



Product Information Data Sheet

**POLYURETHANE – FLEXIBLE FOAM**

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<u>Issue Number:</u>	BPF – 1
<u>Product:</u>	Flexible Polyurethane Foam
<u>Manufacturers:</u>	Members of the Flexible Foam Group (FFG) of The British Plastics Federation
<u>Address:</u>	6 Bath Place Rivington Street London EC2A 3JE U.K.
<u>Tel:</u>	020 7457 5049
<u>Fax:</u>	020 7457 5045

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***IMPORTANT INFORMATION***

Polyurethane foams are industrial polymers in the form of an “Article” or “Product”. They are NOT substances and are outside the scope of EU Material Safety Data (MSDS) legal requirements. Polyurethane foams are also not considered to be hazardous products nor as mixtures of dangerous substances. As a service to customers, however, FFG has produced this Product Information Data Sheet.

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**A) Product Identification**

Product Name:	Polyether foam Polyester foam Combustion modified ether (CME) foam Combustion modified high resilience (CMHR) foam High resilient (HR) polyurethane foam Polyurethane foam, Viscoelastic foam Rebond/ Chip Foam
Composition:	Polyurethane polymer
Chemical description:	Polyaddition products of isocyanates, polyether/ polyester polyols and water. Controlled by catalysts, stabilisers and other substances resulting in cellular polyurethane foams. Levels

of residual materials contained within the foam do not require labelling under existing EU directives.

CFCs, BHT and PBDEs are not employed.

Appearance:	Cellular flexible foam unpigmented (white) or in various colours as described in individual specification sheets.
Regulatory Information:	Polyurethane foam is considered to be an "article".  No labelling is currently required for this product by existing EU Directives on Classification, Packaging and Labelling of Dangerous Substances.

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## **B) Physical Properties**

Physical form/appearance:	Solid elastic material, varying in density, hardness and cell structure. May also be in any colour.
Specific gravity:	15-70 kg/m <sup>3</sup>
Solubility in water:	Insoluble
Flash ignition point:	Between 315 °C to 370 °C
Thermal energy:	28 000 kJ/kg
Stability and reactivity:	The polymer is stable at temperatures between -20 °C and +120 °C, but prolonged exposure at elevated temperature may cause some loss of volatile components (e.g. flame retardants) through evaporation. Unprotected foam will discolour in the presence of UV light but with little effect on physical properties. Solvent resistance varies dramatically with foam and solvent type. Consult your supplier for further information.

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## **C) Fire Hazard Identification**

Auto-ignition point:	Above 200 °C. A range of values for standard (ASTM D 1929) polyurethane formulations have been quoted to be between 370 °C and 427 °C.
Fire hazard:	Standard polyether/polyester foams will resist ignition by a smouldering cigarette, but can be readily ignited by open flames such as burning matches. Once ignited, they burn rapidly and like many other products, will generate molten material,

intense heat, dense smoke and toxic gases. Smoke from a foam fire can contain decomposition products such as carbon black, carbon monoxide, carbon dioxide, gaseous hydrocarbons and nitrogen containing products (e.g. hydrogen cyanide, oxides of nitrogen) in various concentrations depending on the combustion conditions.

In the event of a fire, evacuate premises immediately and call the Fire Brigade. Avoid inhalation of smoke and gases.

**Combustion Modified Foams:** Combustion modified foams comply with the Furniture and Furnishings (Fire) (Safety) Regulations 1988. This means that they are much more resistant to ignition than standard and high resilience (HR) foams, and under normal circumstances, they will resist ignition by a BS5852 No.5 crib (approximately equivalent to a sheet of burning newspaper). If they are ignited by a larger flame source, however, they will still sustain fire and will still produce smoke, heat and toxic gases.

Halogenated flame retardants can lead to the formation of some irritant gases (e.g. low concentrations of hydrogen chloride).

**Suitable fire extinguishers:** Water, liquid foam, carbon dioxide, dry powder.

**Human protection in large fires:** Fire fighters should wear positive pressure, self-contained breathing apparatus.

**Storage & Processing:** When polyurethane foams are stored or worked in bulk, they represent a high fire risk with consequent risk to life if adequate fire precautions are not observed. While, as stated above, CM foams have superior resistance to ignition they will, if ignited, burn rapidly.

It is essential that all users read carefully the British Rubber Manufacturers' Association Ltd (BRMA) leaflet *Flexible Polyurethane Foams: Safe Industrial Storage and Use* and the HSE publication referred to therein. Copies of which are available from the British Plastics Federation.

Downstream processors (e.g. hot-wire cutting, crumbing, solvent lamination, flame lamination etc.) need to have taken expert guidance on the

fire precautions that need to be in place in their own specific premises and operations.

When processing any plastic material the use of a hot wire or flame to cut, weld or adhere flexible polyurethane foam does have the potential to generate vapours which may contain traces of toxic materials. With polyurethanes this could include free diisocyanates. Workplace analysis must be carried out in order to comply with Government guidelines. Abatement techniques are recommended for treatment of the extracted fumes.

#### **D) Toxicological Data**

Oral: There is no evidence that PU foam is toxic when ingested.

LD50 (oral-rats) >5000 mg/kg.

Inhalation: Dust from flexible polyurethane foam does not present a special hazard but, operations such as crumbing or buffing can create nuisance dust particles. In common with all other nuisance dusts, this can cause irritation to the eyes and respiratory tract or lung infection, airway obstruction and fibrosis. In-house hygiene measures should conform to the National Occupational Exposure standards for nuisance dusts. In the UK, the COSHH definition of a substance hazardous to health includes dust of any kind when present at a concentration in air equal to, or greater than, 10 mg/m<sup>3</sup> 8-hour TWA of inhalable\* dust or 4 mg/m<sup>3</sup> 8-hour TWA of respirable\* dust. This means that any dust will be subject to COSHH if people are exposed above these levels. Advice on control is given in EH 44 *Dust: General principles of protection* and, in the great majority of workplaces, reasonable control measures will normally keep exposure below these levels.

\* (The definitions of "inhalable" and "respirable" dusts are contained in HSE's EH40/2005 Workplace Exposure Limits.)

Dust of any kind is a fire hazard and as such, accumulation should be kept to a minimum by good housekeeping.

Skin contact: No adverse effects are known following contact with PU foam.

Eye contact: Dust particles can cause mechanical irritation. Rinse with water to remove dust.

Microbiological contamination: PU foam is sterile when manufactured.

## **E) Protective Measures in Handling, Storage and Processing**

General handling: PU foam at normal temperature presents no risk to health. Special protective equipment and clothing is not necessary when handling foam, since it does not irritate the skin, eyes or respiratory system except in those processes where dust is produced.

Ventilation: Provided there is adequate general ventilation, most handling and cutting operations require no special precautions.

Local exhaust ventilation is necessary for special operations where abnormal dust is produced (e.g. buffing, flocking) or where thermal decomposition occurs (e.g. flame lamination, heat forming, hot wire cutting).

Storage: Store away from heat sources (match, cigarette, open fire, electric heater, vehicle exhausts etc.). Full information is available in *Safe Use and Storage of Cellular Plastics*, HS (G) 92, (ISBN 0 7176 1115 9). Sunlight (UV) or combustion fumes can cause surface discoloration. This is a surface effect, which does not impair physical performance.

Protective clothing: Not required.

Eye protection: Protective goggles should be worn for processes that generate dust.

Other measures: No specific measures are needed when handling cured foam. However, it is recommended that gloves are worn, such as cloth gloves for cured blocks and nitrile rubber for freshly manufactured foam, should be used.

See also section C, regarding fire hazards.

**F) Ecological Information**

Biodegradability:	Depending on the type of PU foam, the product should not present problems due to its extremely low solubility in water. In soil polyether foam biodegrades very slowly (polyester foam disappears pretty rapidly via hydrolysis maybe linked with biodegradation).
Additional ecological data:	In the event of a foam fire, normal environmental controls should be used for extinguishing water. Compared to many other burning materials, PU foam does not require specific ecological measures.

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**G) Transport Information**

Labelling:	PU foam is not classified for conveyance or supply under the <i>Carriage of Dangerous Goods and Use of Transportable Pressure Equipment (Amendment) Regulations 2005</i> . The product is not classified as hazardous for any mode of transportation under current EU/UN regulations.
	The export code for the transportation of Polyurethane Foam throughout the world is 3921130.
Measures:	No special steps need to be taken for the transportation of PU foam.

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**H) Disposal Considerations**

Production trim:	Various methods are available for the recycling of uncontaminated production trim. Off-cuts can be baled, crumbed or shredded or rebonded to produce reconstituted foam.
	Any other form of disposal should be strictly in line with local and government regulations and might include approved landfill or incineration.
Post consumer waste:	If recycling is not possible, post consumer PU foam waste can be disposed of at licensed landfill sites or by incineration under controlled conditions. Advice on the preferred method should be sought from the Local Waste Regulation Authority.

Legislation: Under EU environmental Regulations and Directives, there are no special requirements for the disposal of polyurethane foam. At present flexible polyurethane foam wastes are classified as "200307 bulky waste" and "200301 mixed municipal waste" in the European Waste Catalogue and are, as such, accepted for landfill with certain exceptions. In some EU Member States the phasing out of landfill for untreated municipal solid waste has already started e.g. in Germany the landfill of untreated municipal solid waste has been forbidden since 1<sup>st</sup> June 2005

### **I) Composition and Chemical Characterisation**

Definition: Flexible polyurethanes are polymers and defined in data systems, i.e. IMDS, as material, not as a chemical compound.

Manufacture: In the manufacturing stage, a series of raw materials are used. These include isocyanates, polyols and water. These ingredients are reactive and form the PU matrix of the polymer. In addition, other essential additives of different characteristics are used in lesser concentrations and some of these may also be chemically bonded to the PU matrix.

Depending on the grade, the PU foam may also contain any of the following substances in non-notifiable concentrations:

Aliphatic and/or cycloaliphatic amine catalysts  
 Flame retardants  
 Plasticisers  
 Silicone and/or organic surfactants  
 Stannous octoate catalyst, tin oxide  
 Organic and/or inorganic pigments

No detailed breakdown of the finished foam for any of these raw materials or additives can be expressed as final percentages as most are reactive and chemically bonded to the PU matrix, or disappear gradually during the curing phase (24hours).

**J) Disclaimer**

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of Members of the Flexible Foam Group (FFG) of the British Plastics Federation. The data on this sheet relate only to the specific material referred to herein. FFG assumes no legal responsibility for use of, or reliance upon, this data. For information regarding specific applications of the product, individual members of FFG should be contacted.

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**K) Other Information**

This Datasheet has been supplied on behalf of BPF and FFG by:

Vitafoam Ltd  
Oldham Road  
Middleton  
Manchester  
M24 2DB  
UK  
Tel: +44 (0) 161 655 2663  
Fax: +44 (0) 161 655 3198

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Copies of the publication "Flexible Polyurethane Foam – Safe Industrial Storage and Use" from the British Manufacturers' Association are available via the British Plastics Federation.

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