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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

RCH 87763

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

RCH 87763

1. APPLICANT

DuPont (Australia) Ltd of 49-59 Newton Road WETHERILL PARK NSW 2164 has submitted a notification statement accompanying their application for assessment of a Synthetic Polymer of Low Concern, RCH 87763.

2. IDENTITY OF THE CHEMICAL

Claims were made and accepted for the identity of RCH 87763 to be exempt from publication in the full public report. The data items were:

chemical name;
CAS number;
molecular and structural formulae;
molecular weight;
maximum percentage of low molecular weight species;
spectral data;
polymer constituents; and
residual monomer content.

Trade Name: RCH 87763

Method of Detection and Determination: data from Infrared (IR) spectrophotometry and gel permeation chromatography (GPC) analyses have been provided for the notified polymer

PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	viscous, water white, clear liquid (polymer solution containing 30-60% polymer, toluene 30-60% and methyl isobutyl ketone 10-30%)
Melting Point:	not determined
Specific Gravity:	0.94 – 1.59 kg/L (paint containing the polymer)
Autoignition Temperature:	340°C (paint containing polymer)
Water Solubility:	not determined, see comments below
Polymer Stability:	see comments below
Hydrolysis:	not expected
Reactive Functional Groups	functional groups present in the notified polymer are not expected to undergo further reaction under normal conditions
Charge Density:	not polycationic

Comments on Physico-Chemical Properties

The polymer is amorphous and does not have a time melting point. It has rather a glass transition range over which the polymer transforms from glass to a rubber. The polymer does not have a boiling point as it decomposes before boiling.

Water solubility has not been determined. However, the notifier claims that as the bulk of the polymer consists of poly methacrylic acid ester monomers which, by analogy with similar acrylic polymers (for example, perspex), confer low water solubility. Additionally, the polymer has been designed for use in solvent based paint and has a high solubility in xylene, which support a low water solubility for the polymer.

The polymer is stable under normal conditions of use. It will not hydrolyse, undergo thermal or photo degradation or depolymerization

4. PURITY OF THE CHEMICAL

Degree of Purity:	not provided
Toxic or Hazardous Impurities:	none

Non-hazardous Impurities
(> 1% by weight): none

Maximum Content
of Residual Monomers: total residual monomer content less than 2%

Additives/Adjuvants: none

5. USE, VOLUME AND FORMULATION

The notified polymer will not be manufactured in Australia. It will be imported in 1 litre tins as a component (0.3% by weight) of a solvent based tinter for the automotive refinishing industry. The tints will be mixed with paints to achieve the desired coloured paint. The paint will contain a maximum of 0.05% of the notified polymer.

The tinters will be available solely to professional spray painters through distributor outlets. There are approximately 4 000 professional spray shops in Australia.

Import volumes for the notified polymer are expected to remain less than 320 kg per annum.

6. OCCUPATIONAL EXPOSURE

The paint tinter containing the notified polymer is imported in sealed containers. No reformulation of the tinter product will occur.

Exposure of transport and storage workers is unlikely except in the event of a spill.

At the auto-repair shop, spray painters will mix into a flask, the tinter, paint and isocyanate hardener just prior to use. The mixture is poured into a spray gun pot for application to the automobile surface. Following spray application, the cleaning of spray guns and pots occurs. There is potential for eye, skin and inhalation exposure to the notified polymer, solvent, organic acids and isocyanate hardener during these activities.

The notifier's MSDS for the product containing the notified polymer recommends the use of personal protection such as safety glasses, solvent resistant gloves and air-fed respirators.

At most professional premises spray painting is conducted within a spray booth fitted with exhaust extraction. This minimises the presence of spray paint products in the workplace environment.

7. PUBLIC EXPOSURE

There is little potential for public exposure to the notified polymer during import, storage, formulation of the end-product paints, or transport. Disposal of the chemical after accidental spillage during transport of the paint or tinters is expected to be conducted in accordance with the MSDS, which will control public exposure.

Uncontrolled losses during end-use are expected to be minimal, due to the standard use of spray booths in professional premises. Hence, there is little potential for public exposure arising from the use of a professional paint product.

The chemical will finally be immobilised as part of an inert, dry paint film, which contains the pigment/polymer dispersal as part of a continuous physicochemical matrix in a polymer glass. There may be significant public contact with the notified chemical in this inert form.

8. ENVIRONMENTAL EXPOSURE

Release

Waste paint containing the notified polymer may be generated in the following ways.

Unused/leftover paint after mixing with thinners, hardener, etc, and retained in spray equipment if not used when mixed will be disposed of to a waste drum. This material (totaling up to 10% of paint) is typically sent to a waste disposal company for solvent recovery. A solidified residue obtained as a result of this, is taken to State Waste Management Centres for consignment to landfill or incineration.

Overspray is caught in filters of the spray booth and may constitute from 20-50% of total paint sprayed. Solid residues are trapped in the filter, which when due for replacement (typically every three months), is disposed of to landfill or incinerated.

In approximately 30% of spray shops, a "wet floor" arrangement is used in place of or in combination with dry filters. In this instance, a water trap is used to catch overspray. Periodically (this may typically be every three months), water from the trap is collected by a waste disposal company for treatment. Treatment usually involves flocculation or centrifugation of the suspended material that is then taken to State Waste Management Centres and either consigned of to landfill or incinerated.

The painted vehicles are baked to cure the polymer into a paint film. The crosslinked polymer will be effectively inert and be disposed of with the vehicles. Releases of the cured polymer during vehicle repairs, etc. will be diffuse and limited to small quantities of the cured polymer.

Fate

The low water solubility of the notified polymer indicates that leaching from landfill sites is not expected. Any incineration of the notified polymer is expected to produce water and

oxides of carbon and nitrogen.

The majority of the notified polymer is not expected to be released to the environment until it has been cured into a solid polymer matrix. The resultant matrix structure should limit the hydrolysis or biodegradation of the polymer. Bioaccumulation of the polymer is unlikely due to the high molecular weight of the polymer even before curing (Connell, 1989).

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicological data were provided. This is acceptable for polymers of low concern with a NAMW greater than 1 000 according to the Act.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided. This is acceptable for polymers of low concern with a NAMW greater than 1 000 according to the Act.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

Disposal of the notified polymer to landfill (up to 60% of imported polymer as either an inert solid or cured paint largely from paint overspray) is unlikely to present a hazard to the environment, as it will be in a solid matrix and is not expected to biodegrade or leach.

The main environmental hazard would arise through spillage in transport accidents where small quantities (0.3% of a 1 L tin) of the uncured polymer may be released to drains and waterways. However, the polymer would quickly become immobile on association with soil/sediment layer.

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

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified polymer is not water soluble and since it has a molecular weight greater than 1 000, it is unlikely to readily cross biological membranes. The percentage of low molecular weight species below 1 000 is low. The physicochemical properties include chemical stability and resistance to hydrolysis. The notified polymer does not contain any reactive functional groups and little toxicity from this source is likely. One constituent monomer is reported to cause carcinogenic and reproductive effects in animals and mutagenic effects *in vitro*. Initially, the notifier indicated that the residual monomer content of this monomer was at a maximum of 1.5%. Confirmation of this value was sought from the notifier and based on the calculation of the acid value, the residual monomer content was later shown to be 0.48%

maximum. The initial value of 1.5% was explained as the maximum manufacturing specification based on 100% solids. On the basis of the residual monomer content values provided by the notifier, the notified polymer would not classified as hazardous according to the National Occupational Health and Safety Commission (NOHSC) *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1994a). On the information provided, the notified polymer in the imported product is unlikely to pose a health risk to humans.

Occupational Health and Safety
The notified polymer will be imported in 1 L sealed cans at a maximum concentration of 0.3% by weight of the tinter product. No reformulation of the product will occur. The product will be available to professional spray painters only. The tints will be mixed with paints prior to application. The paint will contain a maximum of 0.05% of the notified polymer. There is potential for ocular, dermal and inhalation exposure to the product containing the notified polymer during pre-mixing, spray application and clean up. However, given the very low concentration of notified polymer in the product, worker exposure at this concentration will be negligible and no adverse health risks are expected.

The product containing the notified polymer also contains xylene and 2-hydroxyethyl acetate and requires the addition of an isocyanate hardener for curing purposes. Xylene is classified as hazardous, R20/21-harmful by inhalation and in contact with skin, R38-irritating to skin (NOHSC, 1994b). 2-Hydroxyethyl acetate is also classified as hazardous, R24-toxic in contact with skin, R34-causes burns and R43-may cause sensitisation by skin contact. Isocyanates are irritating to the skin and may cause dermatitis. They are particularly irritating to mucous membranes and may cause isocyanate asthma.

The notifier recommends the use of local ventilation and personal protective equipment such as protective clothing, goggles, and gloves. During spraying respiratory protection is recommended, see Section 12. In addition, spray painting is commonly conducted within a spray booth, which will minimise the presence of spray paint products in the workplace environment. These measures will serve to control worker exposure to the notified polymer, solvent, organic acids and isocyanate vapour/aerosols.

Notwithstanding the above, to control exposure and consequently risk of adverse health effects, spray painting should be conducted in accordance with the spray painting provisions promulgated by the appropriate local state or territory occupational health and safety authority.

The NOHSC exposure standards (NOHSC, 1995) should be observed during all phases where worker exposure to the paint system may occur. Regular air monitoring should be conducted to ensure that exposure standards are not exceeded. The exposure standards are: isocyanates, 0.02 mg/m^3 (TWA), 0.07 mg/m^3 (STEL), sensitiser notation; n-butyl acetate 150 ppm (TWA), 200 ppm (STEL); xylene, 80 ppm (TWA), 150 ppm (STEL); and n-amyl acetate 100 ppm (TWA).

Regulation 14(1)(a) of the *National Model Regulations for the Control of Workplace Hazardous Substances* (NOHSC, 1994c) provides for health surveillance for isocyanates. Health surveillance should be conducted for any worker who has been identified in the workplace assessment process as having a significant risk of exposure to isocyanates.

In accordance with the *Australian Code for the Transport of Dangerous Goods by Road and*

Rail (Federal Office of Road Safety, 1998), the tinter product is classified as a Dangerous Good (Class 3) because of the solvent/organic acid content (xylene, n-amyl acetate, n-butyl acetate). Therefore, appropriate precautions should be taken during transport, storage and handling. These are outlined in the notifier's MSDS.

Public Health

There is negligible potential for public exposure to the polymer arising from importation and industrial application in automotive topcoats. Similarly, the potential for public exposure to the chemical during transport, or disposal of waste after a spill is very minor. The polymer will finally be immobilised as part of an inert, hardened paint film of very low aqueous solubility. Although the public could contact the paint film on motor vehicles, it will only contain the crosslinked polymer in a matrix with pigments and other polymers, and there seems no likely route of exposure and absorption. Based on the information provided, it is unlikely that the notified polymer will pose a significant hazard to public health when used in the proposed manner.

13. RECOMMENDATIONS

To minimise occupational exposure to the paint system containing the notified polymer the following guidelines and precautions should be observed:

- Respiratory protection to be selected in accordance with Standard 1715 -1994: *Use and Maintenance and Respiratory Protective Devices* (Standards Australia/Standards New Zealand, 1994a) and Australian/New Zealand Standard 1716 -1991 *Respiratory Protective Devices* (Standards Australia/Standards New Zealand, 1994b);

- 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);

- Industrial clothing should conform to the specifications detailed in AS 2919 (Standards Australia, 1987) and AS 3765.1 (Standards Australia, 1990);

- Impermeable gloves or mittens should conform to AS 2161.2 (Standards Australia, 1998);

- All occupational footwear should conform to AS/NZS 2210 (Standards Australia/Standards New Zealand, 1994c);

- Spillage of the notified chemical should be avoided. Spillages should be cleaned up promptly with absorbents which should then be put into containers for disposal;

- Good personal hygiene should be practised to minimise the potential for ingestion;

- Spray painting booths should conform to AS/NZS 4114 (Standards Australia/Standards New Zealand); and

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

Spray painting should be conducted in accordance with the spray painting provisions promulgated by the appropriate local state or territory occupational health and safety authority.

The NOHSC exposure standards (NOHSC, 1995) should be observed during all phases where worker exposure to the paint system may occur. Regular air monitoring should be conducted to ensure that exposure standards are not exceeded. The exposure standards are: isocyanates, 0.02 mg/m^3 (TWA), 0.07 mg/m^3 (STEL), sensitiser notation; n-butyl acetate 150 ppm (TWA), 200 ppm (STEL); xylene, 80 ppm (TWA), 150 ppm (STEL); and n-amyl acetate 100 ppm (TWA).

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14. MATERIAL SAFETY DATA SHEET

The MSDS for the product containing the notified polymer was provided in a format consistent with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994d).

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.

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, USA, .

Federal Office of Road Safety (1998) Australian Code for the Transport of Dangerous Goods by Road and Rail. Canberra, Australian Government Publishing Service.

NOHSC (1994a) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]. Canberra, Australian Government Publishing Service.

NOHSC (1994b) List of Designated Hazardous Substances [NOHSC:10005(1994)]. Canberra, Australian Government Publishing Service.

NOHSC (1994c) National Model Regulations for the Control of Workplace Hazardous Substances [NOHSC:1005(1994)]. Canberra, Australian Government Publishing Service.

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

NOHSC (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 (1987) AS 2919-1987, Australian Standard Industrial Clothing. Sydney, Standards Australia.

Standards Australia (1990) AS 3765.1-1990, Australian Standard Clothing for Protection against Hazardous Chemicals Part 1 Protection Against General or Specific Chemicals. Sydney, Standards Australia.

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

Standards Australia (1998) AS/NZS 2161.2:1998, Australian/New Zealand Standard Occupational Protective Gloves Part 2: General Requirements. Sydney/Wellington, Standards Australia and Standards New Zealand.

Standards Australia/Standards New Zealand AS/NZS 4114 Spray Painting Booths. Sydney/Wellington, Standards Australia/Standards New Zealand,.

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

Standards Australia/Standards New Zealand (1994a) AS/NZS 1715-1994, Australian/New Zealand Standard Selection, Use and Maintenance of Respiratory Protective Devices. Sydney/Wellington, Standards Australia and Standards New Zealand.

Standards Australia/Standards New Zealand (1994b) AS/NZS 1716-1994, Australian/New Zealand Standard Respiratory Protective Devices. Sydney/Wellington, Standards Australia and Standards New Zealand.

Standards Australia/Standards New Zealand (1994c) AS/NZS 2210-1994, Australian/New Zealand Standard Occupational Protective Footwear. Sydney/Wellington, Standards Australia and Standards New Zealand.