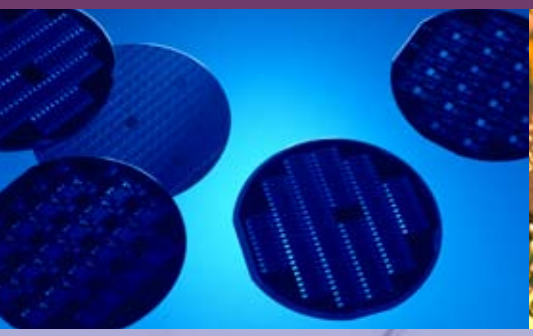
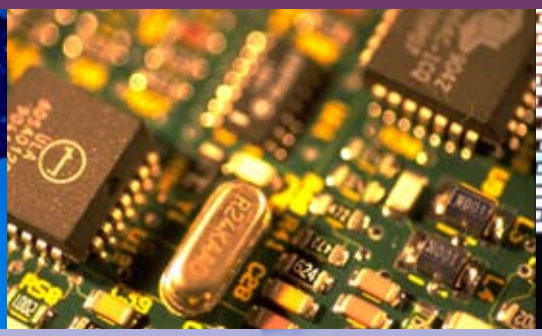
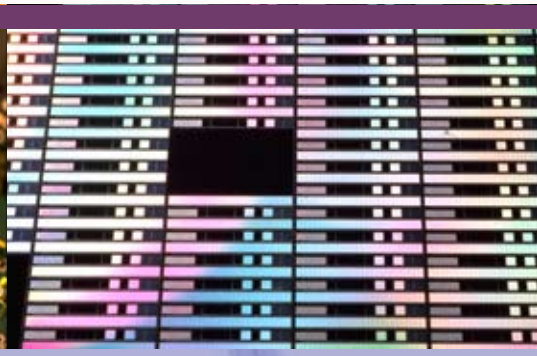
ZOTEFOAMS







ADVANCED FOAM TECHNOLOGY FOR THE **ELECTRONICS** INDUSTRY

AZOTE®
high performance
polyolefin foams

ZOTEK®
advanced
polymer foams

Azote Foams for ESD Protection

Critical electronics devices, assemblies and equipment are susceptible to “static zap”... Electro Static Discharge (ESD). The smaller IC circuitry becomes the more vulnerable it becomes to this type of damage. The annual direct cost to industry of damage caused by ESD is estimated to be in excess of $100 billion, on a worldwide basis. Consequential losses are inevitably far greater.

Electrostatic charge is most commonly created by the contact and separation of two materials. E.g. as shoe soles contact and then separate from the floor surface, a static charge is generated. Walking across a vinyl tiled floor can generate 12,000 volts and picking a polythene bag from a bench can generate 20,000 volts... potential that could decimate static sensitive electronics devices.

Zotefoams manufactures a range of high performance, closed-cell, crosslinked, conductive and static dissipative foams which, when used as part of an ESD Control Program Plan, help reduce the occurrence and cost of ESD damage.

Non-conductive closed-cell foams, also available from Zotefoams, are ideal for a variety of sealing and anti-vibration gaskets in a wide range of electrical instruments and equipment from flat panel displays to BIPV solar panels.

CONDUCTIVE v STATIC DISSIPATIVE v ANTI-STATIC

A static charge can be generated triboelectrically on all three types of material.

The difference is the speed at which the static charge travels through the material when it makes contact with a conductive material or ground. This is a function of the resistivity of that material.

Conductive foams have 'bulk' or isotropic conductivity. They have a volume resistivity of less than 10^4 ohms.cms or a surface resistivity of less than 10^4 ohms/sq according to the ESD Association.

Static Dissipative foams offer a slower, more controlled transfer of a static charge and have volume resistivity in the range 10^4 – 10^{11} ohms.cms and surface resistivity between 10^4 and 10^{11} ohms/sq.

These classifications vary between standards. For further details see the section "Compliance with Standards"

Anti-static foams are generally pink and are characterised by having a surface resistivity between 10^{10} and 10^{12} ohms although some may have surface resistivity higher than this. They may have a degree of inherent conductivity but provide only limited protection from ESD events.

Many rely on surface treatments to provide this conductivity. The dissipative performance of such materials is enhanced by increasing atmospheric humidity whereas static charge build-up becomes more of a potential problem as RH reduces.

STATIC DISSIPATIVE GRADES

PLASTAZOTE® LD30SD

is the most widely used static dissipative grade with a volume resistivity of 10^7 ohm/sq. It has good cushioning properties and is used for packaging devices, assemblies and electronics equipment, where limited conductivity is required. Suitable for inter process wafer interleaving, box liners, end caps, top/bottom frames, corner blocks and case inserts, Plastazote® LD30SD has a relatively fine cell structure and is virtually stress free.

PLASTAZOTE® LD40SD

has been developed to meet the higher density specifications required by the Ministry of Defence for static dissipative packaging material. It has a volume resistivity of 10^7 ohm/sq and has good pin insertion and retention characteristics, which enable the safe transport of conventional, through-hole IC packages.

Plastazote® LD40SD meets DStan 93-117 for materials used in the packaging of certain munitions, which are susceptible to an electrostatic charge.

CONDUCTIVE GRADES

PLASTAZOTE® LD32CN AND LD50CN

grades have excellent energy absorption characteristics for cushion packaging. Plastazote LD32CN has volume resistivity of 5 x 10^3 ohms.cms and exhibits excellent pin insertion and retention characteristics. Plastazote LD50CN has volume resistivity of 10^3 ohms.cms and is suitable for devices with standard leads, while LD32CN should be used for devices with delicate leads. These materials are ideal for shunting component leads and PCB edge connections to equalize the charge in individual circuits.

EVAZOTE® EV45CN AND EV70CN

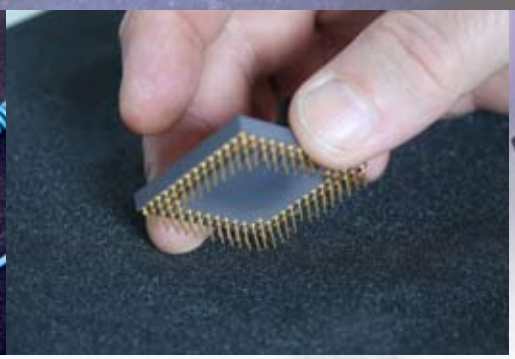
grades are EVA copolymers and are suitable for many conductive packaging applications such as tote liners where their enhanced flexibility and durability are valued. They have a volume resistivity of 10^3 ohms.cms. Evazote conductive grades are used in a variety of other ESD applications including wrist straps, earth straps, grounded bench mats, floor covering, anti-fatigue mats and conductive footwear.

AZOTE STATIC DISSIPATIVE AND CONDUCTIVE FOAMS

Azote conductive and static dissipative materials can be cut, routed, shaped, welded, laminated and thermoformed to meet specific use requirements. They exhibit a range of beneficial properties for the electronics industry:

OUTSTANDING PROPERTIES

- Consistent, isotropic conductivity
- High purity
- Halogen-free
- VOC-free
- Non-staining, non-corrosive
- Low outgassing
- ROHS compliant
- Non-sloughing
- Moisture resistant
- Easy package pin insertion
- Excellent pin retention
- Good energy absorption and cushioning
- Rugged durability
- Light weight
- Uniform density profile



Product Name	Grade	Surface Resistivity	Volume Resistivity
		ohms/sq	ohms.cms
		ESD S-11.11 · 2003	ASTM D991-89
Plastazote	LD30SD	10^7	
Plastazote	LD40SD	10^7	
Plastazote	LD32CN		5×10^3
Plastazote	LD50CN		10^3
Evazote	EV45CN		10^3
Evazote	EV70CN		10^3

ZOTEFOAMS
THE FOAM TECHNOLOGISTS

COMPLIANCE WITH STANDARDS

The definitions of conductive foams vary slightly between the different standards. Following is a summary of the Standards that are concerned with ESD protection in packaging and the definition given for materials in these standards. Surface resistivity is tested to ANSI/ESD STM 11.11-2003. Volume resistivity is tested to ASTM D 991-89

GENERAL STANDARDS: (STATIC DISSIPATIVE MATERIALS)

ANSI/ESD S541-2003

Material with a volume resistance equal to or greater than 10^4 ohms but less than 10^{11} ohms or surface resistance equal to or greater than 10^4 ohms but less than 10^{11} ohms

ANSI/ESD STM 11.11- 2003

Material with a surface resistance equal to or greater than 10^4 ohms but less than 10^{11} ohms

JESD625-A

Material with a volume resistivity between 10^5 ohms.cm but less than 10^{11} ohms.cm or surface resistance between 10^5 ohms and 10^{11} ohms

Military Standards:

DStan 93-117

Material with a surface resistance of 10^5 ohms to 10^9 ohms 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 ohms.cm but less than 10^{11} ohms.cm or surface resistivity equal to or greater than 10^5 ohms/sq but less than 10^{12} ohms/sq

GENERAL STANDARDS: (CONDUCTIVE MATERIALS)

ANSI/ESD S541-2003

Material with a surface resistance less than 10^4 ohms or volume resistance less than 10^4

ANSI/ESD STM 11.12

Material with a volume resistance less than 10^4 ohms

ASTM D991-89 (2005)

Material with a volume resistivity less than 10^4 ohms.cm

JESD625-A

Material with a surface resistivity less than 10^5 ohms/sq or volume resistivity less than 10^4 ohms.cm

ZOTEFOAMS

FOR MORE INFORMATION PLEASE VISIT WWW.ZOTEFOAMS.COM

ZOTEFOAMS PLC,
675 Mitcham Road, Croydon, Surrey, CR9 3AL, UK
Tel: +44 (0) 20 8664 1600
Fax: +44 (0) 20 8664 1616
email: info@zotefoams.com

ZOTEFOAMS INC,
55 Precision Drive, Walton, Kentucky, 41094, USA
Tel: +1 859 371 4046 FREE: (800) 362-8358 (US Only)
Fax: +1 859 371 4734
email: custserv@zotefoams.com

AZOTE® is the group brand for a variety of foams manufactured from differing base polymers but using the same unique process route.
ZOTEK® is the group brand for foams manufactured from high performance polymers.

Photo acknowledgements: GE Avionics Ltd, The Solder Connection

0020/Electronic/English/05/11/2k