

File No PLC/574

25 July 2005

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME
(NICNAS)**

FULL PUBLIC REPORT

Polymer in RC-49917

This Self Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (Cwlth) (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 Department of Health and Ageing, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Department of the Environment and Heritage. The data supporting this assessment will be subject to audit by NICNAS.

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**Director
NICNAS**

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EXEMPT INFORMATION**DISTRIBUTION**

Mr. Robert Ward, Senior Technical Specialist, DuPont (Australia) Ltd
NICNAS
Department of Environment and Heritage

Polymer in RC-49917

1. APPLICANT DETAILS

APPLICANT(S)
 DuPont (Australia) Ltd (ABN: 59 000 716 469)
 168 Walker Street
 NORTH SYDNEY NSW 2060

2. IDENTITY OF CHEMICAL

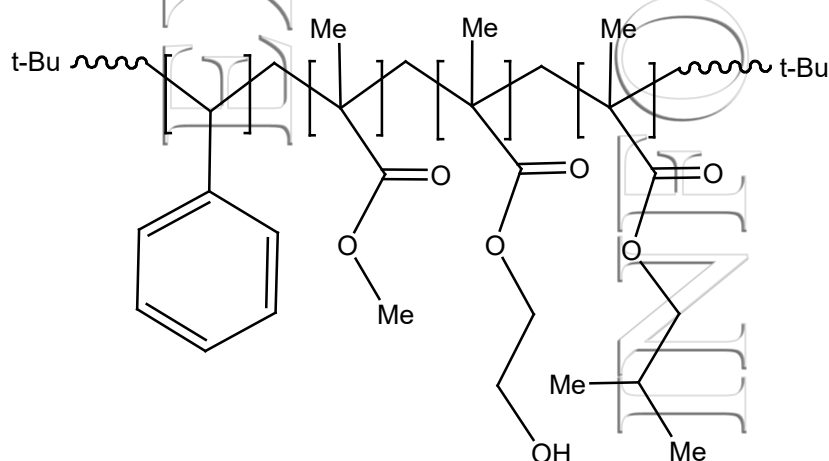
CHEMICAL NAME
 2-Propenoic acid, 2-methyl-, 2-hydroxyethyl ester polymer with ethenylbenzene, methyl-2-methyl-2-propenoate and 2-methylpropyl 2-methyl-2-propenoate, bis-(1,1-dimethylethyl) peroxide-initiated

OTHER NAME(S)
 Poly(Hydroxyethyl methacrylate/Isobutyl methacrylate/Methyl methacrylate/Styrene/Di-tert-butyl peroxide-initiated)

CAS NUMBER
 None Allocated

MOLECULAR FORMULA
 $(C_8H_{14}O_2 \cdot C_8H_8 \cdot C_6H_{10}O_3 \cdot C_5H_8O_2)_x \cdot C_8H_{18}O_2$ initiated

STRUCTURAL FORMULA



MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn)	3981
Weight Average Molecular Weight (Mw)	11384
Polydispersity Index (Mw/Mn)	2.86
% of Low MW Species < 1000	4.92 %
% of Low MW Species < 500	1.92 %

3. COMPOSITION

POLYMER CONSTITUENTS

<i>Chemical Name</i>	<i>CAS No.</i>	<i>Weight % starting</i>	<i>Weight % residual</i>
Styrene	100-42-5	14.6	0.1
Hydroxyethyl methacrylate	868-77-9	19.7	0.1
Isobutyl methacrylate	97-86-9	43.9	0.1
Methyl methacrylate	80-62-6	19.5	0.1
Di-tert-Butyl peroxide	110-05-4	2.3	0.01

The above polymer is formed as a 60 % solution polymer in a 40 % solution of Butyl acetate or Xylene.

4. INTRODUCTION AND USE INFORMATION

RC-49917 is a 60 % w/w solids solution polymer in 40 % butyl acetate or xylene depending on source. The mode of introduction will be as either a component in a finished paint product DuPont 3300S, DuPont 8600/VOC or 3700S ready for application. The notified polymer will also be imported as a resin intermediate for local paint manufacture, Spies Hecker 8015 and Standox 15-60 containing 17.4 % RC-49917.

Approximately 90 % of any imported RC-49917 resin intermediate will be exported in finished paint.

MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Tonnes</i>	8	12	15	20	20

USE

The notified chemical will be used as a resin in automotive refinish paints at a maximum concentration of 17.4 %. The projected volumes include a finished goods export component. The export portion will be approximately 80 % to 90 % of the total volume of RC-49917 above.

5. PROCESS AND RELEASE INFORMATION

5.2. Operation Description

The majority of the notified polymer will be imported as a component of RC-49917, which is used in the manufacturing paint at the DPC factory at 15-23 Melbourne Road RIVERSTONE NSW 2765.

The maximum total amount of RC-49917 resin released during use $0.65 \times 2 \text{ tonnes} = 1.3 \text{ tonnes}$ of the notified polymer per annum assuming 90 % is exported.

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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

DuPont (Australia) Ltd (ABN: 59 000 716 469)

168 Walker Street

NORTH SYDNEY NSW 2060

NOTIFICATION CATEGORY

Self Assessment: Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical Name

Other Names

Molecular and Structural Formulae

Molecular Weight

Polymer Constituents

Residual Monomers/Impurities

Use Details

Import Volume

Site of Reformulation

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

No variation to the schedule of data requirements is claimed.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

Not notified

NOTIFICATION IN OTHER COUNTRIES

USA (2005)

Canada (2005)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

RC-49917

MOLECULAR WEIGHT

> 1,000

3. COMPOSITION

PLC CRITERIA JUSTIFICATION

The notified polymer does not contain any moderate or high concern reactive functional groups.

<i>Criterion</i>	<i>Criterion met (yes/no/not applicable)</i>
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	Yes
Low Charge Density	Yes

Approved Elements Only	Yes
Stable Under Normal Conditions of Use	Yes
Not Water Absorbing	Yes
Not a Hazard Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

The resin manufacturing of the notified polymer will occur in the USA or Europe and will be imported into Australia as < 50 % component in 3.78 L steel cans as a finished paint ready for application or as a resin solution, RC-49917 with mixed solvents in steel 200 L steel drums, and then formulated in Australia into finished automotive spray paints.

MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Tonnes</i>	3-10	10-30	10-30	10-30	10-30

USE

The notified polymer will be used as a component of automotive spray paint.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

Paint Manufacturing

RC-49917 is imported in 200 L steel drums inside containers and transported to the manufacturing site for storage, mixing and transformation into finished paint. All storage warehouses are approved for storage of bulk class 3 flammable goods, and are located in bunded areas with layout and storage according to AS1940.

During formulation, the notified polymer will be semi-manually weighed and then transferred to a mechanically stirred, enclosed, mixing tank using a trolley jack with tilt facility. Other ingredients are added to the batch slowly and stirred mechanically. The tank fume is exhausted to the atmosphere. Once combined with other ingredients into the finished paint product, it will be semi-automatically filled into steel containers, of 4 L or 1 L capacity.

When formulating the final product, RC-49917 is emptied into, and when completed drained from a gravity fed mixer.

Once finished paint is tested and approved by QA, the paint is gravity fed and filled into 4 L and 5 L open head mild steel approved cans and labelled with NOHSC compliant labels. The finished paint is transported to the warehouse, or immediately containerised for distribution.

Imported finished paint product, which has been manufactured overseas, may also be stored in the warehouse.

Individual orders are re-aggregated paint into cartons with other paint types to be transported to the final destination; the spray painter/smash repairer. Product containing RC-49917 may be sold individually or packed in cardboard cartons, each carton holding four 3.78 L, 4 L or 5 L cans.

End Use.

Spray painters who are qualified, professional tradesmen mix the paint containing RC-49917 as a component (part A) to be mixed with isocyanate catalyst (part B) according to the product recipe using a balance or measuring cylinder and mixing jar. After mixing, the paint is loaded into a spray gun and sprayed out onto the vehicle placed in a spray booth constructed and used to AS4114.

After the refinishing is complete the spray gun and lines are emptied and any residual paint placed into a "paint waste" drum for recycling. The spray gun is then cleaned at an earthed recycled solvent wash station ready for the next use.

6. EXPOSURE INFORMATION

6.1. Summary of Occupational Exposure

Workers may be exposed to the < 50 % solution of notified polymer when opening containers, and during weighing and measuring RC-49917. Dermal exposure is expected to be the major route of exposure, however ocular exposure may occur from accidental splashing and secondary transfer from gloved hands. Workers may also be exposed to the solution of the notified polymer via the dermal, ocular and inhalation routes during manufacturing of paint and spraying of the finished product. The product is sprayed in a booth with an exhaust/filter system, and workers wear a supplied air respirator or mask fitted with an organic vapour cartridge, face-shield, gloves and protective suit conforming to AS and NZ standards as specified in the MSDS. Workers may be exposed to a dilute solution of the polymer via the dermal and ocular routes while cleaning and rinsing spray equipment using recirculated solvent.

After application and once dried, the paint containing the notified polymer is cured into an inert matrix and is therefore unavailable for exposure.

Transport and warehousing workers may come into dermal and ocular contact with the notified polymer through accidental leaks and spillages of the drums and containers. The overall risk is exceedingly low.

Paint manufacturing workers will manually weigh and transfer the polymer solution to the mixing vats. Workers will wear impermeable gloves, eye protection and impermeable trousers or suits when required. Exposure from the notified polymer to these workers can occur by either dermal or ocular routes, however significant exposure will be limited by the workplace practices, personal protective equipment and plant design used.

Throughout end use, spray painters may come into contact with the notified polymer through dermal, inhalation and ocular routes. Exposure may occur during mixing of paint components or while applying the paint. The likelihood of exposure, however, will be minimal as application is done in a ventilated spray booth. Air supplied breathing apparatus is used in conjunction with the application of product containing RC-49917 due to the presence of isocyanates.

The use of the paint containing the polymer is expected to be in accordance with the NOHSC National Guidance material for Spray Painting (NOHSC, 1999). The level of protection from exposure afforded by the standard control measures to protect against the isocyanate will minimise any exposure from the notified polymer. PPE used will be impermeable gloves (butyl rubber) in accordance with ANZS2161, eye/face protection goggles in accordance with ANZS1336 and ANZS1337, supplied air respiratory protection in accordance with ANZS1716 and ANZS1715 and clothing in accordance with AS2919.

When the paint containing the notified polymer has dried and cured and the notified polymer RC-49917 will have chemically reacted, creating a new species as a paint film, which is unavailable for exposure to humans or the environment.

6.2. Summary of Public Exposure

The notified polymer will not be available to the public and will only be sold to smash repair businesses for use by technically qualified spray painters. Members of the public will not come into contact with the notified polymer until it has completely reacted, cross-linked and transformed into a fully integrated constituent of a non-reactive paint film covering the surface of the vehicle.

6.3. Summary of Environmental Exposure

6.3.1. Environmental Release

Local Reformulation Process

During paint manufacture, there is potential for small releases through spills, which will be contained within bunded areas and collected for disposal. In the event of a wash out of the mixer, the maximum loss will be up to 2 % (up to 600 kg per annum) of the notified polymer dissolved in the wash out solvent. A solvent recycling company will dispose of the RC-49917 contained in the used wash solvent by complying with NSW EPA protocol allowing no water-soluble fractions of polymer remain in still residuals for disposal to landfill or asphalt tackifier. It is assumed that 2.5 % of the notified polymer remains in each 200 L imported drum. This is removed during drum recycling by washing or incineration.

Local Spray Painting

- Waste attached to disposed container

It will be wasted annually in the residual paint in end-user containers. Traditionally, used paint cans have been crushed and sent to landfill. However, due to a Coating Care program being extended by the Packaging Covenant to steel cans used by industry, this residue may also be incinerated in a steel furnace.

- Residues from paint as sprayed

Over spray will be between 20 % and 50 %. A water curtain will capture it or it will be captured by spray booth/room filters and directed to landfill as dried insoluble polymer that has met NSW state EPA tests for water extractable fractions. In a worst case situation up to 50 % of the notified polymer will be lost due to over spray. Note: 50 % over spray is a maximum amount; normally over spray would be less than 20 % for an experienced tradesman.

- Residues from paint in mixing container

Residual paint remaining in the mixing container is washed out with a solvent wash. This accounts for approximately 5 % of the imported polymer.

- Residues from Cleaning Spray Equipment

After refinishing is complete the spray gun and lines will be emptied and any residual paint will be placed into a waste paint drum for recycling. The spray gun and lines are then washed with recycled solvent with the resultant effluent going to solvent recovery. Approximately 5 % of the imported notified polymer would be lost in this way.

Hence the Maximum total amount of RC-49917 resin released during use is:

$5\%_{\text{container}} + 50\%_{\text{over spray}} + 5\%_{\text{mixing}} + 5\%_{\text{cleaning}} = 65\%$ used in Australian consumed products.

Release to the environment during shipping, transport and warehousing will only occur through accidental spills or leaks of the drums or steel packaged containers.

During formulation and packaging, spills are expected to be minimal. When spills occur, they will be contained by bunding, collected with absorbent material and sent to a licensed off site waste disposal centre. Empty drums from import will be sent to drum reconditioning firms where any residuals are removed by flushing or burning so that the drum is clean for reuse. Any unburnt waste from drum cleaning is treated by a NSW EPA protocol that eliminates any water-soluble fraction. Total waste from all sources is expected to be approximately 2 % of the import volume.

6.3.2. Environmental Fate

The notified polymer is expected to be hydrolytically stable and to not be readily biodegradable. Due to its hydrophobic nature, it is expected that the notified polymer will be stable in landfill and if released will associate with sediments and organic phases of soil and sediments, and slowly degrade to simple carbon compounds. During automobile recycling, the polymer will be destroyed in the steel furnace.

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	Semi-viscous liquid (product)
Melting Point/Glass Transition Temp	138-192°C
Density	0.998 kg/m ³ at 20°C
Water Solubility	Very low due to the lack of hydrophilic constituents
Dissociation Constant	N/A
Particle Size	N/A
Reactivity	Stable under normal environmental conditions
Degradation Products	None under normal conditions of use

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

No toxicological data was submitted.

8.2. Human Health Hazard Assessment

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard.

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology

No ecotoxicological data were submitted as allowed for a PLC. Nonionic polymers of NAMW > 1,000 are of low concern to the aquatic environment.

10. RISK ASSESSMENT

10.1. Environment

The notified polymer meets the PLC criteria and is, therefore, expected to be of low environmental hazard.

The polymer is highly hydrophobic with NAMW > 1,000 and if released would be expected to associate with sediments and the organic fraction of the soil partition. The use pattern is highly diffuse within cities and towns.

No aquatic exposure is anticipated during manufacture and end use of the notified polymer. It is envisaged that the 2 % waste would be generated from the manufacturing process. These wastes would be collected by licensed waste contractors and be either incinerated or reduced to an insoluble polymer mass meeting EPA criteria that may be used as a rubberiser and tackifier in road base.

It is expected that practically all of the waste generated from end users (50 % as over spray) will be solidified and disposed of in approved landfills as inert solid waste by solvent recyclers to state EPA specifications. In landfill, the solid wastes will not be mobile and will degrade slowly and not pose a significant risk to the environment.

10.2. Occupational Health and Safety

The OHS risk presented by the notified polymer is expected to be low, based on low hazard that is required of a polymers meeting the criteria of polymers of low concern. Combined with low exposure and the use of engineering controls and personal protective equipment workers will be well protected from all hazardous ingredients including isocyanates and resulting in a high level of protection from the notified polymer RC-49917. The notified polymer may be present in formulations containing other hazardous ingredients. If these formulations are classified as hazardous to health in accordance with the to the NOHSC *Approved Criteria for Classifying Hazardous Substances* workplace practices and control procedures consistent with the provisions of the State and Territory hazardous substances legislation must be in operation.

10.3. Public Health

The notified polymer will not be sold to the public, being used only by professional spray painters in a controlled industrial setting. Once the polymer is applied and cured it will be contained in an inert matrix, and hence will not be bio-available. Risk to the public is considered low.

11. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS

11.1. Environmental Risk Assessment

The polymer is not considered to pose a risk to the environment based on its reported use pattern and significant level of controls to inhibit escape to the environment.

11.2. Human Health Risk Assessment

11.2.1. Occupational health and safety

There is Low Concern to occupational health and safety under the conditions of the occupational settings described due to the high level of personal protective equipment used to protect against the isocyanate and solvents that both provide a greater risk than this polymer.

11.2.2. Public health

The notified polymer is intended for use by professional spray painters in auto repair workshops only and will not be sold to the public. Following application, the polymer is trapped as an integral part of the paint film and will not be bioavailable. The risk to the public from contact with the polymer is considered low.

12. MATERIAL SAFETY DATA SHEET

12.1. Material Safety Data Sheet

The notifier has provided MSDS for the resin solution containing the notified polymer in accordance with the schedule item B 12 of the *ICNA Act*. The accuracy of the information on the MSDS remains the responsibility of the applicant.

13. RECOMMENDATIONS

CONTROL MEASURES

Occupational Health and Safety

- No specific engineering controls or work practices are required for the safe use of the notified polymer itself; however, these should be selected on the basis of all ingredients in the formulation.

Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- Personal protective equipment required during formulation are
 - Eye protection (safety glasses or goggles)
 - Impermeable gloves
 - Industrial clothing and footwear
 - Breathing Protection
- 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.

Environment

- The following control measures should be implemented by the notifier to minimise environmental exposure during formulation of the notified polymer:
 - Bunding
- The following control measures should be implemented by end users (spray painters) to minimise environmental exposure during use of the notified polymer:
 - Exhaust ventilation with filter

Disposal

- The notified polymer should be disposed of to landfill or incinerated.
- Empty containers should be sent to local recycling or waste disposal facilities.

Emergency procedures

- Spills/release of the notified polymer should be handled by absorbing with sand and put into suitable container for disposal. Contaminated containers can be re-used after cleaning.

13.1. 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.