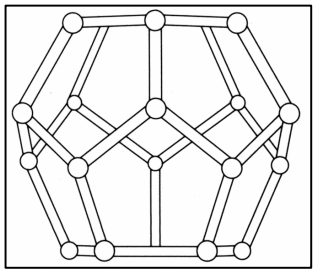
Zotefoams plc

Technical Information Sheet – TIS 01N
Product Specification



ZOTEFOAMS ZOTEK® N BRAND FOAM PRODUCTS

The information below is the Zotefoams plc general specification for each of the products identified, unless otherwise agreed between Zotefoams and the customer. Normally, the foam attributes and properties would be expected to fall well within the limits given in this document, but occasionally properties may approach these limits.

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This specification may be amended periodically in line with our policy of continual improvement. For critical applications or significant new projects we would recommend that customers contact the Zotefoams Sales department before ordering.

1. GENERAL INFORMATION

The ZOTEK® N brand products comprise a range of crosslinked, closed cell foams, physically blown using pure nitrogen gas and based on polyamide polymers. All grades are thermoformable, though the degree of detail and complexity of moulding possible will vary between grades.

The ZOTEK N brand products are manufactured and sold as essentially rectangular sheets (sometimes known as buns or blocks) in a range of sizes, all having process skin surfaces. Talc residues or other processing aids may be present on the skin surfaces.

All information within this specification refers to the products in the form of sheets with process skins unless otherwise stated.

2. PRODUCT DESCRIPTIVE CODES

All ZOTEK N foam products are identified by a descriptive code based on a system that distinguishes the polymer category, nominal density, variant type (if applicable) and colour in that order.

i) ***Polymer Code:*** All polyamide foam products are identified by the descriptive code "**N**". Within the range other polymers are identified by the additional description "**A**" or "**B**".

e.g. *ZOTEK N A30 and ZOTEK N B50 are both polyamide foams but use a different grade of polyamide polymer or blend.*

ii) ***Density Code:*** 2 or 3 digits describing the nominal density (in kg/m³)

iii) ***Variant Code:*** Where special properties have been imparted to foam, a variant code is used to identify these:

FR – Flame retarded version

vi) ***Colour Code:*** Full colour name in English.

vii) ***As an example of the above:***

ZOTEK® N B50 Black	=	ZOTEK branded polyamide foam with a nominal foam density of 50 kg/m³ in black.

3. PRODUCT TYPES

i) Sheets, rolls and laminated sheets: Are classified as:

skin/skin (s/s)	skin/cell (s/c)	cell/cell (c/c)
Product retains both process skin surfaces.	Product has one process skin removed.	Product has both process skins removed.

Note: *Any product may have had one or more edge skins removed.*

4. PRODUCT SIZE

i) Sheets *[Test method : ISO 1923:1995]*

Sheet sizes are defined by length, width and thickness. Nominal dimensions are the dimensions specified on the acknowledgement of order. For skin/skin sheets nominal dimensions (process skins are considered an integral part of the sheet) are the minimum dimensions and will always be met or exceeded.

5. PRODUCT PROPERTIES

i) *Density* [*Test method : BS ISO 7214:1998*]

Foam densities are measured with process skins intact unless otherwise stated. Density ranges by product are given in Table 1. The density range applies irrespective of foam sheet size or colour.

ii) Mechanical Properties [*Test method : Technical Data Sheets*]

Technical data sheets are published listing a range of property values relating to Zotefoams ZOTEK N brand foam products. The data sheet property values are typical of the material when conditioned as described in the handling and manufacturing guide and are intended to provide guidance to customers; they do not constitute a specification and different product designations with the same properties on the data sheet will have different manufacturing tolerances.

Where a specification is required, this should be made and agreed in writing with Zotefoams plc Quality Assurance Department

iii) Moisture content

The properties and handling of polyamide foams is moisture dependent. To ensure foams remain at their optimum processability the guidelines handling and manufacturing provided in a separate document need to be taken into account.

6. PRODUCT APPEARANCE

i) Voids [*Test Method : Zotefoams Internal*]

The method takes into account the perceived seriousness of the void in so much as small voids (≥1 - ≤ 2 mm diameter) are assessed by physical count of an area of a square metre, medium sized voids (>2 - ≤ 4 mm diameter) are counted and then the sum of the cube of all the diameters is quoted per square metre (i.e. one 3 mm diameter void in 1 m^2 = 27). Large voids (>4 - ≤ 5 mm & >5 mm in diameter) are physically counted over an extended area of 15m^2.

The above are arranged into void categories and these categories are quoted for the different grades in Table 1. The category description and the void levels these represent are given in Table 2.

ii) Cell Size [*Test method : Zotefoams Internal*]

Cell size ranges by product are given in Table 1.

iii) Colour [*Test method : Zotefoams Internal*]

Variation may be found between production Lots and/or individual sheets.

The colour appearance of product will be affected by cell size; for the same colour product, larger cell size appears darker, smaller cell size appears lighter. Perceived colour will therefore be affected by the cell size ranges in Table 1.

iv) Surface Condition [*Test method : Zotefoams Internal*]

The products as manufactured will normally show an embossed pattern on one process skin surface. All process skins may occasionally have slight surface marks, indentations or discolouration. Talc residues, water, other processing aids or paint marks used by Zotefoams plc during manufacture may be present on the skin surfaces and/or edges. No guarantee is offered in relation to the skin surface.

v) Internal Condition [*Test method : Zotefoams Internal*]

The products as manufactured may show internal patterns and markings within the cellular structure. Such appearance faults may be very subtle and would not normally affect foam performance.

vi) Sheet Flatness (cell/cell) [*Test method : Zotefoams Internal*]

When sheets are split some waviness may occur at the edges of the sheet. The amplitude and frequency is dependent on the thickness of the split sheet, the original sheet thickness, the product density and the process history of the sheet. Typically a 6 mm thick split from a 30 mm flat sheet would be expected to have no more than 3 waves along its length. These would be less frequent with thicker splits. This waviness would not normally affect the sheet performance and may be further alleviated by trimming of the product prior to splitting through the thickness

vii)Distortion / Bowing (skin/ skin) [*Test method : Zotefoams Internal*]

Distortion is the maximum curvature of a sheet and is the measured difference between the apparent thickness over the curvature and the actual thickness of the

sheet. Distortion is measured using a standard measuring table and for all skin/skin sheets shall be no more than 30 mm.

TABLE 1 : SPECIFICATION FOR DENSITY, CELL SIZE, VOIDS & THICKNESS YIELD

PRODUCT REFERENCE		SHEET DENSITY[a] S/S		CELL SIZE		THICKNESS YIELD
GRADE	VOID Category	MIN (kg/m^3)	MAX (kg/m^3)	MIN (mm)	MAX (mm)	MIN (mm)
N B50	G	41	57	0.1	0.45	s/s nominal -3mm
N A30[b]	H	23	35	0.3	0.6	s/s nominal -3mm

TABLE 2 : MAXIMUM VOID LEVELS BY CATEGORY

	≥1 - ≤ 2 mm [No./m^2]	>2 - ≤ 4 mm [$\Sigma(D)^3/m^2$][c]	>4 - ≤ 5 mm [No./$15m^2$]
Category G	80	200	1
Category H	80	200	3

D = *Void diameter in mm on any split surface.*

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Zotefoams plc Management systems are covered by the following:

bsi. ISO 9001 Quality Management FM 01870

bsi. ISO 14001 Environmental Management EMS 36270

bsi. OHSAS 18001 Occupational Health and Safety Management OHS 52538

[a] Cell/cell densities are lower than the densities quoted. The difference will vary depending on grade and sheet thickness.
[b] This specification is provisional
[c] Sum of the cube of the void diameters (in mm) per unit area of foam.