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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Zytel HTN

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Telephone:	(61) (02) 9577 9514
Facsimile:	(61) (02) 9577 9465

Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Zytel HTN

1. APPLICANT

DuPont (Australia) Ltd of 49-59 Newton Road WETHERILL PARK NSW 2164 has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern Zytel HTN.

2. IDENTITY OF THE CHEMICAL

The following requests for exempt information were accepted: chemical name, CAS No., molecular and structural formulae, constituents, spectral data and exact import volume.

Trade Name:	Zytel HTN
Other Name:	polyamide copolymer
Number-Average Molecular Weight (NAMW):	5 540 (GPC; polydispersity = 3.85)
Weight-Average Molecular Weight (NAMW):	21 400
Maximum Percentage of Low Molecular Weight Species	
Molecular Weight < 500:	1.4%
Molecular Weight < 1 000:	2.6%
Method of Detection and Determination:	gel permeation chromatography and infrared (IR) spectroscopy
Spectral Data:	An infrared spectrum was provided

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	opaque white pellets/granules
Melting Point:	T_g(range) = 300-307°C
Specific Gravity:	1.18
Charge Density:	not determined, but expected to be close to zero
Water Solubility:	not determined (see comments below)
Hydrolysis as a Function of pH:	not determined (see comments below)
Particle Size:	not applicable as the polymer forms a non particulate contiguous solid
Flammability:	combustible
Autoignition Temperature:	approximately 400°C
Explosive Properties:	not explosive at room temperature; if the polymer is sanded or otherwise treated to produce dust, an organic dust explosion is possible
Reactivity/Stability:	expected to be stable under conditions of use

Comments on Physico-Chemical Properties

The water solubility of the polymer is expected to be negligible given its high molecular weight and the absence of ionisable groups within the polymer. Nylons are also generally accepted as being of low water solubility.

The polymer is reported to be stable under the conditions of use, contains no charged groups, will not be cationic or anionic in the typical pH range of use and does not contain functional groups that will readily hydrolyse or further react.

The polymer meets the criteria for a synthetic polymer of low concern.

4. PURITY OF THE CHEMICAL

Residual monomers make up approximately 0.002% of the polymer with low molecular weight cyclic oligomers comprising approxmately 2%.

5. USE, VOLUME AND FORMULATION

The polymer will be imported in premixed resin composites and colours suitable for immediate use. The formulation containing the notified polymer at greater than 62% will be extruded and/or injection moulded into high temperature engineering and mechanical components for use in the automotive, electrical and electronics industries. A range of other applications may exist such as consumer products, food preparation, cookware and specialist electrical and engineering parts. The notified polymer will be imported in 25 kg Kraft paper polylined bags. The import volume in the first five years is uncertain but may be in the range of 100 – 1 000 tonnes per annum.

6. OCCUPATIONAL EXPOSURE

Occupational exposure to transport and storage workers is not expected except in the event of accidental spillage.

Plastic components containing greater than 62% Zytel HTN are produced either by extrusion of the pellets or by injection moulding of the extrudate.

Before extrusion, the bags of Zytel HTN are opened and placed in a predrying room to remove all moisture from the pellets. The pellets are manually poured into the hopper of the extruder which is heated further for compounding of the polymer. Exposure to the polymer pellets is possible during opening of bags and pouring the contents into the extruder hopper. Cleanup of spills may also result in exposure. Once in the extruder exposure to the notified polymer will not occur as the polymer is embedded and bound by heat within the polymer matrix and would not be bioavailable. Inhalation exposure to small amounts of hazardous decomposition gases and/or particulate matter may be possible during drying, purging and moulding.

The notifier refers to the Material Safety Data Sheet (MSDS), which recommends that production workers wear protective clothing and gloves to protect against thermal burns following production of hot moulded articles. In addition, exposure to compounded polymer dust may occur if articles are milled or machined.

7. PUBLIC EXPOSURE

The notified polymer will not be sold to the public but will be used by industrial customers only. There is little potential for public exposure to the notified polymer during import, storage, transport or manufacture of the end products.

Release of the notified polymer to the general environment as a result of its use as engineering or electrical parts is likely to be minimal. It is not expected that the notified polymer will

leach from these parts, as it is stable and not water soluble.

8. ENVIRONMENTAL EXPOSURE

Release

Release to the environment of the notified polymer as a result of industrial or end use product manufacture is expected to be minimal. The polymer will be fed automatically into moulding machinery from a hopper. Sprue will be reground and reused. Contaminated polymer scraps will be deposited into municipal landfills. Overall, such waste streams would account for between 1% (large production runs) and 10% (small production runs) of the annual throughput.

The notifier estimates that between 1 and 20 g of the polymer may remain in the 25 kg poly-lined Kraft boxes after emptying. The residual polymer will be disposed of to landfill along with the packaging.

Used articles containing the polymer will also eventually be deposited in landfills at the end of their useful life. No recycling of the end use articles is currently envisaged in Australia. However, the notifier is investigating a means of recycling in which the polymer is broken down into oligomers and monomers followed by purifying and repolymerising.

Fate

In the case of accidental spillage, pellets of the polymer are expected to remain where they are deposited. Should a spill occur to water, the pellets/granules should settle onto the bottom sediments, where they could be collected. Due to the anticipated negligible solubility of the polymer, leaching from landfill is highly unlikely, and no movement from the landfill site is expected.

The majority of the polymer is not expected to be released to the environment until it has been moulded into components. Biodegradation is unlikely. The high molecular weight of the substance also means that bioaccumulation is not likely to occur (Connell, 1989).

Surface photodegradation of the finished components may occur by sunlight, but this is only likely to occur after the product has been disposed of to landfill, or discarded inappropriately.

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicological data were provided. Toxicological data are not required for a synthetic polymer of low concern.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided. Ecotoxicological data are not required for a synthetic polymer of low concern.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

Disposal of the notified polymer to landfill is unlikely to present a hazard to the environment as it will be either in a pellet form or a finished product. Bioconcentration and leaching are both considered unlikely, due to the high molecular weight of the product and its insoluble nature. Biodegradation of the product is also unlikely.

The low environmental exposure of the polymer as a result of the proposed use, together with its expected negligible environmental toxicity, indicate that the overall environmental hazard should be negligible.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

Zytel HTN has been notified as a synthetic polymer of low concern. The polymer meets the criteria for a synthetic polymer of low concern and can be considered to be of low hazard to human health.

The occupational risk posed to transport and storage workers is negligible, given the expected negligible exposure to the notified chemical under normal circumstances, and the anticipated low health hazard.

The occupational health risk to workers involved in the extrusion and injection moulding of the notified polymer is low. Dermal contact is expected to be the main form of exposure. Processing of the notified polymer takes place in closed systems, after which polymer incorporated within the extruded or moulded article will not be bioavailable. Local exhaust ventilation will normally be employed to extract any decomposition gases from the work area.

The MSDS for Zytel HTN indicates the main hazards are heat and fire hazards due to the molten nature of the polymer mix during processing. Precautions should be taken to minimise skin contact with the molten extrudate. Goggles and gloves should be worn. The MSDS for Zytel HTN lists fibre glass as a significant component of the imported pellets or granules and relates the health effects of skin, eye and respiratory irritation to mechanical damage from the fibres. The NOHSC exposure standard for synthetic mineral fibres is 6.5 fibres/mL (respirable fibres) and 2 mg/m^3, 8 hr TWA for inspirable dust, if most airborne material is fibrous (National Occupational Health and Safety Commission, 1995).

There is negligible potential for public exposure to the polymer arising from importation, storage, transportation and melt extrusion or injection moulding. Similarly, the potential for

public exposure to the chemical during transport and disposal of process waste and clean-up of waste after a spill is very minor.

13. RECOMMENDATIONS

- Safety goggles should be selected and fitted in accordance with Australian Standard (AS) 1336 (Standards Australia, 1994) to comply with Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992);

- Impermeable gloves should conform to AS/NZS 2161.2 (Standards Australia/ Standards New Zealand, 1998);

- employers should ensure that NOHSC exposure standards for synthetic mineral fibres are adhered to;

- A copy of the relevant MSDS should be easily accessible to employees.

14. MATERIAL SAFETY DATA SHEET

The MSDS for the notified chemical was provided in a format consistent with that described in the *National Code of Practice for the Preparation of Material Safety Data Sheets* (National Occupational Health and Safety Commission, 1994).

This MSDS was provided by the applicant as part of the notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of the applicant.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act, secondary notification of the notified chemical shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

16. REFERENCES

Connell DW (1989) General characteristics of organic compounds which exhibit bioaccumulation. In: D. W. Connell ed. Bioaccumulation of Xenobiotic Compounds. CRC Press, Boca Raton.

National Occupational Health and Safety Commission (1994) National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1995) Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment, [NOHSC:1003(1995)]. In: ed. Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards. Australian Government Publishing Service, Canberra, .

Standards Australia (1994) Australian Standard 1336-1994, Eye protection in the Industrial Environment. Standards Association of Australia, Sydney.

Standards Australia/Standards New Zealand (1992) Australian/New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications. Standards Association of Australia/Standards Association of New Zealand, Sydney/Wellington.

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Standards Australia/Standards New Zealand (1992) Australian/New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications. Standards Association of Australia/Standards Association of New Zealand, Sydney/Wellington.

Standards Australia (1994) Australian Standard 1336-1994, Eye protection in the Industrial Environment. Standards Association of Australia, Sydney.

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