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December 2001

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**Urethane Polymer**

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act* 1989 (the Act) and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the National Occupational Health and Safety Commission which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment and the assessment of public health is conducted by the Department of Health and Aged Care.

For the purposes of subsection 78(1) of the Act, copies of this full public report may be inspected by the public at the Library, National Occupational Health and Safety Commission, Plaza level, Alan Woods Building, 25 Constitution Avenue, Canberra ACT 2600 between 9am to 5pm Monday to Friday.

Copies of this full public report may also be requested, free of charge, by contacting the Administration Coordinator on the fax number below.

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Director  
Chemicals Notification and Assessment

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## FULL PUBLIC REPORT

### Urethane Polymer

#### 1. APPLICANT

3M Australia Pty Ltd of 2-74 Dunheved Circuit, St Marys NSW 1760 (ABN 90 000 100 096) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC) Urethane Polymer.

#### 2. IDENTITY OF THE CHEMICAL

The chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data and details of the polymer composition have been exempted from publication in the Full Public Report.

**Marketing names:** Urethane polymer

#### 3. POLYMER COMPOSITION AND PURITY

Details of the polymer composition have been exempted from publication in the Full Public Report.

#### 4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

#### 5. PHYSICAL AND CHEMICAL PROPERTIES

Property	Result	Comments
Appearance	Waxy white solid	
Melting point	Not determined	
Density	~ 1.03 kg/m <sup>3</sup>	
Vapour pressure	Not determined	The notifier indicates that the vapour pressure for the notified polymer is likely to be negligible (3M 2000).
Water solubility	79 mg/L at 23 °C	The notified polymer (~0.1 g) was added to water (30 mL) and the resulting solution was allowed to equilibrate for 5 days. The aqueous

		phase was removed, evaporated to dryness and the percentage solids determined (3M 2000).
<b>Hydrolysis as function of pH</b>	No hydrolysis detected at pH 4, 7 and 9.	Determined by the method described in OECD TG 111. After incubation of an emulsion containing the notified polymer at 50 °C for 125 h in pH 4, 7 and 9 buffer, analysis of each solution by size exclusion chromatography indicated no significant change in MW.
<b>Partition coefficient</b>	Not determined	Given the notified polymer's expected water insolubility and likely hydrophobic nature it would partition into the n-octanol phase.
<b>Adsorption/desorption</b>	Not determined	The notified polymer is expected to adsorb to, or become associated with, soil/sediment and organic matter and be immobile in soil due to its low water solubility.
<b>Dissociation constant</b>	Not determined	
<b>Particle size</b>	Not determined	Polymer imported as a dispersion in finished product.
<b>Flammability</b>	Not flammable	
<b>Autoignition temperature</b>	Not determined	
<b>Explosive properties</b>	Not explosive	
<b>Stability/reactivity</b>	Expected to be stable under normal conditions.	

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## 6. USE, VOLUME AND FORMULATION

**Use:** The notified polymer will be used as a component of a fabric/fibre stain protector. The stain protector will be used predominantly on carpets and rugs and applied as a foaming spray.

**Manufacture/Import volume:** < 50 kg/year for 5 years

**Formulation details:** The notified polymer will not be manufactured in Australia but imported in a finished fabric/fibre protector in 396 g pressurised steel cans at 1-5%. The product will be overlabelled, however, no repackaging will occur.

## 7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
<b><i>Transport and storage</i></b>		
<i>Dockside unload, transport to warehouse and storage (3 workers).</i>		
<i>Transport from storage warehouse to overlabelling facility (2 workers).</i>		
<i>Transport from overlabelling facility to retail outlets (3 workers).</i>		
Dermal, ocular, inhalation	Release of product containing 2.0% polymer from accidental rupture of cans or activation of release valve during handling.	Release valve covered by spray can cap. No other exposure controls specified.
<b><i>Overlabelling</i></b>		
<i>Operation of labelling machinery (4 workers)</i>		
Dermal, ocular, inhalation	Release of product containing 2.0% polymer from accidental rupture of cans or activation of release valve during loading of labelling machine and handling boxed cans.	As above.
<b><i>Retail</i></b>		
<i>Packing of shelves in retail outlets</i>		
Dermal, ocular, inhalation	Accidental release of product.	As above

## 8. PUBLIC EXPOSURE

Public exposure during transportation will be limited to accidental spillage as a result of rupture of containers.

The product containing the notified polymer is sprayed onto carpets and rugs as a foaming aerosol. There is potential for dermal contact with, and inhalation of, the product. The notifier states that there is very little mist produced during spraying, which suggests inhalation would not be significant. Once dried, the product remains in situ which indicates that dermal contact may be significant.

## **9. ENVIRONMENTAL EXPOSURE**

### **9.1. Release**

The majority of the notified polymer will be applied to carpet and rugs as a foaming aerosol which when dry remains on the treated article. The notifier indicates that the notified polymer may, through mechanical action, slowly wear off the carpet surface and be vacuumed away. However, this is expected to be minor. Therefore at the end of their useful life, carpets and rugs to which the notified polymer is bound will be disposed of in landfill or incinerated. Empty import cans will also be disposed of in landfill. Therefore, a majority of the notified polymer will be released into the environment.

### **9.2. Fate**

The majority of the notified polymer will be released into the environment through disposal of carpets and rug products in landfill. The notified polymer in these products will slowly degrade through abiotic and biotic processes to oxides of nitrogen and carbon. Incineration of the notified polymer will produce oxides of nitrogen and carbon and water vapour.

Empty import cans and any residual notified polymer they may contain will be disposed of in landfill. These residues are not expected to escape from the can but, if they did, the notified polymer is expected to be immobile due to its low water solubility and will become part of the soil matrix.

The polymer is not expected to cross biological membranes due to its high molecular weight. Therefore the notified substance is not expected to bioaccumulate (Connell, 1990).

## **10. EVALUATION OF HEALTH EFFECTS DATA**

No toxicological data were submitted.

## **11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA**

No ecotoxicological data were provided.

## **12. ENVIRONMENTAL RISK ASSESSMENT**

The majority of the notified polymer will be applied to carpet and rugs as a foaming aerosol which when dry remains on the treated article with little overspray expected. Therefore, most will be released into the environment through disposal of carpet and rugs in landfill. The notifier also indicates that the notified polymer may, through mechanical action, slowly wear off the carpet surface and be vacuumed away. However, this is expected to be minor. The notified polymer in these products will slowly degrade through abiotic and biotic processes to oxides of nitrogen and carbon. Incineration of the notified polymer will produce oxides of nitrogen and carbon and water vapour.

Empty import cans and any residual notified polymer they may contain will be disposed of in landfill. These residues are not expected to escape from the can but, if they did, the notified

polymer is expected to be immobile due to its low water solubility and will become part of the soil matrix.

The polymer is not expected to cross biological membranes due to its high molecular weight. Therefore the notified substance is not expected to bioaccumulate (Connell, 1990).

### **13. HEALTH AND SAFETY RISK ASSESSMENT**

#### **13.1. Hazard assessment**

No toxicological information has been provided for the notified polymer. However, due to its high molecular weight and presence of only low concern reactive functional groups, it is unlikely to be a hazardous substance in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b). The notified polymer meets the criteria for a Polymer of Low Concern and thus is unlikely to represent a health hazard.

#### **13.2. Occupational health and safety**

Exposure to the notified polymer is not expected during import and handling of pressurised cans containing 1-5% notified polymer. Cans are not opened prior to end-use and so occupational exposure of import/storage and relabelling plant workers to the polymer would only be envisaged in the case of accidental rupture of containers or inadvertent activation of the release valve. These are unlikely given the low concentration of notified polymer in the product (1-5%), the strength of the containers and covering of the release valve by a cap that would require removal only during end use.

If any of the above scenarios occurs, dermal, ocular and inhalation exposure may be envisaged. Based on the MSDS for the product (an aqueous suspension of notified polymer), if skin, eye or inhalation exposure occurs, local irritation may result. The MSDS further warns that intentional overexposure can be harmful or fatal. It is likely that this and cautions regarding central nervous system depression following overexposure are likely to be due to the solvent propellant (isobutane) and not the notified polymer.

Given the engineering controls, low possibility of exposure and the low health hazard associated with the notified polymer, the health risk for workers handling the notified polymer from import, relabelling through to retail would be assessed as low.

#### **13.3. Public health**

The two most likely avenues for exposure are dermal contact and inhalation. After treatment, the product remains on the treated surface and may be slightly irritant. However, once the product has dried there is likely to be limited exposure to the public as the product is intended to remain in contact with the treated material. The product is potentially harmful if intentionally inhaled in concentration, however, it is likely that this is due to the solvent propellant and not the notified polymer. The notifier expects very little mist produced from proper use. The risk to public health is therefore not likely to be significant.

It is noted that draft labels for the product containing the notified polymer advise that contact with the wet product should be avoided.

## 14. MSDS AND LABEL ASSESSMENT

### 14.1. MSDS

The MSDS of the notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). It is published here as part of the assessment report. The accuracy of the information on the MSDS remains the responsibility of the applicant.

### 14.2. Label

The label for the notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994b). The accuracy of the information on the label remains the responsibility of the applicant.

## 15. RECOMMENDATIONS

### *Control Measures*

#### Occupational Health and Safety

- No special precautions are required for the notified polymer. However, in the interests of good occupational hygiene practice, employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer in the aerosol product.
  - Impervious coveralls and footwear
  - Impervious gloves
  - Safety glasses
- A copy of the MSDS should be easily accessible to employees.
- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

### **Secondary notification**

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

- (1) Under subsection 64(1) of the Act; if

- the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

or

(2) Under subsection 64(2) of the Act:

- if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

## **16. REFERENCES**

3M Internal Correspondence (2000): Physical Properties, (unpublished report submitted by 3M).

Connell D. W. (1990) General characteristics of organic compounds which exhibit bioaccumulation. In Connell D. W., (Ed) Bioaccumulation of Xenobiotic Compounds. CRC Press, Boca Raton, USA.

National Occupational Health and Safety Commission (1994a) 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 (1994b) National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(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: Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1999a) List of Designated Hazardous Substances [NOHSC:10005(1999)]. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1999b) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]. Australian Government Publishing Service, Canberra.