Master Brewers Safety Toolbox Talk

Flammable Liquids

What is a Flammable Liquid?

Most of us, when asked this question, think of gasoline. But let's take a closer look. If we look at our brewery, where might we have flammable liquids?

First, lets define what a flammable liquid is. There are two main governing agencies that define flammable liquids for us – the Occupational Safety and Health Administration (OSHA) and the National Fire Protection Association (NFPA).

OSHA defines a flammable liquid as any liquid having a flash point at or below 199.4°F and further defines 4 categories of flammable liquids. The NFPA defines a flammable liquid as any liquid having a flash point <100°F. Yes, this is confusing, so for the purposes of this toolbox talk, we are going to concentrate on liquids with flash points <140°F, which both agencies agree, can pose a fire hazard in the workplace.

The first step is to determine what flammable liquids you have in your brewery. More common flammables may be spray paints or finishes, solvents, oil-based paints, some lubricants, etc. Typically these liquids in smaller containers will be an OSHA flammable liquid and must display the "Flame" pictogram with "DANGER" signal word.

These items, when not in use, should be stored in an **approved** flammable storage cabinet such as the type below.

OSHA limits the storage of liquids with flash points < 140°F to not more than 60 gallons per cabinet. There are also limits to the number of cabinets stored in an area. location

An often, overlooked area concerning flammables are flavorings used for a variety of new products such as seltzers, ciders, FMB's (flavored malt beverages), etc. When the Safety Data Sheet is reviewed, flash points on the raw flavorings can be quite low and definitely less than 140°F. That is typically due to the flavoring being mixed with ethanol. Flammable **food products** should not be stored with flammable **non-food** products.

Often these materials are received in larger quantities such as 55-gallon drums, or intermediate bulk containers (IBC's), 275 gallons or greater.

When dispensing flammables from drums or totes, certain considerations should be maintained regarding the electrical classification of transfer equipment, transfer hoses, secondary containers, grounding and cross-bonding.

Over pressure relief vents on these containers can also emit flammable vapors, so control of ignition sources is a must.

Containers

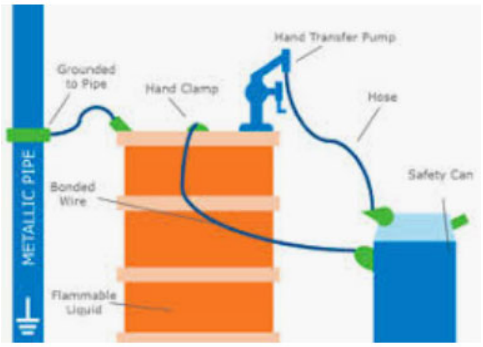
Whenever possible, you should specify that the flammable materials are received in conductive or anti-static containers. Metal drums or containers, or IBC's made of metal, or plastic with anti-static properties.

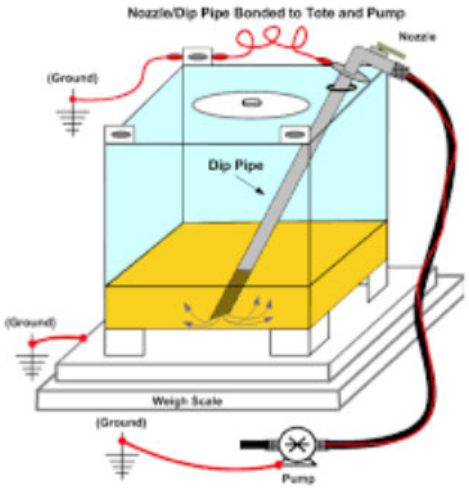
This will allow containers to be grounded to a building ground and cross-bonded to the secondary containers or vessel.

Smaller containers, 5 gallons or less should also be conductive if possible. If the container is non-conductive the spout and dip tube should be conductive to facilitate grounding/ cross-bonding and have self-closing lid or spigot and flash arrestor.

Grounding and Cross-bonding

Whenever dispensing a flammable liquid, the containers should be grounded and cross-bonded.





All items, containers, pump, transfer line must be cross-bonded to ensure continuity and grounded back to a facility ground. This will ensure that static electricity has a pathway to ground, which eliminates the static electricity as an ignition source.

When filling containers, measures should be taken to prevent liquid from free-falling. Fires have occurred due to static from free-falling liquid.

Design your filling process through a valve in the bottom of the IBC/tank to eliminate free-falling liquid. Or if you must fill from the top, utilize a "dip tube" that reaches within six inches of

the bottom of the container being filled. This will ensure that liquid free-fall is limited and most of the filling operation will occur under the liquid level.

Pumps and other electrical equipment must be rated for flammable service. Typically Class I Div 1 or 2.

Transfer Hoses

Whether purchasing hoses and tubing with fittings already attached or making your own hose assemblies, it is imperative that the proper methods are used to safely ground your hose systems for areas of your facility that require a grounded / cross-bonded system.

The following illustrations will help.
1). Know how to properly order pre-assembled hose systems.
2). Assemble and test your systems in-house.
3). Perform safety checks to ensure there is a grounded and bonded loop throughout the fluid transfer system.

"Unless a hose is described specifically and clearly branded to be Conductive or Non-Conductive, it must be assumed that the electrical properties are uncontrolled"

When ordering pre-made hose assemblies with fittings attached

- Advise the assembler that you are transferring a flammable liquid.
- Provide the SDS describing the liquid.
- Give details on pressure and temperature of liquid conveyed.
- Make sure they can provide a hose that can be grounded to the fitting.
- Make sure they can properly perform a continuity test once the hose is completely assembled
- https://www.alliancehose.com/assets/site/docs/stamped-form.pdf

Proper assembly procedure for grounding fittings to hose.

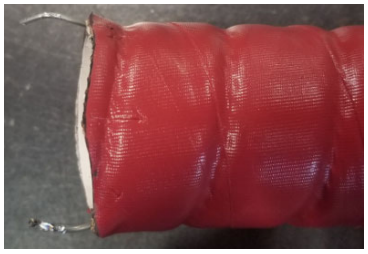
1). Cut hose to desired length.

2). Expose the (2) helical wires located between the tube and cover. Be careful not to expose too much wire. It may result in a leak path when attaching the fitting to the hose.

3). Fold reinforcement wires inward, so they are now turning inside the inner wall of the hose.

4). Insert fittings and use the proper attachment method to secure fitting to hose. (Ref. June TBT on attachment methods)

5). Using a digital ohmmeter touch each end of fittings to confirm that the hose has continuity throughout the system/length.

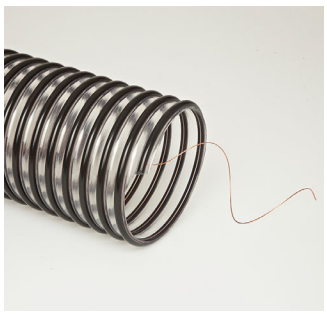


Note #2

Note **#3**

Note #5

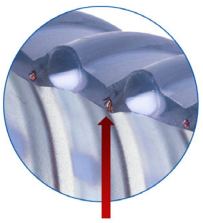
The same procedure applies to grain transfer ducting hose. Using a duct hose with a copper static wire is recommended for grounding to connectors.



Hose inspection and Safety Check

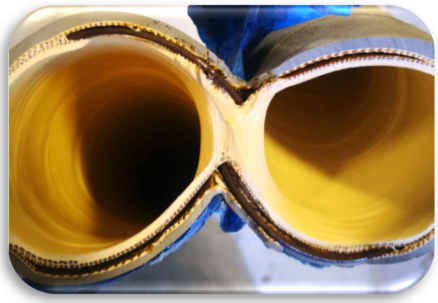
When using hose and ducting for flammable product transfer the following are potential causes of failure and loss of continuity in the hose system.

1). Worn or damaged tube and cover.



Copper wire is embedded in dry material handling hose/ducting. The abrasiveness of the grain wear inner liner over time and expose the copper wire. Would require changing duct line.

2).



The cover and tube can wear or be damaged exposing the inner galvanized wire to chemical breakdown. CIP Caustics will breakdown the exposed wire reinforcement causing loss of continuity as well as contamination if exposed to the inner tube of the hose.

Final Notes: If you have any questions regarding this Toolbox Talk, please see your supervisor / manager or post a question for the MBAA Safety Committee.

FOR MORE INFORMATION ON BREWERY SAFETY, PLEASE VISIT THE MBAA BREWERY SAFETY WEBSITE AT:
http://www.mbaa.com/brewresources/brewsaet