APPLICATION ARTICLE

Portable Containers

Static grounding for metal drums and IBCs ranging from 55 gallon to 275 gallon capacity

Metal drums and IBCs are containers that provide site operators with a flexible means of transporting and processing batch quantities of products. Operations ranging from mixing, agitation and blending to the filling and emptying of low conductivity liquids can result in the generation of static electricity leading to the accumulation of electrostatic charge on the container if it is not grounded. If electrostatic charge is permitted to accumulate on the container the risk of an incendive static spark discharge to objects at a different potential, like operators and other plant equipment is a high possibility. If a flammable atmosphere is present at the static spark discharge location, then ignition is very possible.

Portable containers in the 55 gallon to 275 gallon capacity range

The processes associated with metal drums and IBCs in the 55 gallon (205 liter) to 275 gallon (1000 liter) range normally rely on the use of pumping or mixing equipment. Site operators have the option of specifying active grounding systems that feature output contacts which can be interlocked with the process equipment*. In this scenario the mixing or pumping process cannot take place unless the

grounding system confirms that the metal drum or IBC has a connection to the site's designated ground point with a resistance of 10 ohms or less.

** Assumes the grounding system is installed as per the accompanying Instruction Manual.*

Different types of IBCs and drums

The range of materials that make up the construction of IBCs and drums needs to be assessed by site operators when trying to mitigate the risk associated with static electricity.

The use of plastic, a naturally low conductivity material, whether it be used as a vessel for IBCs, or as a liner inside metal drums, is a factor that needs to be considered. The use of static dissipative plastics has also increased over the last 10 to 15 years. As such there is a multitude of "composite" drums and IBCs being used in hazardous areas today.

Wherever possible, Newson Gale adopts guidance on electrostatic hazards by standards publishing institutions and industry bodies that can help define the parameters for effective grounding and bonding in hazardous areas.

As Newson Gale is not a static control consultancy, we cannot recommend any specific types of containers for different processing applications, but if IBCs with plastic containers is a process requirement (e.g., for material compatibility reasons), please consult **NFPA 77 2024ed Clause 11.1.2.1.**

ESIG, the European Solvents Industry Group, has a free downloadable guide for site operators engaged in the processing and transportation of solvents.

This document provides practical guidance on the different types of IBCs and drums in use within the solvents industry.

If you require a static control solution for metal drums or IBCs that are of a static dissipative construction, please contact us for solutions that can actively monitor at resistance thresholds higher than 10 ohms.

IBCs

In relation to the static grounding of IBCs it promotes a "Clamp On First, Clamp Off Last" protocol:

11.1.1 Conductive (Metal) Portable Tanks and IBCs

11.1.1.1. Metal portable tanks, IBCs, and containers, in addition to fill tubes and hose, should be grounded during filling and emptying.

11.1.1.2. The metal portable tank, IBC, or container should be bonded to the fill system prior to opening and should be closed before being disconnected from the bond.

Section 11.1 of NFPA 77 2024ed called **"Portable Tanks, Intermediate Bulk Containers (IBCs), and Non-Bulk Containers"** addresses some of the complexity associated with the construction of drums and IBCs.

11.1.7 Handheld Containers

11.1.7.1. The severity/consequence of a fire, flash fire, and/or explosion is expected to increase with the container size. The risk of ignition from static electricity discharge is about the same regardless of the container size. Handheld containers are typically 25 L (6.6 US gal) or less.

Earth-Rite® PLUS ground loop monitoring circuit path.

Section 7.3.2 of IEC TS 60079-32-1 called **"Small conductive tanks and containers"** addresses some of the complexity associated with the construction of drums and IBCs.

Regardless of the severity/consequence of a fire, flash fire, and/or explosion, consideration should be made to address the risk of ignition from a static electricity discharge.

Metal drums

In the case of painted metal drums, or drums covered in product deposits (e.g., resins, paint coatings), it is important for the grounding clamp to penetrate these layers through to the base metal of the drum to enable static charges to pass from the drum to earth.

NPFA 77 2024ed Section 7.3.1.9 states:

"Pressure-type bonding clamps should have sufficient pressure to penetrate any protective coating, rust, or spilled material to ensure contact with the base metal. When making connections through any surface that is compromised "e.g., by debris, by corrosion", the connection should be verified with a low voltage ohmmeter or similar device" See A.3.3.2 referencing 10 Ohms resistance or less for copper wire."

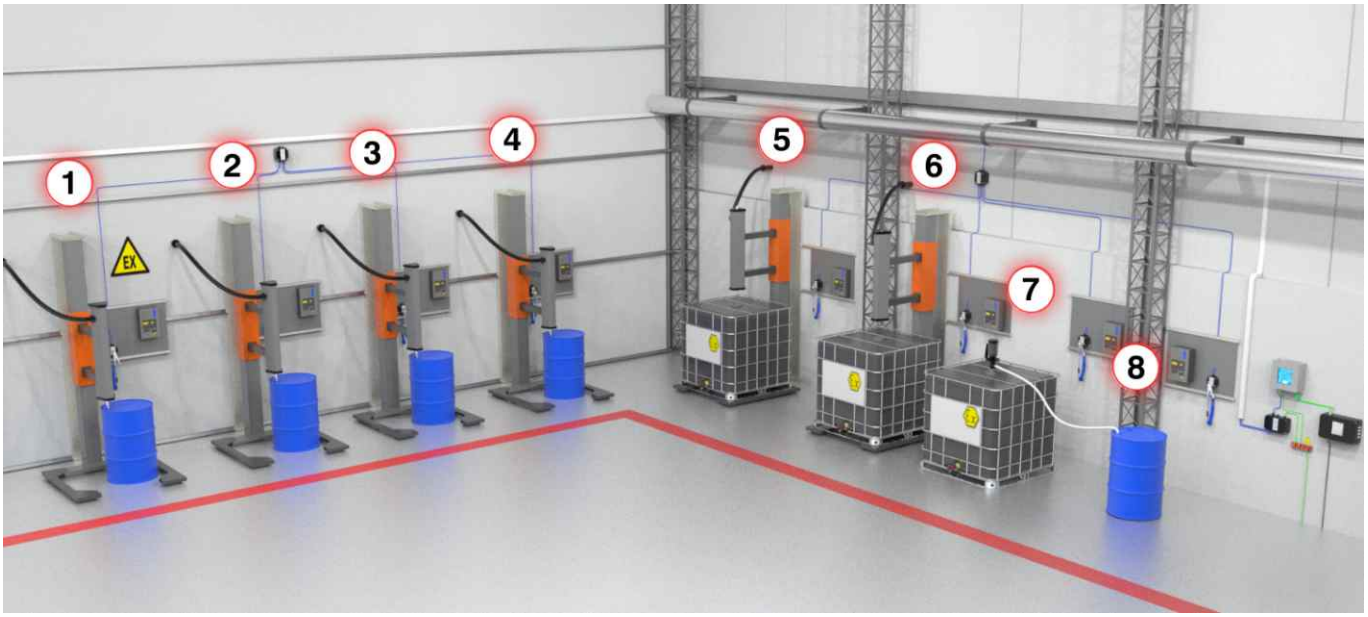
This issue is also referenced in **IEC 60079-32-1:1:**

3.4 The establishment and monitoring of earthing systems *(from IEC TS 60079-32-1).*

"Pressure-type clamps should have sufficient pressure to penetrate any protective coating, rust, or spilled material to ensure contact with the base metal with an interface resistance of less than 10 Ω."

Hazardous area classification

It is important to know what the hazardous area classification of the location is prior to specifying a static control solution. Due to their portability, metal drums and IBCs can be situated anywhere in the workplace. As active monitoring systems require hazloc certification



ONE single Earth-Rite® MULTIPOINT grounding system provides site operators with EIGHT independent active ground monitoring circuits.

(for installation and use in hazloc areas), Newson Gale has developed a range of active monitoring solutions that can cater for variations in hazardous area classifications, the number of objects that require grounding, and the flexible location of associated apparatus like power supplies.

In any event, all Newson Gale active monitoring systems utilize Intrinsically Safe (IS) circuits which are suitable for use in all Class I, II and III Div 1 areas or lower. This means the grounding clamp can be attached to points on the drum or IBC if there would be some doubt as to the boundary between a Division 1 and Division 2 areas.

Recommended Solution

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