

File No: PLC 211

May 2001

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**Polymer in Intermediate 170724**

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**FULL PUBLIC REPORT****Polymer in Intermediate 170724****1. APPLICANT**

Dow Chemical (Australia) Ltd of Kororoit Creek Rd Altona Victoria 3018 (ABN 000 264 979) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC 211) Polymer in Intermediate 170724.

**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:** Intermediate 170724

**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
<b>Appearance</b>	Light yellow viscous liquid	
<b>Boiling point</b>	Not applicable.	
<b>Specific gravity</b>	1.03	
<b>Water solubility</b>	26.15 mg/L	Moderately soluble in the uncured form.

<b>Flammability</b>	Not determined.	Not expected to be flammable.
<b>Autoignition Temperature</b>	Not expected to auto-ignite.	
<b>Explosive properties</b>	Not expected to be explosive.	
<b>Stability/reactivity</b>	Not expected to undergo degradation under normal conditions of storage.	At temperatures > 177 °C, thermal decomposition may occur and yield carbon dioxide, carbon monoxide, smoke and fumes.
<b>Adsorption/desorption</b>	Not given.	The notified polymer is cured (oxidised) and unavailable to the environment.
<b>Dissociation constant</b>	The notified polymer does not contain any groups which can undergo dissociation.	

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### 5.1 Comments on physical and chemical properties

A Gel Permeation Chromatography (GPC) trace was supplied. Although no slice data was provided, it is accepted on examination of the trace that the low molecular weight species meet the criterion for a PLC (< 2 % molecular weight < 500, < 5 % molecular weight < 1000). An IR spectrum was also provided for identification of the polymer.

## 6. USE, VOLUME AND FORMULATION

### *Use:*

The notified polymer is used as a component in the formulation of glass bonding adhesive used primarily in the post-market glass replacement industry, in particular, replacements of windscreens. It will not be sold to the public. At customer sites, the adhesive will be applied using conventional pumping equipment (*ie.* caulking type guns). The adhesive is applied to a localised area around the perimeter of the automotive windshield prior to installation of the automotive replacement glass.

### *Manufacture/Import volume:*

The product is to be imported in 350 g aluminium cartridges. The estimated quantity of the notified polymer contained in the adhesive being imported is 4 tonnes in year one, rising to 8 tonnes in years 2 – 5.

### *Formulation details:*

No manufacture or reformulation will occur in Australia.

## 7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
<b>End use:</b> Applicators: Up to 100 automotive glass replacement workshops will utilise the adhesive.		
Dermal and inhalation are the more likely routes of exposure.	<p>The maximum potential for exposure is 4 hours/day up to 100 days/year.</p> <p>The adhesive product containing the notified polymer is applied using caulking type application guns.</p> <p>During use, the notified polymer reacts with atmospheric moisture to form an inert solid of infinite molecular weight.</p>	Applicators are required to wear safety glasses, impervious (neoprene) gloves, coveralls and safety boots. Application areas are fitted with local exhaust ventilation to carry any emitting volatile gases.
<b>Transport and storage:</b> The adhesive product is off loaded from the dockside and transported by road.		
Workers would be exposed dermally in the event of accidental spillage.	The maximum potential for exposure is 1-2 hours/day up to 10 days/year.	Spills contained using absorbent material.
<b>Disposal:</b> Any residual inert material around the perimeter of the windshield will be cut-off and disposed to existing waste streams.		
Unlikely to be available for any exposure.	The maximum potential for exposure is up to 100 days/year.	The material reacts/cures with atmospheric moisture at the time of application to form an inert solid material.

## 8. PUBLIC EXPOSURE

There will be no manufacturing or reformulation of the imported adhesive product and the product will not be sold to the public. Exposure to the public is only likely to occur in the event of accidental spill during transportation. According to the Material Safety Data Sheet (MSDS) provided for the adhesive product containing the notified polymer, spills should be allowed to cure by contact with atmospheric moisture and then collected for disposal in an approved landfill.

The public will come into contact with replacement glass held in place by the adhesive product containing the notified polymer. However, since the notified polymer reacts with atmospheric moisture at the time of application and forms an inert solid of high molecular weight, the potential exposure to public is considered low.

## **9. ENVIRONMENTAL EXPOSURE**

### **9.1. Release**

The notified polymer will be exclusively used as a component of glass bonding adhesives. There is scope for release of the polymer to occur through accidental spillage during transport and use, but the adhesive reacts (or cures) with atmospheric moisture to form an inert solid of infinite molecular weight. Therefore it can be easily collected and disposed of, thereby minimising environmental impact during a spill. Any residual in cartridges will also be allowed to react with atmospheric moisture to form an inert material prior to disposal. The residual in cartridges is expected to be 2 % of the total amount, therefore the amount of waste polymer will be 80 kg in the first year and 160 kg in years 2-5. Residual inert material around the perimeter of the windshield will be cut off and disposed of to existing waste streams. Cartridges and inert material will be disposed of to landfill by licensed waste disposal contractors.

### **9.2. Fate**

Once applied in the intended manner, the notified polymer will be incorporated into an inert material and would not present a significant hazard. Presumably, at the end of the life of the windshield/automobile the cured polymer will be disposed of to landfill, or during metal recycling. During recycling, the polymer would be destroyed in the blast furnaces and converted to water vapour and oxides of carbon, nitrogen and silicon. When deposited into landfill the polymer would be inert and immobile, but could be expected to be very slowly degraded through biological and abiotic processes operative in these facilities.

In the event of accidental spillage, the hazard to aquatic systems is expected to be minimal due to the polymer becoming an inert cured material formed when the formulated product reacts with atmospheric moisture or on contact with water.

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

No toxicological data were submitted for the notified polymer. Due to its high molecular weight, the notified polymer is unlikely to be absorbed across biological membranes. According to the MSDS provided, the notified polymer may be a skin and eye irritant.

The health hazards of the constituents and hazardous impurities, additives and adjuvants are tabulated below.

Chemical	Health hazards	Regulatory controls
<b>Constituents</b>		
Benzene, 1,1'-methylenebis[4-isocyanato- at < 1 %	Harmful by inhalation irritating to eyes, respiratory system and skin Respiratory sensitiser	NOHSC exposure standard of 0.02 mg/m <sup>3</sup> TWA (as isocyanate, equivalent to 0.12 mg/m <sup>3</sup> MDI) and 0.07 mg/m <sup>3</sup> STEL with a “sensitiser” notation.  Where MDI is present at >1 %; Risk phrases Xn; R42/43 apply  Where MDI is present at > 5 %, risk phrases Xn; R42/43; R36/37/38 apply  Where MDI is present at > 25 %, risk phrases Xn; R20; R42/43 and R36/37/38 apply
<b>Hazardous impurities</b>		
None stated.		
<b>Additives/adjuvants</b>		
None stated.		

## 11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were submitted.

## 12. ENVIRONMENTAL RISK ASSESSMENT

Upon application, the majority of the polymer in the adhesive product reacts with atmospheric moisture to form an inert solid material. Polymer that is released from accidental spills and wastage in imported containers of the adhesive product will be unavailable to the environment as the adhesive material will react with to form an inert material.

The polymer is unlikely to present a hazard to the environment when it is incorporated into the adhesive and used as intended. The low environmental exposure of the polymer as a result of the proposed use indicates the overall environmental hazard should be low.

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

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

The notified polymer meets the low concern criteria due to its high molecular weight (NAMW > 10 000). No toxicological data were provided for the notified polymer. Due to its high molecular weight, the notified polymer is unlikely to be adsorbed across biological membranes. The low molecular weight monomer concentration is very low. The notified polymer in the formulated product is considered stable under normal conditions of use and is not classified as a hazardous substance in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999).

The notified polymer contains the residual monomer MDI at up to 1%. This level is below the concentration cut-off of 1% for respiratory sensitisation (and well below the concentration cut-offs of 5% for skin, eye and respiratory irritation and 25% for harmful effects by inhalation). However, exposure to MDI itself presents a risk of harmful effects via inhalation, irritation to skin, eyes and respiratory system and respiratory sensitisation. According to the MSDS provided, the Intermediate 170724 may be a skin and eye irritant.

### ***13.2 Occupational Health and Safety***

The adhesive is applied to a localised area around the perimeter of the automotive windshield prior to glass installation. Dermal and inhalational exposure to the notified polymer by the applicators may occur whilst applying the adhesive to and wiping residues off the glass sheets. Inhalational exposure to residual MDI may also occur. The application area in workshops is fitted with local exhaust ventilation to capture any volatile materials. As the applicators may be exposed to the notified polymer and residual MDI, the use of personal protective equipment, *i.e.* goggles, coveralls, impermeable gloves and occupational footwear during applications is recommended.

Atmospheric monitoring should be conducted to establish that the workplace MDI levels are below the Australian Workplace Exposure Standard (National Occupational Health and Safety Commission, 1994a). It is the employer's responsibility to maintain atmospheric levels of MDI below the NOHSC exposure standard of 0.02 mg/m<sup>3</sup> TWA (as isocyanate, equivalent to 0.12 mg/m<sup>3</sup> MDI) and 0.07 mg/m<sup>3</sup> STEL with a "sensitiser" notation (National Occupational Health and Safety Commission, 1995). However, it is noted that the ACGIH TLV for MDI is 0.051 mg/m<sup>3</sup> TWA (ACGIH, 2000). The risk of occupational asthma from repetitive exposure to isocyanates is well known. Therefore, respiratory protection during application and clean up procedures must be considered to prevent worker exposure.

Once the product is exposed to air, *i.e.* applied to the windscreen perimeter, a reaction with atmospheric moisture occurs to form an inert solid of infinite molecular weight, resulting in the notified polymer being unavailable for dermal/inhalational exposure. The health risk for



workers is considered to be low once the adhesive product is exposed to air. For this reason, spillages and end-use disposal pose a very low exposure risk to workers.

### **Conclusion**

The Intermediate 170724 and formulated adhesive product containing the notified polymer is of concern to human health and/or safety and risk reduction measures are necessary to reduce exposure to workers during the application processes.

### **13.3. Public health**

The notified polymer is intended for use by professions in the glass replacement industry and will not be sold to the public. The public would only be exposed to the notified polymer once it has become part of an inert and fully cured solid. Therefore the risk to the public from exposure to the notified polymer is considered low.

## **14. MSDS AND LABEL ASSESSMENT**

### **14.1. MSDS**

The MSDS of Intermediate 170724 and formulated product provided by the notifier were in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). They are 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 and products containing the polymer provided by the notifier was (were) 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**

To minimise occupational exposure to the adhesive product containing the notified polymer, the following guidelines and precautions should be observed:

- Due to the presence of the residual monomer, MDI, which is on Schedule 3 of the *NOHSC National Model Regulations for the Control of Workplace Hazardous Substances* – ‘Hazardous substances for which health surveillance is required’, health surveillance should be conducted for workers potentially exposed to Intermediate 170724 and the formulated adhesive product if the workplace risk assessment indicates a significant health risk.
- Local exhaust ventilation in all areas where the notified polymer Intermediate 170724 and formulated product are handled;

- Personal and area atmospheric monitoring should be conducted for workers potentially exposed to MDI in excess of the NOHSC exposure standard of 0.12 mg/m<sup>3</sup> TWA. Employers should ensure that other relevant NOHSC exposure standards are not exceeded in the workplace;
- Protective eyewear, chemical resistant industrial clothing and footwear and rubber or neoprene gloves should be used during occupational use of the products containing the notified polymer Intermediate 170724 and formulated product; where engineering controls and work practices do not reduce MDI exposure to safe levels, an air fed respirator should also be used;
- A copy of the MSDS should be easily accessible to employees.

If products containing the notified polymer are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999), workplace practices and control procedures consistent with State and Territory hazardous substances regulations must be in operation.

Guidance in selection of goggles may be obtained from Australian Standard (AS) 1336 (Standards Australia, 1994) and Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992); for industrial clothing, guidance may be found in AS 3765.2 (Standards Australia, 1990); for impermeable gloves or mittens, in AS 2161.2 (Standards Australia/ Standards New Zealand, 1998); for occupational footwear, in AS/NZS 2210 (Standards Australia/ Standards New Zealand, 1994a); for respirators, in AS/NZS 1715 (Standards Australia/ Standards New Zealand, 1994b) and AS/NZS 1716 (Standards Australia/ Standards New Zealand, 1994c) or other internationally acceptable standards.

## 16. REQUIREMENTS FOR SECONDARY NOTIFICATION

Secondary notification may be required if:

- any of the circumstances stipulated under subsection 64(2) of the Act arise. If any importer or manufacturer of the notified polymer becomes aware of any of these circumstances, they must notify the Director within 28 days; or
- the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

## 17. REFERENCES

ACGIH (2000), 2000 TLVs.

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.

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

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Standards Australia (1990) Australian Standard 3765.2-1990, Clothing for Protection against Hazardous Chemicals Part 2 Limited protection against specific chemicals. Standards Association of Australia.

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

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.

Standards Australia/Standards New Zealand (1994a) Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994b) Australian/New Zealand Standard 1715-1994, Use and Maintenance of Respiratory Protective Devices. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994c) Australian/New Zealand Standard 1716-1994, Respiratory Protective Devices. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1998) Australian/New Zealand Standard 2161.2-1998, Occupational protective gloves, Part 2: General requirements. Standards Association of Australia/Standards Association of New Zealand.