

File No: PLC/178

August 2000

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

RCP 20921

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 Family Services.

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**RCP 20921****1. APPLICANT**

DuPont (Australia) Ltd of 49 – 59 Newton Road Wetherill Park NSW 2164 (ACN No.: 000 716 469) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC) RCP 20921.

2. IDENTITY OF THE CHEMICAL

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

Trade names: Nason 496-00 Select Clear as imported, contains the notified polymer (RCP 20921) at a low concentration.

Structural identification method: Infrared spectroscopy.

3. POLYMER COMPOSITION AND PURITY

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

Purity (%): > 99%

Hazardous impurities (other than residual monomers and reactants): None.

Non-hazardous impurities at 1% by weight or more: None.

Additives/adjuvants: The notified polymer is manufactured as a resin solution in xylene and methyl ethyl ketone.

4. PLC JUSTIFICATION

The notified polymer meets the criteria for a Synthetic Polymer of Low Concern as follows:

- The NAMW is greater than 1 000.
- The low molecular weight species are within the prescribed limits (less than 25% with MW < 1 000 and less than 10% with MW < 500 together with the fact that the combined FGEW for high concern reactive functional groups is greater than 5 000).
- The combined FGEW of cationic groups is greater than 5 000.
- The concentration of residual monomers or reactants does not render the polymer hazardous according to NOHSC *Approved Criteria for Classifying Hazardous Substances* (1999a).
- The elemental criteria were satisfied.
- The polymer is stable.

5. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is never isolated from the solvent solution in which it is manufactured which contains xylene and methyl ethyl ketone. Therefore, the following properties relate to this solution unless otherwise specified.

Property	Result
Appearance	Clear to light yellow viscous solution
Density	990 kg/m ³
Water solubility	Expected to be < 1 mg/L.
Particle size	Not applicable.
Flammability	Lower flammability limit: 1.0%. Upper flammability limit: 11.5%
Autoignition temperature	515°C
Explosive properties	When free of solvent, RCP 20921 is not expected to be explosive.
Stability/reactivity	The polymer is not self reactive and is stable for storage up to 120°C. It has the potential to oxidise.

5.1 Comments on physical and chemical properties

The polymer is never isolated and the data provided were for RCP20921 as a solution of the polymer (60%) in xylene and methyl ethyl ketone. The notifier did not determine the boiling point but stated that the polymer solution RCP20921 is highly stable under normal conditions but that decomposition occurs at temperatures in excess of 250°C.

The notifier did not determine the water solubility of the notified polymer. It is expected to be of low solubility due to the high molecular weight and hydrophobic character. The lack of polar functionality is noted and supports the expectation that the water solubility of the notified polymer would be low, that is < 1 mg/L.

The notified polymer contains ester linkages that could be expected to undergo hydrolysis under extreme pH. However, due to the expected low water solubility, hydrolysis unlikely in the environmental pH range between 4 and 9.

The notifier did not determine the partition coefficient and adsorption/desorption of the notified polymer, and it is noted that determination of these properties would be difficult. Due to its low water solubility, the notified polymer is expected to become associated with the organic component of soils and sediments.

The notified polymer is expected to be neutral and will not be cationic or anionic in the environmental pH range.

6. USE, VOLUME AND FORMULATION

Use:

The notified polymer is a component of a paint used for refinishing of automobiles.

Manufacture/Import volume:

Less than 20 tonnes per year of the notified polymer are expected to be imported for the first five years. Importation is in 3.78 L cans.

Formulation details:

The notified polymer is imported as a component of Part A of a 2-part paint at a low concentration. No further formulation or repackaging is reported. It is mixed at 3:1 with Part B, an isocyanate catalyst.

7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
End use		
<i>Refinishing Motor Vehicles (up to 230 days per year, up to 8 hours per day, 3 800 workers)</i>		
dermal	Manually pour resin solution into measuring container, mix with other components including the polymeric isocyanate-containing Part B. Load into spray gun.	Local exhaust ventilation in most shops. Personal protective equipment (gloves, eye protection) may be worn.
dermal	Spray vehicle. Drying and curing of painted surface.	Spray booths designed to AS/NZS 4114 specifications. Spray painters wear supplied air respirator, faceshield, gloves and protective suit. Local exhaust ventilation.

dermal	Cleaning equipment.	Local exhaust ventilation. Dedicated gun wash station. Gloves and goggles.
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Transport and storage

Transport of drums (up to 12 loads per year, up to 8 hrs per day, several workers)

none	handling sealed drums; no exposure expected except in case of accident	none
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Warehousing and Dispatch (up to 230 days per year, up to 1 hr/day, 10 workers)

none	handling sealed drums; no exposure envisaged	none
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8. PUBLIC EXPOSURE

The imported paint product will not be sold to the public, and will be used by professional spray painters in the automobile refinishing industry. The public will be potentially exposed to the notified polymer in the imported product only in the event of a transport accident. The public will come into contact with the notified polymer under normal circumstances only after it has been applied to and becomes an integral part of a hard film on finished motor vehicles.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

There is potential for release of the notified polymer during paint formulation and paint application. The paint is applied to automotive surfaces with approximately 50 - 80% efficiency in spray booths with control measures, such as a filtering system and masking materials in place. Cleaning of the spray gun and mixing equipment will generate waste that will be collected and disposed of in the same manner as wastewater from the spray booth.

During coating application it is expected that up to 50% of the imported volume of notified polymer waste will be produced. Some product residue will also remain in the 'empty' containers after use. It is estimated that up to 5% of the container contents, will remain as residue in the 'empty' import containers. A further 10% of the notified polymer may be lost due to cleaning of the spray and mixing equipment.

9.2. Fate

Once applied to the metal panels of motor vehicles the notified polymer will be incorporated into a water resistant coating and will not present a significant hazard. Any fragments, chips and flakes of the coating will be of little concern as they are expected to be inert. The notifier

does not comment on the fate of the metal panels coated with the polymer, but they are likely to be either recycled for steel reclamation or be placed into landfill at the end of their useful lives. When recycled the polymer is expected to be incinerated in blast furnaces and converted to water vapour and oxides of carbon.

The solid waste generated in the formulation and application of the coating and from containers and their residue will be disposed of to landfill or by incineration. The product when sprayed will be catalysed with an isocyanate activator, resulting in all overspray being crosslinked and becoming inert due to the very high molecular weight. Waste residue is expected to dry out and harden. Leaching of the notified polymer from landfill sites is unlikely given the expected low water solubility of the polymer and its high molecular weight. Under these conditions the waste polymer would be very slowly degraded to gases such as carbon dioxide through the agency of abiotic and bacteriological processes.

Mixing containers and spray equipment will be washed with solvent. The solvent is collected and recycled and the dried solid residues disposed of to landfill or combined with asphalt to be used as road base tackifier.

The notified polymer is not expected to cross biological membranes, due to the expected low water solubility, high molecular weight and strong adsorption to soil, and should not bioaccumulate (Connell 1989).

10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological data were submitted.

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were submitted.

12. ENVIRONMENTAL HAZARD (RISK) ASSESSMENT

The notified polymer crosslinks with other paint components to form a very high molecular weight water resistant film that is highly stable to light and temperature. The notified polymer in the surface coating will share the fate of the vehicle panel. When the vehicle panel is recycled, the notified chemical will be destroyed through incineration.

No repackaging of the notified polymer occurs and it will only be supplied to licensed professional spray painters who will mix it with activator on site immediately prior to use. Overspray will be captured and disposed of to landfill or by incineration as will paint residues in empty cans. Equipment will be washed with solvent and the solvent sent for recycling. Disposal of solid residues will be to landfill or combined with asphalt to be used as road base tackifier. The notifier estimates that a maximum total of approximately 10 000 kg/annum of the notified polymer will be released to the environment due to the application process. The paint film will contain the notified polymer as part of a crosslinked polymer matrix. The ultimate fate of the notified polymer will presumably be the same as that of the vehicle, viz.,

to landfill or for metal recycling where the polymer will be incinerated to water vapour and oxides of carbon.

In the event of accidental spillage of the polymer into waterways, it is not expected to disperse in the water, but settle out onto sediments. If the polymer is spilt on land, either during usage or transport, it is expected to become immobilised in the soil layer. Contaminated soil can then be collected and disposed of to landfill. The small container sizes would limit any hazard in the event of a spill.

Given the above, environmental exposure and the overall environmental hazard is expected to be low.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

The notified polymer fulfils the criteria for a synthetic polymer of low concern and can be considered not to be a health hazard. However, the Material Safety Data Sheet for the imported coating containing the notified polymer indicates that it contains up to 40% acetone or xylene, up to 13% methyl ethyl ketone and up to 13% 1-chloro-4-(trifluoromethyl)benzene. According to NOHSC *List of Designated Hazardous Substances* (1999b) the coating may be irritating to skin and harmful by inhalation and in contact with skin as a result of the xylene content. The coating should be considered flammable as a result of the methyl ethyl ketone, xylene and 1-chloro-4-(trifluoromethyl) benzene content.

13.2. Occupational health and safety

As the notified polymer fulfils the criteria for a synthetic polymer of low concern, handling of the polymer itself involves a low risk of adverse health effects to workers involved in transport, storage, use or disposal of the imported coating (containing the notified polymer at less than 10%) or the paint. Therefore, no specific risk reduction measures are required for the polymer. However, the coating in which the notified polymer is imported should be assumed to be irritating to skin and harmful by inhalation or in contact with skin from the solvent content.

Spillage during transport and storage operations with the 3.78 L tins in which the coating is imported is rare. Therefore, the risk of skin irritation or acute toxic effects to workers is low.

Workers manually weigh out the imported coating into a measuring cylinder and mixing jar where it is mixed with Part B prior to loading the paint into a spray gun. Spillage or direct contact with the clear coat or the paint is possible. There is a risk of skin irritation or acute toxic effects unless the risk is minimised by wearing protective gloves and clothing. Most shops employ local exhaust ventilation and good general ventilation to control inhalation exposure. Nevertheless, it is the responsibility of the employer to maintain the atmospheric levels of solvents below the national exposure standards. For the imported coating, the vapour concentration should be maintained below 80 ppm (TWA) as a result of the xylene content (NOHSC, 1995).

Following paint mixing the paint is sprayed on to automobiles as a fine mist. The hazard of most concern to spray painters can be considered to be occupational asthma from inhalation of isocyanate-containing aerosols. This necessitates the use of correctly designed spray

booths as described in Australian/New Zealand Standard (AS/NZS) 4114:1995 and risk minimisation strategies as comprehensively described in NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999c). Most professional spray painters are expected to use adequate personal protective equipment (PPE) including an air supplied respirator with a face shield, impervious gloves and protective clothing. Similar PPE is required during solvent cleaning of spray equipment. Once the paint is cured, usually by baking, there is no risk of adverse health effects to workers coming in contact with the painted surface.

13.3. Public health

The public can potentially come into contact with the notified polymer in the event of accidental spillage during transport of the imported coating and when it is a component of a hard film on automobiles. There is no risk to public health arising from these scenarios.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS for the imported product containing 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 imported product containing 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

No special precautions are required to minimise occupational exposure to the notified polymer. However, a copy of the MSDS should be easily accessible to employees and spillage of the notified polymer should be avoided. Spillage should be cleaned up promptly with absorbents which should then be put into containers for disposal.

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

Guidance on engineering controls and work practices employed to minimise health and safety risks for spray painting of automobiles is contained in the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999c).

Safety goggles, chemical resistant industrial clothing and footwear and impermeable gloves should be used during occupational use of the products containing the notified polymer; where engineering controls and work practices do not reduce vapour and particulate exposure to safe levels, an air fed respirator should also be used.

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).

16. REQUIREMENTS FOR SECONDARY NOTIFICATION

Secondary notification may be required if:

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

17. REFERENCES

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