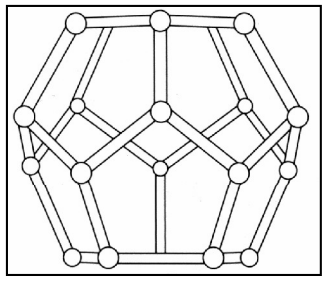
Zotefoams plc

Technical Information Sheet – TIS 13
(previously T10)
Weathering of Azote Foams



INTRODUCTION

Zotefoams plc products are based on polyethylene (LD/HL/HD), ethylene, copolymers (EV/VA) or polypropylene (PA). Ultra Violet (UV) stabilisers are not normally incorporated. The stability of the foam depends on that of the basic polymer and any pigments present.

Weathering performance is dependent on a number of factors which in real exposure situations are uncontrolled, e.g.:

- Intensity and duration of (locations near the equator have a higher radiation intensity)
- Incident angle of radiation
- Temperature radiation
- Ozone level
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Although accelerated ageing tests under controlled conditions are commonly performed, the relation between such tests and actual outdoor results is not clearly defined. The results given in this document should only be regarded as a guide.

The type of deterioration due to weathering may include:

- Colour fading
- Embrittlement
- Surface cracking
- Surface powdering
- Shrinkage

Ageing periods which may affect the surface of foams do not necessarily affect the interior.

OUTDOOR STORGAGE OF ZOTEFOAMS PLC MATERIALS

Problems can arise when storing foam outside:

Heat Effects
Stored in direct sunlight with little air circulation (including wrapped in film), the foam can become very hot and the heat cannot escape. In extreme cases the edges of the sheet can become distorted and the sheet can shrink. Particularly susceptible are: the ethylene copolymer foams, which have lower operating temperatures; dark colours, which absorb heat energy; and materials which have already been split.

Sunlight
UV degradation can occur as a result of exposure to sunlight. Effects worsen with length of exposure and intensity. Polypropylene foams are particularly susceptible.

It is recommended that foam be stored out of direct sunlight during sunny weather. Storage inside is the preferred option although storage in the shade or covering the foam in a loose fitting thick white hood will reduce the effects of heat and sunlight. Propozote® foam should be protected by a suitable UV blocking material when stored in daylight.

Dimensional Stability
Converters should be aware that changing climates can cause slight dimensional changes in foam. Material should be equilibrated with the environment prior to fabrication of products with tight tolerances.

GENERAL OVERVIEW OF UV RESISTANCE

The following have an effect on the resistance of a foam item to UV:

Colour	Colour of the foam has the largest effect. Black has superior resistance compared to white and other colour.
Polymer	The polymer type has the next largest effect. Plastazote® foam LD and MP grades have superior UV resistance to Plastazote® foam HD, HL grades and Evazote® foam EV and VA grades. Propozote® foam PA grades have relatively poor UV resistance.
Density & Thickness	Increasing foam density has a small positive effect on UV resistance as it has a limited penetration depth. If the object being exposed is very thick, the loss of mechanical performance will be negligible, the effects being restricted to the surface.

It is strongly recommended that black foam grades are used in all circumstances where extended outdoor exposure is expected.

Plastazote® Foam - LD and MP White Grades

Results indicate that in UK conditions, foam surface deterioration (yellowing/powdering) can occur over a period of 1-2 years. Over longer periods surface cracking can occur extending into the interior of the foam. Thin samples (<5mm) can become brittle and over such periods though thicker samples can maintain useful properties. In locations where increased exposure is found, deterioration will occur more rapidly. Higher density foams will deteriorate slightly less than those of a lower density.

Plastazote Foam® - LD and MP Colours and Black

Pigments used in Zotefoams plc products are selected to have excellent light stability. Little colour fading will be found during the service life of LD colour grades. Deterioration of physical properties is similar to that of white grades, which contain no pigment. The exception is Plastazote® foam LD Black. Tests have shown that all black grades have considerably better weathering resistance than white or colour grades. Little deterioration has been found in accelerated ageing equivalent to several years actual exposure.

Evazote® Foam Grades

Behaviour of EV and VA foam grades is similar to, though slightly worse than, that of corresponding LD and MP grades. Note, however, that EV grades in particular can shrink at high temperatures, which may be reached if black Evazote® Foam is exposed to strong sunlight in windless conditions.

Plastazote® Foam HD Grades

Weathering resistance of Plastazote® foam HD grades is generally lower than that of LD grades, and deterioration (usually embrittlement), may be expected around 1 years exposure. As with LD grades, higher densities show greater weathering resistance and black HD grades show little deterioration over periods equivalent to several years exposure.

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