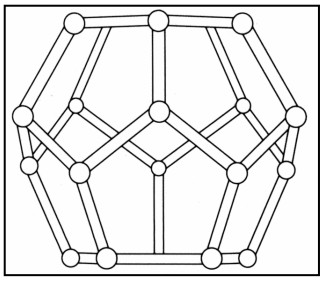
Zotefoams plc



Technical Information Sheet TIS 17
(previously BTI14)
Static Dissipative Foams

Introduction

Zotefoams plc have a range of conductive foams from the Azote product ranges which are suitable for packaging and handling of devices that are sensitive to electrostatic discharges (ESD). This bulletin aims to give an overview of the properties and applications for the static dissipative (SD) grades. For general information on ESD protection please consult technical information sheet TIS 18 and for specific information on conductive products please consult technical information sheet TIS 16.

Two static dissipative foams are currently available from the Azote range, Plastazote® LD30SD and Plastazote® LD40SD. The materials are black and available in form of sheets.

Like all Zotefoams materials the SD grades are expanded using our unique nitrogen expansion process. This ensures that it is free of halocarbon or hydrocarbon blowing agents. It also shares the typical characteristics of our standard foams such as closed cell structure, isotropic physical properties, good performance as cushioning material, good chemical resistance.

Advantages of Zotefoams static dissipative foam

The formulation used to produce Plastazote® LD30SD and Plastazote® LD40SD overcomes the problems typically associated with the production of a polyethylene foam suitable for packaging ESD sensitive equipment. The general approaches to modification of polyethylene foams include surface treatment with chemicals, chemical additives such as amides or amines and conductive fillers.

The surface treatment with e.g. aqueous salt solutions adds to the costs of the converter and is often unreliable as it can be rubbed or washed off and requires high humidity to function effectively.

Chemical additives like amines rely on migration of the additive to the surface of the material. While this method tends to give a more lasting effect than the surface treatment, leaching of some additives can cause deterioration of the electrical equipment the foam is meant to protect and increased surface resistivity due to loss of the additive. This method also requires (high) humidity to give a satisfactory performance.

Conductive fillers such as carbon black can be used to create permanent low resistivity however formulation of materials in the static dissipative range have been proven difficult, as materials tend to be either conductive or insulative. This is due to the properties of carbon black which requires certain concentrations to create a conductive material.

As a result of extensive development Zotefoams plc is able to control the formulation of its Plastazote® LD30SD and Plastazote® LD40SD materials to give a truly static dissipative nitrogen blown crosslinked polyethylene foam.

Applications

Together with the conductive foam grades (see technical information sheet TIS 16) the static dissipative foams provide a comprehensive range of materials for ESD control applications. Plastazote® LD30SD has good cushioning properties and can be used for packaging of materials where only limited conductivity is required. Plastazote® LD40SD has been developed to meet the higher density specifications required by the Ministry of Defence for static dissipative packaging material. Like the conductive Plastazote® grades it has good pin insertion and retention characteristics which enable a safe transport of IC devices.

Compliance with Standards

The definitions of conductive foams vary slightly between the different standards. Below is a summary of the Standards that are concerned with ESD protection in packaging and the definition given for static dissipative materials in these standards. Surface resistivity is tested to ANSI/ESD STM 11.11-2003:

General Standards:

ANSI/ESD S541-2003	Material with a volume resistance equal to or greater than 10^4 Ω but less than 10^{11} Ω or surface resistance equal to or greater than 10^4 Ω but less than 10^{11} Ω
ANSI/ESD STM 11.11	Material with a surface resistance equal to or greater than 10^4 Ω but less than 10^{11} Ω
JESD625-A	Material with a volume resistivity between 10^5 Ω.cm but less than 10^{11} Ω.cm or surface resistance between 10^5 Ω and 10^{11} Ω

Military Standards:

DStan 93-117	Material with a surface resistance of 10^5 Ω to 10^9 Ω and a density between 40 kg/m^3 and 50 kg/m^3 (Plastazote® LD40SD)
MIL-HDBK-263B	Material with a volume resistivity equal to or greater than 10^4 Ω.cm but less than 10^{11} Ω.cm or surface resistivity equal to or greater than 10^5 Ω/sq but less than 10^{12} Ω/sq

The materials also meet the requirements for static dissipative flooring, work surfaces and other items given in standards by the ESD Association.

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