NewsonGale
HOERBIGER Safety Solutions

Application Spotlight

Enquiry > Click here to submit a product related query or a request for quotation.

Earth-Rite® FIBC

Static grounding protection for Type C FIBC located in potentially flammable/combustible gas or dust atmospheres

Type C bags are designed to dissipate static electricity through static dissipative threads that are interwoven through the bag's material.

Grounding tabs located on the bags are points where grounding systems can be connected to ensure static electricity does not accumulate on the bag. To ensure bags destined for use in hazardous areas will not accumulate static electricity to hazardous levels there are several standards that provide guidance on the key parameters to which Type C bags must comply.

The primary standard is IEC 61340-4-4, *"Electrostatics – Part 4-4: Standard test methods for specific applications – Electrostatic classification of flexible intermediate bulk containers (FIBC)."* This standard was released in the early part of 2012 and it sets out the essential requirements of Type C bags in relation to eliminating the risk of charge accumulation on the bag. It states that the resistance through the bag should be less than 1 x 10^7 ohms (10 meg-ohm). This means that the resistance from a point on the bag to a grounding tab should never be higher than 10 meg-ohm. The latest edition of NFPA 77, *"Recommended Practice on Static Electricity"*, recommends this value of resistance.

This standard has superseded the recommendations contained in the 2003 CENELEC technical report, called CLC/TR 50404 which stipulates a maximum value of 1 x 10^8 ohms (100 meg-ohms). The latest edition of **TRBS 2153:2009** recommends the same value of resistance.

Checking and grounding Type C bags.

When a company wishes to utilise Type C bags they must provide a means for grounding the bag. This can be achieved with either passive (single pole clamp and cable) or active means (monitoring systems), but given the scale of the charge that can build up on bags and the resulting energies that can be reached by static sparks, in combination with the presence of a combustible dust cloud, an active grounding system is the better choice.

This is because the system can determine whether or not the bag's construction complies with the recommendations of the standards highlighted above and will also ensure the bag is grounded for the duration of the filling / emptying operation. The primary benefit of checking the resistance through the bag is to ensure that after many cycles of repeated use, the static dissipative threads are functioning correctly and, more importantly, to ensure that bags not of Type C construction are not permitted to be used in the hazardous area. Additional benefits with grounding systems are that they can control the movement of the powder through output contacts interlocked with valves or PLCs.

Helpful Tips for correctly grounding Type C FIBC bags:

> Ensure Type C bags are manufactured in accordance with the electrostatic recommendations of IEC 61340-4-4 / NFPA 77 or CLC/TR: 50404.

> Ensure that the grounding system selected can check and continuously monitor the full range of resistance through the bag.

> Ensure the grounding system not only checks the condition of the bag's static dissipative threads, but also ensure that the ground circuit includes a direct and monitored connection to a verified True Earth grounding point.

> Ensure the grounding system does not monitor a limited percentage of the permitted range of resistance as they may pass faulty bags and reject acceptable bags.

The illustration highlights how a bag can be checked for its static dissipative capability in combination with providing active grounding of the bag. Following the connection of two quick release clamps, the Earth-Rite® FIBC system will identify if the bag is operating in accordance with the relevant standard. This is achieved by sending an Intrinsically Safe (Hazloc approved) signal (red line in the illustration) through the bag. If the green ground status indicators pulse continuously, the operators know the bag is grounded. The system verifies the grounding of the bag by ensuring the signal returns via a verified true earth ground. If there is any charge on the bag it will leave the bag via the static dissipative threads to the verified ground. If the output contacts are interlocked with the process then the material cannot flow without the permission of the operator.

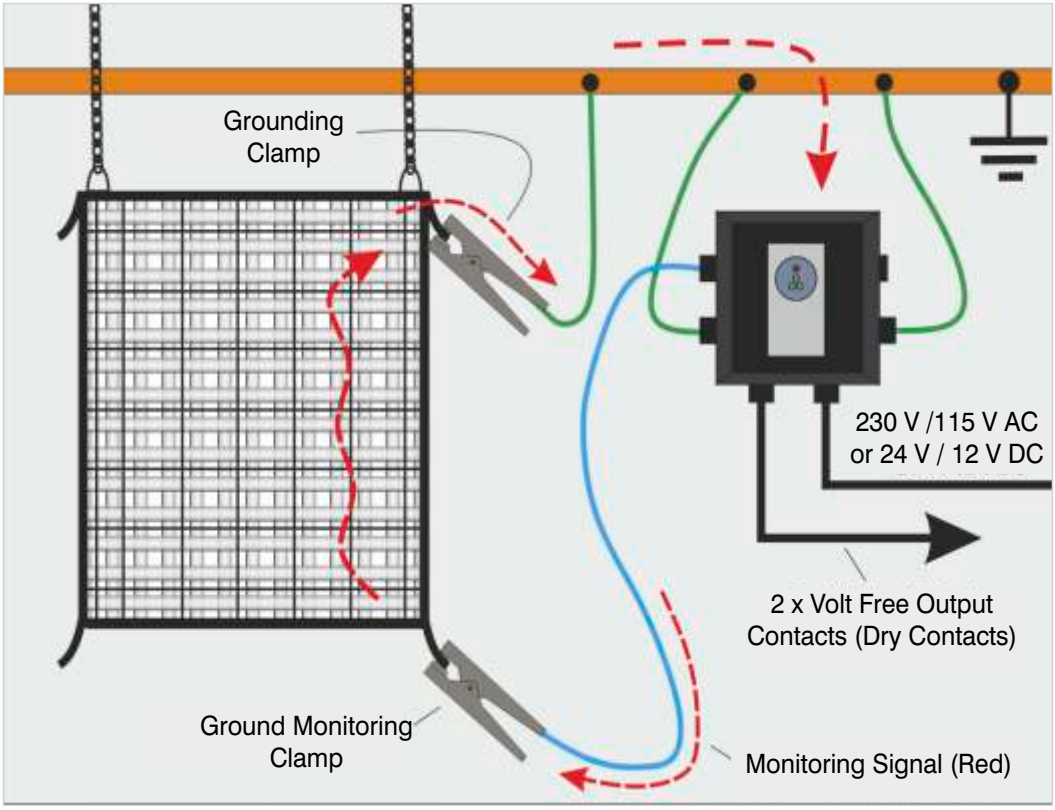
Are the Type C FIBCs 10 meg-ohm or 100 meg-ohm bags?

The primary question to address when selecting a Type C FIBC grounding system is to determine which standard the bags in use are constructed to. Although bags manufactured in accordance with the 10 meg-ohm requirement are growing in number, there is a significant percentage of Type C FIBCs manufactured in accordance with the 100 meg-ohm requirement.

If the company is committed to using CENELEC compliant 100 meg-ohm Type C bags then the grounding system should monitor the full range of resistance.

This ensures that bags of different static dissipative consistency can be checked and monitored for the full permissive range of resistance. Any bags operating outside of this range should be rejected.

Likewise, if a company is committed to using IEC / NFPA 77 compliant 10 meg-ohm bags the permissive range of resistance to which the grounding system should be monitoring should be 0 ohms up to 10 meg-ohms.



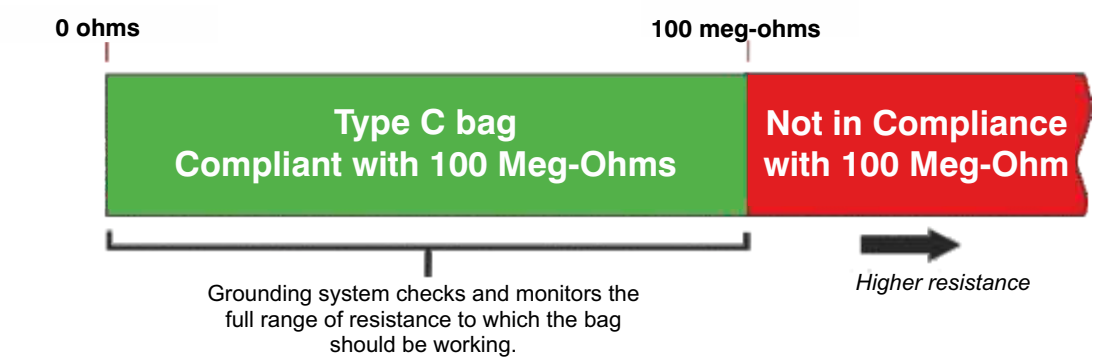
Ensure the grounding system you select is specific to the type of bag in use on site.

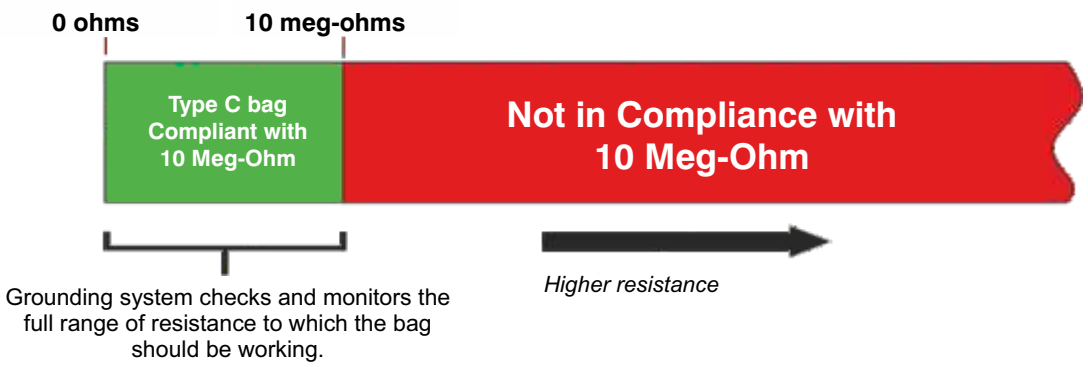
If a grounding system is selected that monitors a narrow range of resistance, for example, monitors from 0 ohms up to 50 meg-ohms, this creates a problem and this problem could have two outcomes.

The first is that if 10 meg-ohm bags are specified for the site, the system could pass faulty bags as it will pass any bag that shows a resistance from 10 meg-ohms up to 50 meg-ohms. A direct consequence of this feature is that it could be passing bags not manufactured in accordance with IEC-61340-4-4 and the recommendations of NFPA77.

The second outcome is if 100 meg-ohm bags are specified for the site. As the grounding system has a cut-off resistance of 50 meg-ohms, it will fail any bag that is operating between 50 meg-ohms and 100 meg-ohms. A direct consequence of this problem is that the system could reject a bag that is perfectly adequate and result in delayed operations while the operators are replacing the bag.

It is, therefore, of paramount importance to determine what types of Type C bags the site will be using. On that basis the site can select a system that will monitor the full range of 10 meg-ohm bags or a select a system that will monitor the full range of 100 meg-ohm bags.





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

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

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

South East Asia
Newson Gale S.E.A. Pte Ltd
136 Joo Seng Road,#03-01
Singapore
368360
+65 6704 9461
ngsea@newson-gale.com

www.newson-gale.co.uk