AZOTE

the complete expanded polyolefin foam family

PLASTAZOTE®

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EVAZOTE®

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SUPAZOTE®

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PROPOZOTE®

ZOTEFOAMS plc

The head office and factory are situated in the UK at Croydon where the Company has manufactured high quality closed cell materials since 1936 using the nitrogen process. Zotefoams Inc., the North American subsidiary, now manufactures the product range in the USA.

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

PLASTAZOTE®, EVAZOTE®, SUPAZOTE® and PROPOZOTE® are world-wide registered trademarks for the current product range which is available through a global distributor and converter network.

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AZOTE

high performance polyolefin foams

TECHNOLOGY products & PERFORMANCE

ZOTEFOAMS

THE technology TO DEVELOP SUPERIOR FOAMS

Unique process

Zotefoams plc produces an unparalleled range of closed cell, crosslinked, polyolefin foams using a unique, environmentally friendly, high-pressure nitrogen gas solution process.

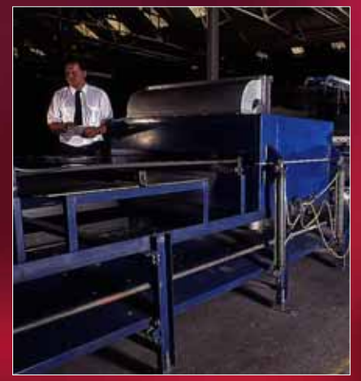
The manufacturing process comprises three essential stages:

(a) Mixing, extrusion and crosslinking

The polymer is blended in-line and extruded into solid sheet form. This sheet is then cross-linked, a process that enhances material strength, durability and temperature resistance.

Crosslinking is effectively the formation of a lattice like structure at molecular level. It gives benefits in many areas such as thermal moulding. A high temperature window exists where crosslinked foams can be compressed or stretched and when cool they retain their shape. (Non crosslinked materials would collapse and melt at these temperatures.)

The sheet is subsequently cut to size, ready for the gas solution process.



Extrusion

(b) Impregnation and saturation

The plastic slabs are loaded into a carriage system that feeds into high-pressure autoclaves where they are heated above softening temperature in an atmosphere of pure nitrogen. Process temperatures of up to 250 °C (482 °F) and pressures of up to 10,000 psi (670 bar) combine to dissolve the nitrogen gas into the molecular structure of the softened plastic. Final cooling retains the nitrogen in the plastic.

Impregnation

(c) Final expansion

The nitrogen charged slabs are loaded into a low-pressure autoclave where the material is again heated above its softening temperature under moderate gas pressure. When this pressure is removed the nitrogen expands, physically foaming the soft plastic in a uniform manner.

Expansion

Pushing the boundaries

The use of this unique manufacturing route enables foams to be produced from polymers such as HDPE and other technical polymers that could not be foamed easily using any other method.

The separation of these manufacturing stages allows very accurate control of the individual parameters that govern the production of these high quality foams and contribute so fundamentally to their performance properties, cell size uniformity and consistency.

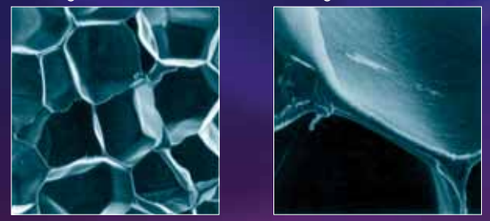
The fundamental difference

The superiority of Azote foams, compared with polyethylene foams made using other technologies, stems directly from the use of this high pressure gas technology.

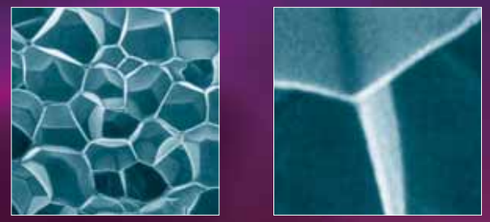
It produces a pure, low odour, chemically inert foam without blowing agent residues and with a uniform cell structure and regular cell walls.

Most other crosslinked technologies use chemical blowing agents that react at temperature and release a gas into the plastic in order to create the foam. Non-crosslinked foams have been expanded using ozone depleting CFCs, HCFCs, HFCs and more recently, flammable volatile organic compounds (VOCs). Residues of the chemicals blowing agents remain within these materials and can be seen with a relatively low level of magnification. The presence of these residues within foams can detract from their physical properties and can sometimes act as reactive impurities or contaminants. They cause an unwelcome odour and may even continue to react upon subsequent heating, further expanding the foam.

Magnification x 50 | Magnification x 500



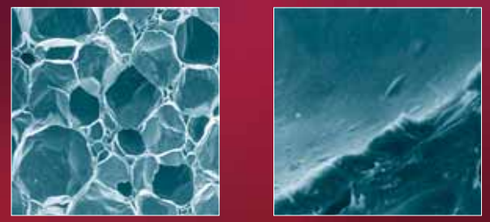
Plastazote® foam



Evazote® foam

These photomicrographs show the cell structures of polyolefin foams made by different methods. Note the uniform and regular cell walls of the Plastazote and Evazote samples that give the foams their consistent and isotropic mechanical properties.

Magnification x 50 | Magnification x 500



Cross linked and chemically expanded LDPE foam

Non cross-linked LDPE foam

The small-scale imperfections in the chemically blown samples can seriously reduce the mechanical strength of the foam. Irregular cell structure can cause significant variation in density throughout these foams that, in turn, may lead to fabrication difficulties.

No other manufacturing route can produce foam with such a consistent cell structure as that achieved with the Zotefoams process.

Cell size consistency is highly important for optimum workability, colour uniformity, impact absorption and physical performance predictability.

The unique nitrogen expansion process results in the AZOTE range of foams produced from a wide range of polymers, including:

- **Low Density Polyethylene (LD)**
- **High Density Polyethylene (HD)**
- **High and Low Density PE Mix (HL)**
- **EVA copolymers (EV & VA)**
- **EMA copolymer (EM)**
- **Polypropylene (PP)**

Polymer	Nominal density in kg/m³																				
	15	18	24	25	26	29	30	32	33	34	35	45	47	50	60	65	70	79	80	115	120
LD	●[4]	●	●[4,1]			●	●[3]	●[2]	●[4]			●[1]		●[2]	●		●				
HD							●								●				●	●	
HL										●			●					●			
EV							●					●[2]		●			●[2]				●[2]
VA				●							●					●			●		
EM					●																
PPA							●														

1 Available as Flame Retardant Grade (FR)
2 Available as Conductive Grade (CN)
3 Available as Static Dissipative Grade (SD)
4 Available as Flame Retardant Grade to meet FMVSS specification (FM)

Azote foams are available in a wide range of densities, ranging from 15kg/m³ (1lbs/ft³) up to 120kg/m³ (7.5lbs/ft³)

THE products

TO STIMULATE YOUR IMAGINATION

Plastazote® Foam

Closed cell, cross-linked polyethylene foam.

A wide range of polymer combinations is available to give increased stiffness, improved temperature resistance and improved mouldability. Application areas include packaging, marine, protective padding in contact sports, automotive, health care and construction. The inert qualities of Plastazote foam have led to its widespread use in healthcare applications.

Evazote® Foam

Closed cell, cross-linked ethylene copolymer foam.

Evazote foams are more resilient than Plastazote foams and are mainly used in a wide range of sports, leisure and footwear applications. Evazote is also used widely in the construction industry where its enhanced durability, along with its sealing properties and chemical resistance qualities, make it ideal for expansion joints.

Supazote® Foam

Closed cell, cross-linked ethylene copolymer foam.

The softest foam in the range recommended for 'soft touch' applications. Zotefoams' products are used in the manufacture of a variety of sports and leisure equipment such as buoyancy aids. Supazote is also an excellent inert thermal insulating material that can accomodate any size of space or gap.

Propozote® Foam

Closed cell, 100% polypropylene foam.

Propozote foam has high temperature resistance and can be recycled. Main application areas are in the automotive industry where high temperature performance is a requirement and returnable packaging industries where the material is subjected to rigorous sterilisation processes.

Colour

Many grades are available in bright attractive colours.
See Colour Waves folder for details.

Special Properties

Special grades are available with flame retardant properties (so essential in the aerospace, automotive and construction industries) and with conductive and static dissipative properties for the transit packaging and storage of electronics devices and EMC shielding.

THE

performance

TO DEVELOP YOUR PRODUCT POTENTIAL

- PURE
- NON CORROSIVE
- CONSISTENT
- LOW WEIGHT
- HIGH STRENGTH AND DURABILITY
- GOOD AESTHETICS
- WATER AND CHEMICAL RESISTANT
- CONDUCTIVE
- FLAME RETARDANT
- INSULATIVE
- BUOYANT
- EASY TO PROCESS AND MANIPULATE
- ENERGY ABSORBING

Rib formers for FRP marine construction.

CONSISTENT
The high consistency and stress free nature of Azote foams enables extremely complex shapes to be produced with great accuracy and processing and fabrication is eased. Sheet material can be cut to 1.0mm thickness.

Complex, lightweight packaging for in-flight medical diagnostic unit

Professional and military camping mats

INSULATIVE
Azote foams' thermal and sound insulation properties are of benefit to the building, aircraft and automobile industries and encourage its use in cold weather camping mats

LOW WEIGHT
Weighing as little as 1.5% of the solid polymer, Azote foams are ideal for many applications where weight is a cost penalty, from automotive to marine and aerospace.

Lightweight, flame retardant insulation for aircraft

Lightweight aircraft seating and interiors

FLAME RETARDANT
Flame retardant grades are used in many aerospace applications such as aircraft seating.

Moulding used to shape prosthetic legs

Thrust rocket motor cradle

NON CORROSIVE
The use of pure nitrogen for expansion ensures Azote foams (unlike chemically blown foams) have no corrosive residues, encouraging its use for long term protection of munitions and weapons

HIGH STRENGTH AND DURABLE
Much re-useable packaging depends on the durability of Azote foam for its longevity. From dunnage to protective inserts for cases and boxes, Azote foams are the natural preference.

Returnable transit packaging used by automotive manufacturers

Safety buoyancy in Man Overboard Boat (MOB)

BUOYANT
Suitable for many buoyancy applications from floating oil pipelines and boats to personal flotation devices.

Customised packaging for the protection of fine art

Static dissipative packaging for sensitive electronics devices

GOOD AESTHETICS
Outstanding aesthetic properties add a further dimension to retail packaging protection. The colour depth and uniformity of Azote foams are unmatched.

Display packaging for perfume brand

Complex moulded gaskets and noise control components for the automotive industry

EASY TO PROCESS
The consistency and crosslinking of Azote foams makes them easy to manipulate and fabricate. Azote foams are ideal for conversion using common thermoforming techniques.

PURE
The purity of Azote foams makes them ideal for a range of hygienic applications in the healthcare field. It also makes Plastazote the material of choice for protecting valuable artworks and museum pieces during storage and transit.

CONDUCTIVE AND STATIC DISSIPATIVE
These special grades are highly suited to the protection and packaging of electronic equipment, assemblies and components as well as for EMC/RFI shielding and gasketing.

WATER & CHEMICAL RESISTANT
These inherent properties make Azote foams ideal for a range of applications from automotive gaskets to expansion joints and eaves fillers for the building and construction industry.

Expansion jointing for civil engineering project (Shae Stadium, Home of Major League Baseball's New York Mets)

Impact absorbing sports wear for personal protection

GOOD ENERGY ABSORPTION
Sports protection benefits from Azote foam's energy absorbing properties as does a whole range of returnable packaging applications.