RISK BULLETIN

ALLIANZ GLOBAL CORPORATE & SPECIALTY®

BONDING AND GROUNDING

ALLIANZ RISK CONSULTING

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You may encounter many obvious exposures in a manufacturing facility. Operations may include use of hazardous chemicals and/or flammable liquids that may have known hazards. One not so apparent risk involves static electricity that may be created because of some operations.

WHAT IS STATIC ELECTRICITY?

Static electricity is defined as an imbalance of electrical charges within or on the surface of a material. This charge may remain until it is able to move away by an electric current or discharge. Static electricity may occur in a manufacturing environment during the following operations:

- Gases or liquids moving through pipes
- Spraying or coating
- Blending and mixing
- Dry powders moving through chutes/conveyors
- Filling containers

The familiar occurrence of a static shock is caused by the neutralization of charge. We can sometimes see the electrical arc as the charge moves toward neutral, and these arcs can reach temperatures exceeding 15,000 degrees Fahrenheit. At this temperature, an electrical arc caused by static electricity could generate enough heat to ignite flammable vapors.

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CONTROLLING STATIC

There are several methods a company can implement to control static buildup. The first is known as bonding, in which two or more conductive objects or pieces of equipment are connected together so that static electricity can move freely to equalize itself and prevent sparks. You are minimizing the electrical potential differences between the two objects. An example would be a flammable liquid dispensed from a large drum to a safety can and a metal cable bonds the two to each other.

A second technique for controlling static is called grounding, in which a conductive object is connected directly to the ground. This may be done using cold water pipes, a building's structural steel or installing a grounding rod. A metal cable is then connected from the flammable liquid dispensing vessel to the ground, which will bleed off any static electricity buildup.

It is essential to note that when practicing bonding and grounding, ALL connections must be metal to metal. Any coatings or obstructions such as paint, rust or dirt must be eliminated to ensure a proper connection to drain off the static.

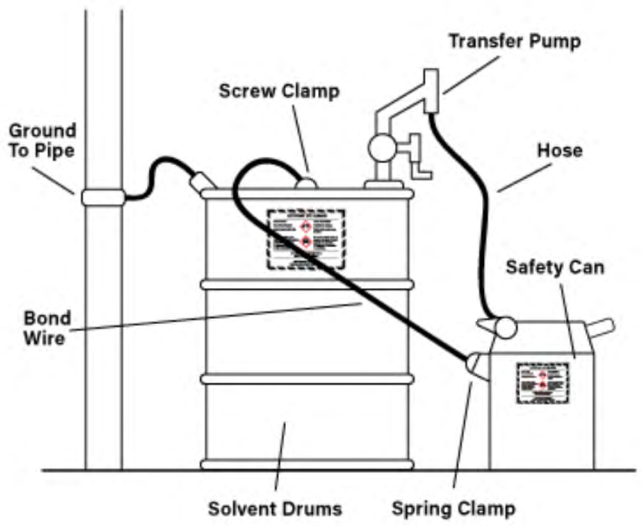

Photo from the Canadian Centre for Occupational Health and Safety.

While bonding and grounding are two of the most familiar methods to control static buildup, several other steps may be taken to reduce the possibility of an electrical arc from static. Companies can implement dispensing methods that reduce turbulence and free fall in the liquid being transferred. This can be achieved by having the nozzle of the hose touch the bottom of the receiving container so that there is no free fall while the liquid fills the container.

In addition, humidifying the atmosphere can also reduce the chance of a static spark by helping prevent fabrics from sticking together. Static collectors may also be used in some work areas. These are metallic devices that look like brushes or combs that are designed to collect static caused by dry materials. The collectors then discharge the static buildup to the ground.

MAINTENANCE OF EQUIPMENT

Electrical conductors cannot work effectively without proper installation and maintenance of the equipment. The employee should conduct a visual inspection each time the equipment is used. Clamps and cables used for connections must be inspected on a regular basis to ensure they are clean, unbroken and capable of making contact with the containers. Contact points should be inspected to make sure they are clean and free of rust or other obstructions to a clean connection. Connections to the clamps must be tight.

Attached is a brief checklist that may be used to perform inspections, which may be modified as necessary. If you have any further questions, do not hesitate to contact your Allianz Risk Consultant.

ADDITIONAL RESOURCES

Canadian Centre for Occupational Health and Safety: https://www.ccohs.ca/oshanswers/prevention/howto/flammable_static.html

Occupational Safety and Health Administration (OSHA): https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.106

BONDING/GROUNDING EQUIPMENT INSPECTION SAMPLE

Date: Inspected By: 06/25/2020

Equipment	Yes	No
Grounding Rod		
Staked in the ground	☐	☐
Connected to electrical conductor leading to flammable liquids room	☐	☐
Electrical Conductors		
Attached to the grounding stake	☐	☐
Clean and free of paint or ink	☐	☐
Adequate number of conductors available	☐	☐
Flammable liquid containers connected to electrical conductors	☐	☐
Clamps		
Firmly attached to conductor	☐	☐
Conductor in good condition at point of connection	☐	☐
Clean and free of paint or ink	☐	☐
Clamp capable of attaching to containers	☐	☐
Adequate number of clamps available	☐	☐

NOTES

Design: Graphic Design Centre