DATA SHEET

This issue of data sheet T5, November 1994, supersedes all previous issues. Where the text differs from the previous issue, November 1992, this is shown in Italics.

1. INTRODUCTION

This data sheet provides guidance on the storage, handling and processing of all Zotefoam products. PLASTAZOTE foam encompasses Low Density (LD), High Density (HD) and HL (Blend of LD and HD) expanded cross-linked polyethylene grades and the expanded cross-linked Metallocene catalysed polyethylene (MP) grades. EVAZOTE foam and SUPAZOTE are expanded cross-linked ethylene copolymers, whilst PROPOZOTE foam is an expanded propylene copolymer. There is no essential difference in the hazards associated with any of the materials and the information given below also applies to all Zotefoams products unless otherwise specified.

2. POTENTIAL HAZARDS

2.1 Toxicity
Plastazote foam is chemically unreactive and tests have demonstrated that it is biologically inert.

2.2 Inhalation – (Fume Evolution)
There is no release of any noxious fumes from Plastazote foam at ambient temperature.

2.3 Ingestion
Ingestion of Plastazote foam should be avoided, although the material is inert and can be regarded as toxicologically harmless except for some flame-retardant grades containing additives, which could be harmful if swallowed.

2.4 Physical Contact
Plastazote foams are considered not to be skin irritants but since the basic polymer is fairly hard, under some circumstances foams can have a minor abrasive effect on skin. Particles of foam may cause physical irritation if they get into eyes. No cases of allergic reaction of
Plastazote foam have been confirmed in over twenty years of use and this is supported by cytotoxicity tests.

2.5 Fire, Ignition and Burning Characteristics

When Plastazote foam is heated in air, softening will occur at 105-115°C (for Evazote foam 85-90°C; for Supazote foam 70-80°C) and decomposition will occur at about 300°C. Above this temperature Plastazote foam will pyrolyse oxidatively to produce carbon monoxide and water plus small amounts of various hydrocarbons and aldehydes. The evolved gases may ignite, and if they do they will provide heat of combustion pyrolysing more foam and any other in the vicinity. Under flaming conditions the main combustion products are carbon dioxide and water, although if insufficient oxygen is present, or when the flame is extinguished, the smoke may contain appreciable quantities of carbon monoxide, acrolein and other aldehydes. Burning can be accompanied by the release of flaming molten droplets, which could ignite adjacent flammable materials.

Some flame-retardant grades contain toxic additives designed to reduce the ignitability and flame spread from small heat sources. In a full-scale fire these materials can burn to give dense black smoke and acrid fumes.

These comments can only be of a general nature since the conditions of a real fire cannot be fully predicted.

3. RECOMMENDED PRECAUTIONS FOR TRANSPORTATION, HANDLING AND STORAGE

3.1 General

Plastazote foams are normally supplied as sheets or slabstock as manufactured with process skins. Material may be supplied loose or stretch-wrapped on pallets. Split sheets are supplied wrapped in paper or polyethylene bags.

The products are chemically stable at room temperature and as no fumes are produced under normal conditions no special precautions need to be taken on this account.

Plastazote foams can show a deterioration in physical properties if exposed for extended periods to strong sunlight, and this will apply also to the film used for wrapping stacked pallets. It is therefore recommended that materials are stored out of direct sunlight.

Additional the outer surfaces of products wrapped in transparent film and exposed to strong sunlight have been found to reach temperatures sufficiently high to cause shrinkage and warping of sheets at the top and side of the stack. This particularly applies to Evazote foam and Superazote foam. It is due to a 'greenhouse' type of effect and is an additional reason for recommending storage out of direct sunlight.
The handling and stacking of Plastazote foam, as with all insulating materials, can generate static electric charges, which may discharge through operators causing minor discomfort.

Such static discharges may cause ignition of vapours from flammable solvents and such materials (together with any other materials subject to ignition or damage from static discharge) should not be stored adjacent to Plastazote foam (see also 4.2.2 and 4.2.8).

Plastazote foams are combustible, and good housekeeping is necessary to minimise the possibility of accidental fires. Excessive heating can cause Plastazote foam to decompose giving off combustible fumes with consequent fire danger. Plastazote foam should be stored well away from any direct heat source. Users who stock large quantities are recommended to review their precautions with regard to fire and consult the local fire prevention officer.

3.2 Fire – Action in the Event of a Fire Involving Plastazote Foam

Any commonly available extinguisher may be used. Water, particularly in the form of a spray, has been found to be very effective but may be inadvisable in certain circumstances; e.g. in close proximity to electrical installations. It is recommended that advice should be sought from the local Fire Authority on fire fighting equipment and procedures.

4 RECOMMENDED ADDITIONAL PRECAUTIONS

4.1 Effect of Heat

As with all polyolefin based materials, Plastazote foam undergoes minor thermal degradation at temperatures approaching 200°C and small quantities of organic volatiles are generated.

Work carried out for Zotefoams by RAPRA Technology Ltd has investigated the thermal treatment of Plastazote foams. This work shows that there is a very low emission of volatile species of temperatures up to 190°C.

4.2 Processing Methods
4.2.1. General

The following notes are given to indicate hazards associated with the main processes used to convert foam sheets into finished parts. Good housekeeping by segregation and removal from the working areas of off-cuts and waste should be adopted. Machines should be cleaned regularly to remove any build up of dust and to eliminate the risk of a dust explosion.

4.2.2 Knife Cutting

For this technique it is recommended that, if continuous sharpening of the knives is employed, the grinding wheels are enclosed or so arranged that sparks cannot impinge on any off-cuts or dust produced by this process.

Static build up on large cut areas has been observed and although this is not hazardous, for employee comfort some form of dissipation may be necessary. Efficient earthing or ionisation of the air has been used satisfactorily (see also 3.1 and 4.2.8).

4.2.3 Press Cutting

No special employee protection is necessary beyond the normal safety precautions for power-operated presses.

4.2.4 Bandsawing and Routing

No special employee protection is necessary but wood-working machinery regulations should be observed.

4.2.5 Hot wire cutting and heat laminating

Safety interlocks which cut off the heat supply when Plastazote foam is in contact with but not moving past the heat source are recommended. Small quantities of fumes are produced during this process and it is recommended that these be extracted to the outside of the building. (See also 2.5).

4.2.6 Grinding

Profiles can be formed in Plastazote foam using coarse grit grinding wheels. For this technique continuous extraction of the dust produced is recommended. The dust exhaust system should be earthed to prevent the build-up of static, and regularly cleaned out.

Operators should wear goggles as required by Health and Safety Regulations. Whilst not physically harmful the dust generated can
cause discomfort and normal standards of personal hygiene should be maintained.

4.2.7 Thermoforming

Plastazote foam may be formed by heating to an appropriate temperature prior to cooling in intimate contact with a cold former.

Plastazote Ltd foam, evazote foam and supazote foam grades at and below densities of 50kg/m can be handled under recommended conditions (details available on request) without gloves and do not cause burning when applied to the human body. However, for operators who have to handle large amounts of heated Plastazote foam it is recommended that for comfort gloves should be worn (cotton or corduroy has been found satisfactory). In handling grades with a density greater than 50kg/m or for handling IID and III grades, the wearing of corduroy gloves is recommended to prevent burning of the hands.

Excessive heating can cause Plastazote foam to decompose giving off combustible fumes and there is a consequent danger of fire. (See 2.5) Operators of such equipment should be aware of this hazard. Should a fire occur, power to heaters should be switched off and the fire extinguished using a carbon dioxide fire extinguisher.

In moulding operations, users should observe the normal precautions for handling heavy moulds in power operated processes.

4.2.8 Adhesives

The exposure of operators to the solvents contained in some adhesives may be subject to legal constraints. The suppliers of adhesives should be contacted for further details.

In addition, the handling, stacking or fabrication of foams can generate static charges. The use of solvent-based adhesives in circumstances where static charges could accumulate may increase the risk of fire. This risk can be reduced by adequate ventilation. When large areas of plastics foam may acquire a static charge, special static discharge facilities such as ionised air blowers or corona discharge bars may also be needed. (See also 3.1 and 4.2.2.)

5 RECOMMENDED FIRST AID TREATMENT

5.1 Eye Injuries
Any material entering the eye should be flushed with copious quantities of water. Medical attention should be obtained if soreness or redness persists.

5.2 Inhalation of Fumes (From overheated material)
An affected person should be removed as quickly as possible into fresh air, kept warm and artificial respiration applied as necessary. Medical attention should be obtained immediately.

5.3 Burns
Any molten material on the skin should be cooled as quickly as possible; e.g. in cold water, but should not be pulled off. Medical attention should be obtained immediately.

5.4 Ingestion
Rinse mouth with water and obtain medical attention.

5.5 Nasal and Aural
If small sections of Plastazote foam become lodged in the passages of the ears or nose, medical attention should be sought for their removal.

5.6 Medical Attention
It is important that medical staff involved should be advised of the nature of the material being handled and its likely decomposition products.

6 WASTE DISPOSAL

Due to the fire risk with all organic foams, off-cuts and discarded wastes should not be allowed to accumulate in loose piles but should be stored in containers which are themselves preferably non-combustible. Waste may be disposed of by controlled incineration or burial but the requirements of pollution control legislation must be observed. Advice on the preferred method should be obtained from the Local Authority Waste Disposal Officer.

Methods of recycling foam and foam products are under development.

7 APPLICATION FOR FOOD PACKAGING OR TOYS

Information on compliance of Plastazote foam with standards for these applications is available on request.

8 THIRD PARTY MATERIALS

The customer should ensure that he has received from other manufacturers or suppliers all technical data and other information relating to materials used or stored in conjunction with Zotefoam products.

9 REFERENCES

1 British Industrial Biological Research Association.
Investigation of the toxicity to cultured cells of Plastazote foams and Evazote foams. (1984)

2 RAPRA Technology Ltd, G Lawson and K T Paul
Burning characteristics of Plastazote foam and Evazote foam stacks. Analysis of combustion products. (1979)

3 RAPRA Technology Ltd, G Lawson. Thermal treatment of Plastazote foam and Evazote foam. (1979)

4 BIBRA Toxicology International. Cytotoxicity tests on samples of eight plastic foams. (1994)

Copies of these reports are available on request.

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