

# Technical Information Sheet – TIS 16

## Conductive Azote® foams

### Introduction

Zotefoams have a range of conductive foams within 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 conductive (CN) grades. For general information on ESD protection please consult technical information sheet TIS 18 and for specific information on static dissipative products please consult technical information sheet TIS 17.

Three conductive foams are currently available from the Azote® range. These are:

- Plastazote® LD32CN
- Plastazote® LD50CN
- Evazote® EV45CN

All materials are black and available in form of sheets.

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

Conductive materials from the Azote® product ranges are formulated with a special carbon black to provide conductive properties. The carbon black is introduced by pre-compounding (not post impregnation as with some types of conductive foam), and is fully encapsulated in the polymer. Hence the foams are non-sloughing (will not shed particles) and virtually non marking.

### Thermoforming

Heat lamination and thermoforming are possible with all conductive materials but the process requires greater control than conversion of our standard grades by these methods. Overheating causes carbonisation of the surface and which results in poor weld strength.

For heat lamination using a blade laminator guideline temperatures and speeds for conductive materials can be provided upon request.

For thermoforming low speeds (e.g. press closure rate 100 cm/min) are recommended to avoid tearing. Vacuum forming is possible but care should be taken to apply the vacuum gradually and radius all corners and edges if possible. A normal draw ratio for Evazote® EV45CN is 0.7 though this may be increased for higher densities. The suggested pre-heating temperature for thermoforming is hot air at 150 °C, guideline heating times are listed below.

Plastazote® LD32CN	8 sec/mm thickness
Plastazote® LD50CN	12 sec/mm thickness
Evazote® EV45CN	12 sec/mm thickness

Adhesive bonding is possible. For information on suitable adhesives we suggest contacting an adhesives manufacturer. A summary of adhesives types and contact details for adhesive manufacturers can be found on our technical information sheet TIS 15. Care should be taken to select an adhesive with conductive properties where it is required.

### **Applications**

Zotefoams conductive Evazote® products intended for general conductive packaging and for conductive mats in electronic assembly and clean room areas.

The Plastazote® LD conductive products have been formulated to have good IC pin insertion and retention characteristics for safe transport of IC devices and offer slightly lower volume resistivity compared to the Evazote® grades. They also have good energy absorption for cushion packaging.

### **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 conductive materials in these standards. All conductive Azote materials fulfil the requirements for volume resistivity when tested to ASTM D 991-89 (re-approved 2014):

#### **General Standards:**

ANSI/ESD S541-2003	Material with a surface resistance less than $10^4 \Omega$ or volume resistance less than $10^4 \Omega$
ANSI/ESD STM 11.12	Material with a volume resistance less than $10^4 \Omega$
ASTM D991-89 (2014)	Material with a volume resistivity less than $10^4 \Omega \cdot \text{cm}$
JESD625-A (1999)	Material with a surface resistivity less than $10^5 \Omega/\text{sq}$ or volume resistivity less than $10^4 \Omega \cdot \text{cm}$

Military Standards:

DStan 81-146/1	Material with a volume resistivity of $10^2 - 10^5$ $\Omega$ .cm*
MIL-HDBK-263B	Material with a volume resistivity less than $10^4$ $\Omega$ .cm or surface resistivity less than $10^5$ $\Omega$ /sq

\* this standard contains other physical property requirements that need to be checked before selecting a suitable material for applications requiring compliance.

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

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