

Powder processing equipment and the risk of electrostatic charge

Powder processing operations can generate large quantities of electrostatic charge via the movement of powder. The most common cause behind the electrostatic charging of powder processing equipment is triboelectrification.

Mitigating electrostatic charge in powder processing operations

In pharmaceutical operations, equipment such as powder conveying systems, micronizers, blenders and sieve stacks all make up multiple component assemblies that can accumulate high levels of electrostatic charge should any of the components be isolated from a true earth.

In the food, beverage and pharmaceutical industries where regular disassembly for cleaning and maintenance is required, it can result in bonding connections being missed or not made correct when the equipment is reassembled, as well as degradation of assembly connections. All of this creates isolation from true earth ground, and electrostatic charges are allowed to accumulate to excessively high voltage potential. Regular flexing, vibration and corrosion can also degrade assembly connections, so it is imperative to ensure that no parts in the assembly become isolated from a true earth ground.

Powder processing equipment presents more of a challenge compared to standard applications as there are many metal parts that can make up larger assemblies that are potentially electrically isolated from each other. It is therefore important to ensure that multiple components that come into contact with charged powders have a means of being monitored for static grounding protection purposes.

NFPA 77 2024ed Clause 15.6 “Pneumatic Transport Systems” states:

15.6.2 “The construction materials of pipes and ducts used for the conveying of powders should be conductive(e.g., metal) or static dissipative and be grounded.”

15.6.2.1 “Equipment to which the conduits connect should be conductive (e.g., metal) or static dissipative and grounded to dissipate the charge impressed on it by the transport of the material.”

7.3.1.6.1 “Where the bonding/grounding system is all metal, resistance in continuous ground paths is measured to verify mechanical integrity. (See A.3.3.2.) Such systems include those having multiple components. Greater resistance usually indicates that the metal path is not continuous, usually because of loose

connections or corrosion. A permanent or fixed grounding system that is acceptable for power circuits or for lightning protection is more than adequate for a static electricity grounding system. Static grounds should be made to the building steel, if possible. Grounding to power grounds or lightning protection systems is not recommended.”

A.3.3.2 Bonding “A resistance not exceeding 10 ohms for copper wire or 25 ohms for stainless steel or other metals is typically found in practice. Higher resistances could indicate a lack of mechanical integrity.”

NFPA 77, 15.3.1 & 15.3.2 “Mechanisms of Static Electric Charging” states:

“Contact static electric charging occurs extensively in the movement of powders, both by surface contact and separation between powders and surfaces and by contact and separation between individual powder particles. Charging can be expected any time a powder comes into contact with another surface, such as in sieving, pouring,

scrolling, grinding, micronizing, sliding and pneumatic conveying.”

IEC TS 60079-32-1, 13.4.1 “The establishment and monitoring of earthing systems” states:

“Where the bonding/earthing system is all metal, the resistance in continuous earth paths typically is less than 10 Ω . Such systems include those having multiple components. A greater resistance usually indicates that the metal path is not continuous, usually because of loose connections or corrosion. An earthing system that is acceptable for power circuits or for lightning protection is more than adequate for a static electricity earthing system.”

Recommended Solution:

Earth-Rite® MULTIPOINT



Copyright Notice

The document and its content is copyright of Newson Gale Ltd © 2024. All rights reserved.

Any redistribution or reproduction of part or all of the contents in any form is prohibited other than the following:

- You may print or download to a local hard disk extracts for your personal and non-commercial use only
- You may copy the content to individual third parties for their personal use, but only if you acknowledge the website as the source of the material

You may not, except with our express written permission, distribute or commercially exploit the content. Nor may you transmit it or store it in any website or other form of electronic retrieval system.

United Kingdom
Newson Gale Ltd
Omega House, Private Road 8
Colwick, Nottingham
NG4 2JX, UK
+44 (0)115 940 7500
groundit@newson-gale.co.uk

United States
IEP Technologies LLC
417-1 South Street
Marlborough, MA 01752
USA
+1 732 961 7610
groundit@newson-gale.com

Germany
IEP Technologies GmbH
Kaiserswerther Str. 85C
40878 Ratingen
Germany
+49 (0)2102 5889 0
erdung@newson-gale.de

Right to change

This document provides general information only and may be subject to change at any time without notice. All information, representations, links or other messages may be changed by Newson Gale at any time without prior notice or explanation.

Newson Gale is not obliged to remove any outdated information from its content or to expressly mark it as being outdated. Please seek the advice of professionals as necessary regarding the evaluation of any content.

Disclaimer of liability

The information provided in this document is provided by Newson Gale without any representations or warranties, expressed or implied, as to its accuracy or completeness. The liability of Newson Gale for any expenses, losses or actions incurred whatsoever by the recipient as a result of the use of this document shall be excluded.