential damages resulting from the use or misuse of this information. You are not entitled to rely upon this information or any loss control activities provided by us and you may not delegate any of your legal responsibilities to us. All loss control activities are conducted solely for the purpose of, and in accordance with, our underwriting activities.



Data Source: NFPA Std. No. 30, "Flammable and Combustible Liquids Code".

## Drum Venting and Pressure Relief

Drums of flammable liquids require venting to relieve pressure buildup due to heat and also to prevent creation of vacuum during draining or sudden cooling. Every drum should be equipped with a combined pressure and vacuum relief valve, installed in the drum bung opening. Two types of drum vents are available: automatic pressure relief and manual vacuum relief, and automatic relief of both pressure and vacuum.

## References

For more information on this subject, the following references should be consulted:  
NFPA - 77, Recommended Practice on Static Electricity, latest edition. NFPA  
- 30, Flammable and Combustible Liquids Code, latest edition. Justrite  
Manufacturing Co. - How to Handle Flammable Liquids Safety, 1985.

Products and services are provided by one or more insurance company subsidiaries of W. R. Berkley Corporation. Not all products and services are available in every jurisdiction. Certain coverages may be provided through surplus lines insurance company subsidiaries of W. R. Berkley Corporation through licensed surplus lines brokers. Surplus lines insurers do not generally participate in state guaranty funds and insureds are therefore not protected by such funds. Berkley Life Sciences conducts business in California as Berkley LS Insurance Solutions, LLC, a licensed surplus lines broker (License Number 0H44165).

This material is provided to you for general informational purposes only. Coverage afforded under any insurance policy issued is subject to the individual terms and conditions of that policy as issued. Claims scenarios are hypothetical in nature and for illustrative purposes.

Maintaining safe operations and a safe facility in accordance with all laws is your responsibility. We make no representation or warranty, express or implied, that our activities or advice will place you in compliance with the law; that your premises or operations are safe; or that the information provided is complete, free from errors or timely. We are not liable for any direct, indirect, special, incidental or consequential damages resulting from the use or misuse of this information. You are not entitled to rely upon this information or any loss control activities provided by us and you may not delegate any of your legal responsibilities to us. All loss control activities are conducted solely for the purpose of, and in accordance with, our underwriting activities.