

File No: PLC/161

June 2000

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

RCP27374

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

Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**RCP27374****1. APPLICANT**

DuPont (Australia) Ltd of 49-59 Newton Road WETHERILL PARK NSW 2164 (ACN No 000 716 469) has submitted a Polymer of Low Concern notification statement in support of their application for an assessment certificate for "RCP27374".

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.

Other Names: RCP27374

Marketing Name: Nason 421-20 Select Prime
(product containing the notified polymer).

3. POLYMER COMPOSITION AND PURITY

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

Degree of Purity: High

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

The polymer is never isolated as a defined entity. Physical-and chemical data provided were determined from a butyl acetate solution of the polymer (51.2%), or the product containing the notified polymer.

Property	Result	Comments
Appearance	Clear to pale yellow viscous liquid (polymer solution).	

Boiling point	Not determined.	
Density	1.14± 0.05 g/cm ³ (polymer solution); 1.40 g/cm ³ (Nason primer paint product).	
Water solubility	Not determined.	See comments below.
Particle size	Not relevant.	Polymer remains in solution.
Flammability	Upper Explosive Limit =13.1%; Lower Explosive Limi =1.3% (both from Nason primer paint product).	
Autoignition temperature	272-425°C (Nason prime paint product).	
Explosive properties	Related to the solvents in the paint product.	
Stability/reactivity	Not considered reactive under normal conditions.	
Hydrolysis as function of pH	Not determined.	See comments below.
Partition coefficient	Not determined.	See comments below.
Adsorption/desorption	Not determined.	See comments below.
Dissociation constant	Not determined.	

5.1 Comments on physical and chemical properties

The notifier did not determine the boiling point but stated that the polymer RCP27374 is highly stable under normal conditions but decomposition will start at temperatures in excess of 250°C.

The notifier indicated that density was measured using a method based on ASTM D-1475, a commonly used method in the paint industry.

The notifier did not determine the water solubility of the notified polymer. The notifier indicates that the notified polymer is expected to be of low solubility due to its high molecular weight and hydrophobic character. Given the lack of polar functionality, the water solubility of the notified polymer is expected be low (< 1 mg/L).

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

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

6. USE, VOLUME AND FORMULATION

Use:

The notified polymer is an automotive binder resin for use in the refinish industry on heavy vehicles and machinery.

Manufacture/Import volume:

Anticipated import quantities for RCP27374 over the next five years are less than 5 tonnes per annum.

Formulation details:

The notified polymer will be imported into Australia as a component (9-15%) of a finished paint formulation, which will be sold under the name, Nason Select Prime 421-20 in 3.78 litre Dangerous Goods approved containers.

The product containing the notified polymer will be sold only to licensed spray painters. No reformulation or repackaging of the imported notified polymer will occur prior to distribution to spray painting companies. Prepared spray paints would contain <10% notified polymer.

7. OCCUPATIONAL EXPOSURE

Transport, storage and retailing

The notified polymer will be imported as a part of a paint in 3.78 L Dangerous Goods compliant containers and combination packaging. It will be transported by licensed contractors. The paint will be stored in a warehousing facility, which is licensed for storage of Dangerous Goods. Exposure to the notified polymer during transport, storage and retail is unlikely except when packaging is breached in an accident.

End-use

The notified polymer could be used by around 600 spray painting businesses, employing 1 200 to 6 000 qualified spray painters. The professional painters may handle the products containing the notified polymer on a daily basis.

The spray painters who will be exposed to the notified polymer will be fully trained in use of such chemicals. Typically, the spray painter will open the container and mix the contents with other components (pigments, binder, thinner and activator) and transfer the paint into a spray gun. This weighing operation will be carried out on a balance in a well-ventilated area.

The spraying of the automobile will be carried out in a laminar flow downdraft spray booth, which is designed to rapidly remove aerosol particles and solvent vapour from the atmosphere. Several possible booth designs may be used. In a dry floor booth, the overspray

will be collected in filters contained in the floor of the booth; any unremoved particulates will reach the exhaust stack with the solvent vapours. In a wet floor booth, overspray will collect in a pool of water below the grill floor or in a wet scrubber in the exhaust and will be removed with a filter. The residual solids will be disposed of to a secure landfill. The spray booths are subject to AS/NZS/4114.1:1995 *Spray Painting Booths – Design, Construction and Testing* (Standards Australia/Standards New Zealand, 1995a) and AS/NZS/4114.1:1995 *Spray Painting Booths – Selection, Installation and Maintenance* (Standards Australia/Standards New Zealand, 1995b).

After spraying, the spray equipment will be washed with solvents at a gunwash station. The station is grounded and has exhaust ventilation. Residual paint mixture will be washed from the equipment manually, using recycled paint solvent and the washings will be disposed of by solvent recyclers.

Once residual final paint mixture has dried, the notified polymer will be irreversibly bound within the cured matrix and not separately available for either exposure to workers, or for dermal absorption.

The main exposure routes will be dermal and inhalation. Spray painters will wear appropriate personal protective equipment at all times; gloves and overalls while mixing the paint, and, in addition, a full face shield and respirator while inside the spray booth.

8. PUBLIC EXPOSURE

Automotive paints containing the notified polymer will be sold only to licensed professional spray painters and will not be available to the general public. The potential for public exposure to the notified polymer during transport and coating operations or from disposal is assessed as negligible. Although members of the public will make dermal contact with automobiles coated with products containing the notified polymer, exposure will be negligible because of the cured state of the notified polymer in the coatings.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

There is potential for release of the notified polymer during the paint formulation and the 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 include up to 2 500 kg/annum of notified polymer waste will be produced.

Some residue will also remain in the ‘empty’ containers after use. It is estimated that 250 kg of the notified polymer, 5% of the container contents, will remain as residue in the ‘empty’ import containers.

A further 5%, 250 kg of the notified polymer, will be lost due to cleaning of the spray equipment.

9.2. Fate

Once applied to the metal panels of heavy vehicles the notified polymer will be incorporated in a hard, durable, inert film and will not present a significant hazard. Any fragments, chips and flakes of the lacquer will be of little concern as they are expected to be inert. The metal panels coated with the polymer are likely to be either recycled for steel reclamation or be placed into landfill at the end of their useful life. When recycled the polymer would be incinerated in the blast furnaces and converted to water vapour and oxides of carbon.

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

Mixing containers and spray equipment will be washed with solvent that is collected and sent to solvent recycling. The resulting dried solid residues will be sent to landfill.

The notified polymer is not expected to cross biological membranes, due to the expected low solubility, high molecular weight and strong adsorption to soil, and as such 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 RISK ASSESSMENT

The notified polymer crosslinks with other paint components to form a very high molecular weight and stable film that adheres firmly to the primer layer to which it is applied. The notified polymer, as part of this surface coating will, therefore, share the fate of the vehicle panel. The paint will slowly deteriorate under the action of UV light, but this is not expected to release the polymer over the useful life of the heavy vehicle surfaces. When the vehicle panel is recycled, the notified polymer would be destroyed through incineration.

No repackaging of the notified polymer occurs. It will be supplied to licensed professional spray painters who will formulate with pigments and activator on site directly prior to use.

Overspray will be captured and disposed of to landfill or incinerated, as will paint residues in empty cans. Equipment residues will be washed with solvent and sent for solvent recycling. Solid residues will be sent to landfill. An estimated 3 000 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 in a crosslinked polymer matrix. The final fate of the notified polymer will be shared with that of the vehicle, 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 solution into waterways the polymer is not expected to disperse into the water, but settle out onto sediments. Polymer spilt on land 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 also limit any hazard in the event of a spill.

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

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

No toxicological data on the notified polymer have been submitted. The notified polymer is not expected to traverse biological membranes due to its high molecular weight and low residual monomer content. Based on the available data, the notified polymer would not be classified as a hazardous substance according to NOHSC *Approved Criteria for Classifying Hazardous Substances* (National Occupational Health and Safety Commission, 1999a). No adverse health effects have been characterised following human exposure overseas, according to the notifier.

The notified polymer will be imported as a component of the product, Nason Select Prime 421-20. The product Material Safety Data Sheet (MSDS) includes the ingredients carbon black, propylene glycol monomethyl ether and magnesium silicate, which are on the NOHSC *List of Designated Hazardous Substances* (National Occupational Health and Safety Commission, 1999b). According to the MSDS, the product will produce gastro-intestinal distress on ingestion and may also be an eye and skin irritant. Inhalation may cause respiratory irritation and central nervous system depression. Prolonged overexposure may cause permanent brain and nervous system damage. These effects relate mainly to the solvents and additives, rather than the notified polymer.

13.2. Occupational health and safety

Health risk for workers in transport, storage and retail is expected to be low unless the cans are damaged and spillage occurs. However, personal protective safety equipment such as chemically resistant gloves, and electric torch should be carried with transport vehicles, as the product is classified as a Class 3 Dangerous Good. The MSDS specifies precautions for clean up.

The final paint mix, including the pre-prepared paint containing the notified polymer, could contain a wide variety of additional ingredients once fully mixed. This is likely to introduce human health hazards because, apart from a range of potentially toxic solvents, there may be

components containing resins with pendant isocyanate groups. The spraying procedure also produces a dense aerosol of paint particles, which would adversely affect human health even in the absence of additional hazardous components. It is also probable that professionals involved in the spray painting industry will use a number of different paint formulations.

For these reasons, the notified polymer must be assessed for the contribution it makes to the hazards associated with use of the spray paints. The presence of many potential and actual hazardous substances in the formulation requires the use of stringent engineering controls, such as a correctly constructed and maintained spray booth, and a high level of personal protective equipment, such as impermeable overalls, neoprene gloves, full face shield and goggles during mixing and cleaning. A respirator should be used during spraying operation. The use of the paint containing the notified polymer should be in accordance with the NOHSC *National Guidance Material for Spray Painting* (National Occupational Health and Safety Commission, 1999c). The level of protection from exposure afforded by the standard protective measures will provide adequate protection from the notified polymer, which is likely to be less intrinsically toxic than most of the solvents, pigments and other paint resins.

Once the applied final paint mix has hardened, the polymer will not be separately available for exposure or absorption.

There are NOHSC exposure standards for components butyl acetate, magnesium silicate, calcium carbonate, carbon black and titanium dioxide, identified as ingredients in the pre-prepared paint product (National Occupational Health and Safety Commission, 1995). The employer is responsible for ensuring that these exposure standards, and exposure standards pertaining to other final paint mix additives, are not exceeded in the workplace.

The paint components containing the notified polymer are flammable due to their solvent content. Precautions must be taken to avoid sources of ignition, e.g. use of earthing leads. Operators should wear antistatic overalls and footwear.

Similar considerations apply in the disposal of the polymer. The wastes containing the notified polymer may be hazardous substances on the basis of the solvent and other resin content, and the precautions used on the basis of these additional materials should be adequate for protection from the notified polymer. In addition, much of the chemical will be crosslinked, hardened and immobilised by the time of disposal.

13.3. Public health

The notified polymer will not be sold to the general public and will only be used only in automobile coatings. Although members of the public may make dermal contact with automobiles coated with products containing the notified polymer, exposure will be negligible because of the cured state of the notified polymer in the coatings, from which the notified polymer is not likely to be bioavailable. Based on the above information, it is considered that the notified polymer will not pose a significant hazard to public health when used in the proposed manner.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS for the product containing the notified polymer was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (National Occupational Health and Safety Commission, 1994a).

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.

14.2. Label

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

15. RECOMMENDATIONS

To minimise occupational exposure to RCP27374, the following guidelines and precautions should be observed:

- Use of the paint containing the notified polymer by spray application should be in accordance with 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;
- Paints containing the notified polymer should be labelled to indicate that eye protection should be worn during their use;
- 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;
- A copy of the MSDS should be easily accessible to employees.

If products containing the notified chemical 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 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), neoprene gloves are recommended on the MSDS; 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

Connell DW (1989) General characteristics of organic compounds which exhibit bioaccumulation. In Connell DW, (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.

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

National Occupational Health and Safety Commission (1999c) National Guidance Material for Spray Painting. Sydney, National Occupational Health and Safety Commission.

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.

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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.

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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.