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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

RCP-29191

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FULL PUBLIC REPORT

RCP29191

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT
DuPont (Australia) Ltd
49 – 53 Newton Rd
Wetherill Park
NSW 2164
ABN 59000716469

NOTIFICATION CATEGORY
Standard: Polymer with NAMW < 1000 (more than 1 tonne per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:
Chemical name, other name, CAS number, molecular and structural formulae, molecular weight, spectral data, purity, Hazardous and Non-hazardous Impurities, Additives/Adjuvants, Manufacture/Import Volume, and Site of Manufacture/Reformulation and identity and composition of the molecule.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed as follows:
Acute oral, dermal and inhalation toxicity, skin and eye irritation, skin sensitisation, repeat dose toxicity, genotoxicity, ecotoxicity and biodegradation.

The notified polymer is a polyester highly similar to that that can be formed from listed monomers that give rise to a polyester within the rules of a PLC. Several of the monomers used are not listed, but are either anhydrides which are incorporated as listed monomers, or are closely analogous to listed monomers and are expected to have no additional contribution to the hazard properties.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT
None

NOTIFICATION IN OTHER COUNTRIES
USA - TSCA TS1089 (1999)

2. IDENTITY OF CHEMICAL

METHODS OF DETECTION AND DETERMINATION

ANALYTICAL METHOD	IR spectroscopy
REMARKS	A reference spectrum was provided

3. COMPOSITION

DEGREE OF PURITY
>70%

HAZARDOUS IMPURITIES/RESIDUAL MONOMERS

All hazardous impurities are present below the cut-off concentration levels for classification of the notified polymer as a hazardous substance.

NON HAZARDOUS IMPURITIES/RESIDUAL MONOMERS (>1% by weight)
None

ADDITIVES/ADJUVANTS
None

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified polymer will not be manufactured in Australia, but will be imported as resin solution for paint manufacture in Australia. The notified polymer will also be imported as an ingredient in a solvent-based paint formulation, DuPont ChromaClear HC-7600S.

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

Volume of polymer imported would be in the range of 100-500 tonnes per annum over the next 5 years.

USE
Component of an automotive refinish spray paint.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, transport and storage

PORT OF ENTRY
Sydney

IDENTITY OF MANUFACTURER/RECIPIENTS
DuPont (Australia) Ltd

TRANSPORTATION AND PACKAGING
RCP29191 will be imported as a component of finished paint in 3.785 L or 5 L approved mild steel cans. Future formulations could have up to 80% RCP29191. The product is stored in the warehouse facility before distribution to suppliers and end users. These cans may be sold singly or packed in cardboard cartons, each carton holding four 3.785 L, 4 L or 5 L cans. Transport will be by road.

5.2. Operation description

The resin will be used as an ingredient of automotive paints imported from overseas or in the local manufacturing of paint.

For the manufacture of paints, the resin is blended with other ingredients to make the final paint product. The resin is first emptied into a 5000 L covered tank mixer using a trolley jack with tilt facility. Bulk solvents are added to the batch slowly via piped supply directly into the mixer and stirred without human contact. This occurs over a period of up to 5 hours. When the loading of the product formulation is complete, the mixture is stirred for 30 minutes to 1 hour before the batch is tested. The product is then filled in 4 L and 5 L open head mild steel cans and sent to contract warehouse for storage and distribution to automotive refinish suppliers.

The packaged paint product (imported or locally manufactured) will be distributed through wholesalers to spray painting/smash repair businesses, who are the main end-users. The paint will be mixed on site with other components of the coating system, including an isocyanate catalyst, and applied in spray booths to motor vehicles as part of the repair or repainting process. There is the potential for the product to be used at up to 2000 sites in Australia.

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

A proportion of the locally manufactured paint product will also be exported.

5.3. Occupational Exposure

Number and Category of Workers

Category of Worker	*Number*	*Exposure Duration*	*Exposure Frequency per Yr*
Import and Distribution of Finished Product			
Transport driver inwards	1	4 hours/day	10 days/year
Warehouse storemen	10	3 hours/day	20 days/year
Transport drivers Outwards	30	4 hours/day	30-50 days/year
Local Manufacturing			
Storemen	1	2 hours/day	40 days/year
Factory hand (mixing resin solution)	1	6 hours/day	40 days/year
Filling room		6 hours/day	
Quality Control	1	2 hours/day	40 days/year
Local Use by Spray painters			for classification of the notified polymer as a hazardous substance.
Weighing and mixing	7,600	1 hour/day	200 days/year
Spraying	7,600	3 hours/day	200 days/year
Cleaning	7,600	0.5 hour/day	200 days/year

Exposure Details

Transport and storage

Exposure to the notified polymer is not expected during the importation, warehousing or transportation of the notified polymer solution or the paint product except in cases where the packaging is accidentally breached.

Formulation and end use

Formulators of the product may be exposed to the notified polymer when opening containers, weighing and measuring of volumes and when pouring the polymer solution in mixing vessels. Dermal exposure is expected to be the major route of exposure, however, ocular exposure may occur upon accidental splashing.

Spray-painters mix the paint component containing the notified polymer with isocyanate catalyst, load the mixture into a spray gun and spray it onto the vehicle placed in a spray booth. Dermal, inhalation and ocular exposure can occur during the application process. However, exposure to significant amounts of the notified polymer will be limited due to the engineering controls and personal protective equipment worn by workers. For application in spray booths, controls against exposure are stringent as isocyanates are also used in the process. The spray-painters will be equipped with respiratory protection, eye protection, hand protection conforming to AS and NZ standards. The product is sprayed in booths with an exhaust/filter system, and workers wear air respirator or mask fitted with organic vapour cartridge, faceshield, gloves and protective suit.

Workers may also be exposed to the polymer via the dermal and ocular routes while cleaning and rinsing spray equipment using recirculated solvent.

5.4. Release

RELEASE OF CHEMICAL AT SITE

Local Paint Manufacturing
The loss of the RCP29191 in paint manufacturing will be in the following ways:

- Residues in Import containers (200 L drums)

  An estimated 0.2 kg of the resin RCP29191 remains in the 200 kg container. This is removed during drum reconditioning. Thus the maximum estimated waste would be 500 kg of RCP29191 annually (for 500 tons of resin imported), which will be disposed of by the solvent recycling company in the sludge formed during the reclamation process.

- Process equipment cleaning

  Recycled washout solvent will be used to wash any residual paint (containing the notified polymer) from the mixer and filling lines with the resultant effluent being sent to a solvent recycling company for further recycling. Approximately 1000 kg of RCP29191 will be sent in the washing effluent to a solvent recycling company, where the notified polymer will end up in the resultant sludge.

- Spills

  There will be minor losses due to spills during paint manufacture.

Thus the maximum total waste RCP29191 from local manufacturing is estimated to be 1.5 tonnes, which will go to landfill.

RELEASE OF CHEMICAL FROM USE

Local Spray painting

- Waste attached to disposed container

  Approximately 5% (25 tonnes) of the notified polymer will be wasted annually in the residue paint in end-user containers. Traditionally used paint cans have been crushed and sent to landfill. However due to Coating Care program being extended by the Packaging Covenant to steel cans used by industry this residue may be incinerated in a steel furnace or similar.

- Residues from Paint as sprayed

  Overspray will be between 20%-50%. It will be captured by a water curtain or spray booth/room filters and sent to landfill as dried polymers. Thus, in a worst case situation up to 250 tonnes of the notified polymer will be lost due to overspray.

- Residues from Paint in Mixing Container

  Residual paint remaining in the mixing container is washed out with solvent wash. This accounts for approximately 4% of the imported polymer, ie up to 20 tonnes annually.

- 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 4% of the imported notified polymer will be lost in this way, ie up to 20 tonnes annually.

Hence the Maximum total amount of RCP29191 resin released during use is:
5% (container) + 50% (over spray) + 4% (mixing) + 4% (cleaning) = 63% of RCP29191 used in Australian consumed products. Thus, if RCP29191 used in paint locally were to grow to 500 tonnes per annum, 315 tonnes is the maximum that will be lost to the environment. However, it is likely that

this will be much less, possibly around 165 tonnes.

5.5. Disposal

Unused paint and dirty paint-laden wash solvent are poured into a closed head drum and sent to a solvent recycling firm where the drum contents undergo distillation to recover the solvent, which is then re-drummed. The residual polymer is reduced to a solid and sent to landfill. The waste streams treated in this manner include the waste solvent generated during paint manufacture, equipment cleaning and import container rinsate, and waste solvent generated by the cleaning of application equipment (mixing tanks, lines and spray guns) and accounts for up to 41.5 tonnes annually.

Waste, containing the notified polymer, from spills and overspray will be collected allowed to dry and then disposed of to landfill and will account for up to 62.5 tonnes of waste notified polymer annually. User containers containing residual amounts of paint will be disposed of to landfill or, as the Coating Care program grows, may be disposed of by incineration generating water and oxides of carbon, and will account for up to 25 tonnes annually of waste notified polymer.

5.6. Public exposure

The resin is to be used as a clear topcoat on motor vehicles. The general public will come in contact with the fully cured finished topcoat. At that stage the polymer will be fully cured and cross-linked by isocyanate groups and adhered to the vehicles outer surface forming a continuous totally insoluble molecule of infinite size and is consequently rendered non-hazardous and immobile.

6. PHYSICAL AND CHEMICAL PROPERTIES

Limited data were available for the notified polymer, however some data were available for an analogue (notified as STD/1077) that is proposed as a surrogate for the notified polymer.

Appearance at 20ºC and 101.3 kPa Light yellow – clear, semi viscous liquid.

Melting Point/Freezing Point -36ºC

METHOD	DuPont QC Method similar to OECD TG 102 Melting Point/Melting Range.
Remarks	Report not provided.
TEST FACILITY	Du Pont QC Specification & MSDS

Boiling Point 152ºC at 101.3 kPa

METHOD	Du Pont QC method similar to OECD TG 103 Boiling Point
Remarks	MSDS for RCP29191 states 152ºC. Report not provided.
TEST FACILITY	Dupont QC Specification & MSDS

Density 1090 kg/m^3 at 20ºC as the solution polymer RCP29191

METHOD	Du Pont method similar to OECD TG 109 Density of Liquids and Solids.
Remarks	From MSDS for RCP29191. Report not provided.
TEST FACILITY	Du Pont QC Specification & MSDS

Vapour Pressure Not determined

Remarks	Due to the polymer's moderate molecular weight, it is not likely to be volatile.

Water Solubility 5-10% solubility

METHOD	
Remarks	Based on the analogue, KG11518, notified as STD/1077. Three samples were shaken at room temperature for 3.5 days and then centrifuged for 2 hours. Aliquots of the aqueous phase were weighed, then dried under heat and nitrogen purge conditions and then reweighed.

Due to the generally hydrophobic nature of the polymer this solubility appears high. This may be accounted for by the presence of suspended material in the aqueous phase supernatant. However, the partition coefficient indicates up to 16% of the molecular species present have potentially greater solubility.

Note: Only a very brief test report was part of the CEPA DOC-750 documentation. The notifier indicates that the notified polymer has a higher molecular weight than the analogue (KG11518, notified as STD/1077) and should offer a lower risk as the larger size reduces the solubility and ability to be transported across cellular boundaries.

TEST FACILITY DuPont Performance Coatings (year not stated).

Hydrolysis as a Function of pH Not determined

Remarks Due to low water solubility, the polymer is not expected to hydrolyse under environmental conditions (pH 4-9) in spite of the presence of groups which are potentially hydrolysable.

Partition Coefficient (n-octanol/water) Log Kow = 2.9 (25ºC) (for log K_{ow} range 1.16 to 2.39, total area % = 16%)

METHOD Not provided.

Remarks Based on the structure of a related polymer (KG11518) notified separately as STD/1077. Rather than the original study report, only brief details have been provided in the CEPA DOC750 documentation. From this it appears that an HPLC method was used and that there were at least 4 peaks of greater hydrophilicity.

TEST FACILITY DuPont Performance Coatings (2001).

Adsorption/Desorption Not determined.

Remarks While this was not attempted, it is expected that the polymer will adsorb to or associate with soils and sediments due to its hydrophobic structure (in spite of comparatively high water solubility).

Dissociation Constant Not determined.

Remarks No portion of the molecule is expected to be ionised in the environmental pH range of 4 – 9. No acidic or basic groups are present.

Particle Size Not applicable

Flash Point - resin solution 60.5 – 90.3 ºC
-resin solid Does not flash

METHOD EC Directive 92/69/EEC A.9 Flash Point.
Remarks From MSDS. Report not provided. Resin solution data for solvent.

Flammability Limits Upper: 7.9%
Lower: 1.1%

METHOD EC Directive 92/69/EEC A.11 Flammability (Gases).
Remarks From MSDS. Report not provided. Data for solvent.

Autoignition Temperature	Data not provided, but expected to be that of the solvent Methyl amyl ketone = 532 deg C
Remarks	Data referenced from Sax's Dangerous Properties of Industrial Materials, Tenth edition (2000).
Explosive Properties	Not explosive.
Remarks	Not expected to be explosive based on structure.
Reactivity	
Remarks	RCP29191 will oxidise and combust at high temperatures. The solvents associated with RCP29191 in the resin and paint is flammable. Otherwise the reactivity of this material is negligible.

7. TOXICOLOGICAL INVESTIGATIONS

Toxicological data for the notified polymer were not submitted. For the reasons detailed below, it was concluded that RCP29191 is of low toxicological concern and actual toxicity studies were not required for this polymer.

A chemical must be absorbed by an organism in order to cause an adverse health effect. The ability of a molecule to pass through biological membranes and therefore be absorbed by organisms generally decreases with increasing molecular weight. It is generally accepted that polymers with MW exceeding 1000 are unlikely to pass through biological membranes (Anliker et al 1988 and Connell DW, 1989). The notified polymer is a relatively large molecule. Absorption of RCP29191 through the skin is therefore expected to be very low. The oligomer has a tight polydispersity of 1.1, meaning the size of the majority of species will be above 700 daltons and would find it difficult to cross cellular boundries.

RCP29191 does not contain any high or moderate concern reactive functional groups. It is a polyester oligomer constructed from reactants that are not on the list of exempt monomers but give rise to a structure that is highly similar to a structure derived from reacting listed monomers that would qualify as polyester PLC.

Chemical databases searches (HSDB, RTECS; see Section 13 for references) indicated that the monomers arising from the hydrolysis of the polymer have low toxicity by all routes.

In addition, based on the acute toxicological data available for a chemical with similar structural features, castor oil (NICNAS File No. NA/749), the notified polymer would be expected to have the following toxicological profile.

Acute toxicity Castor oil has very low acute toxicity by all routes, so the notified polymer would be expected to have very low acute toxicity by all routes.

Irritation Based on the absence of skin and eye irritant effects in humans for castor oil, the notified polymer would be at most a slight skin and eye irritant.

Skin sensitisation. A number of cases of contact dermatitis have been observed in humans exposed to castor oil, however, no animal studies were available. Therefore, the notified polymer may possess some sensitisation potential.

Based on its predicted toxicity, the notified polymer cannot be classified as a hazardous substance in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (National Occupational Health and Safety Commission, 1999a). In the absence of confirmative test data, the evidence for skin sensitisation is insufficient to warrant classification.

7.1. Acute toxicity – oral

Acute oral toxicity of the notified polymer was not tested. An analogue polymer notified separately as KG-11518 (STD/1077) was tested for acute oral effects in rats.

TEST SUBSTANCE	DOC750 (KG-11518)
METHOD	OECD TG 401 Acute Oral Toxicity.
Species/Strain	Rat/Crl:CD (SD)IGS BR
Vehicle	2-heptanone
Remarks - Method	Single oral dose by intragastric intubation

RESULTS

Group	*Number and Sex of Animals*	*Dose mg/kg bw*	*Mortality*
1	1 male	670	No
2	1 male	2300	No
3	1 male	3400	No

LD_{50}	>3400 mg/kg bw
Signs of Toxicity	No clinical signs were observed, and no significant body weight losses occurred during the study.
Effects in Organs	None
Remarks - Results	Under the conditions of study, the oral approximate lethal dose (ALD) for KG-11518 was greater than 3400 mg/kg body weight. This polymer is considered to be slightly toxic when administered as a single oral dose to male rats.
CONCLUSION	The analogue polymer is of low toxicity via the oral route.
TEST FACILITY	E.I. du Pont de Nemours Company, Newark, USA

7.2. Acute toxicity - dermal

Acute dermal toxicity of the notified polymer was not tested. The polymer is likely to have low dermal toxicity due to its large molecular size/weight (low dermal absorption) and lack of reactive functional groups.

7.3. Acute toxicity - inhalation

Acute inhalation toxicity of the notified polymer was not tested. The polymer is likely to have low inhalation toxicity due to its molecular size/weight and lack of reactive functional groups.

7.4. Irritation – skin

Skin irritation potential of the notified polymer was not tested. The molecule does not have any reactive functional groups that could react with dermal proteins or other macromolecules to cause skin irritation.

7.5. Irritation - eye

Eye irritation potential of the notified polymer was not tested.

7.6. Skin sensitisation

Skin sensitisation potential of the notified polymer was not tested. The molecule does not have any reactive functional groups that could react with dermal proteins or other macromolecules to cause skin sensitisation.

7.7. Repeat dose toxicity

The notified polymer was not tested for its repeat dose toxicity. Toxicity from repeated exposure to the polymer is expected to be low, based on the properties of the constituent monomers.

7.8. Genotoxicity – bacteria

The notified polymer was not tested for its genotoxicity.

8. ENVIRONMENT

8.1. Environmental fate

The notifier has proposed that a polymer (KG-11518) notified separately as STD/1077 is an appropriate analogue for RC29191. This is considered to be an appropriate analogue. The following biodegradation results are based on that analogue.

8.1.1. Ready biodegradability

The report was submitted as part of the Canadian assessment document.

TEST SUBSTANCE	DOC7509 (KG11518)
METHOD	OECD TG 301 B, Ready Biodegradability: CO_2 Evolution Test (Modified Sturm Test).
Inoculum	Activated sludge
Exposure Period	28 days
Auxiliary Solvent	None
Analytical Monitoring	
Remarks – Method	Reference substance – sodium benzoate Toxicity test – test substance + reference substance

Results

Test substance		*sodium benzoate*	
Day	*% degradation*	*Day*	*% degradation*
0	0	0	0
5	5	5	22
10	10	10	54
12	10	12	62
28	13	28	-

Remarks - Results	Percentage degradation of the reference substance was greater than 60% by day 12, thus validating the study. In the toxicity test the degradation was greater than 25% within 10 days, thus indicating that the test polymer was not inhibitory to the microorganisms in the inoculum.
CONCLUSION	The degradation of the polymer did not reach 60% within the 28 days, thus the polymer is not readily biodegradable.
TEST FACILITY	CCER 2001

8.1.2. Bioaccumulation

Based on the $\log K_{o/w}$ of 2.9 for a polymer analogue (KG11518, notified separately as STD/1077) and the relatively large molecular weight, there is unlikely to be a potential for bioaccumulation. There is also likely to be limited aquatic exposure.

8.2. Ecotoxicological investigations

The notifier has proposed that a polymer analogue, KG11518, notified separately as STD/1077 is an appropriate analogue for RC29191. This is considered to be an appropriate analogue. The following ecotoxicity results are based on the analogue.

8.2.1. Acute toxicity to fish

A very brief report on the analogue polymer, KG-11518, was submitted as part of the Canadian assessment document.

TEST SUBSTANCE	DOC750 (KG11518)
METHOD	OECD TG 203 Fish, Acute Toxicity Test – unaerated, static.
Species	*Oncorhynchus mykiss*
Exposure Period	96 hours
Auxiliary Solvent	None
Water Hardness	Not reported
Analytical Monitoring	None
Remarks – Method	Temperature was maintained at 12.6-12.8ºC Dissolved oxygen and pH were measured at the start and end of the study and ranged between 10.2–10.7 (0 h) and 7.7–8.8 (96 h) mg/L and 7.0-7.1 (0 and 96 h) respectively.

RESULTS

Concentration mg/L		*Number of Fish*	*Mortality*				
Nominal	*Actual*		*1 h*	*24 h*	*48 h*	*72 h*	*96 h*
0	-	10	-	0	0	0	0
1	-	10	-	0	0	0	0
10	-	10	-	0	0	0	0
100	-	10	-	0	0	0	0
1000	-	10	-	4	6	9	10

LC50	316 mg/L (95% CI = 100–1000) at 96 hours.
NOEC (or LOEC)	100 mg/L at 96 hours.
Remarks – Results	At the start of the study visual examination concluded that the control, 1, 10 and 100 mg/L concentrations were clear and colourless, while the 1000 mg/L concentration was cloudy. By the end of the study undissolved material was present in all concentrations except the control. Dissolved oxygen and pH varied within acceptable limits.
CONCLUSION	The polymer is very slightly toxic to fish (Mensink 1995)
TEST FACILITY	Haskell Laboratory for Toxicology and Industrial Medicine, 2001.

8.2.2. Acute toxicity to aquatic invertebrates

The submission cites Nabholz et al (1993) indicating that "polymers with NAMW <1000 AMU are generally assessed [in the USA] as a monomer is assessed based on the type of functional group in the compound". While polycarboxylic acids are toxic to algae by over-chelation, the final step in the synthesis of the polymer creates end caps that convert the polycarboxylic acid moieties to esters thus negating the chelation effect.

A concern with RCP29191 is that up to 50% of the molecular weight species is below 1000 dalton, and some smaller oligomers are also present (4% <500 daltons). Toxicity of monomers is seldom used to describe the toxicity of the final polymer. However, because of the presence of the low molecular weight species, an evaluation of the monomer toxicities was done to confirm that RCP29191 did not contain any toxicologically relevant functional groups. The notifier's evaluation indicated that the notified polymer would exhibit low toxicity to aquatic invertebrates.

8.2.3. Algal growth inhibition test

See section 8.2.2. The monomer evaluation indicated that RCP29191 would exhibit low toxicity to algae. The notifier indicates that the RCP29191 would confer greater hydrophobicity and large size and thus offers a relatively lower environmental risk than the polymer analogue, KG11518, notified separately as STD/1077.

9. RISK ASSESSMENT

9.1. Environment

9.1.1 Environment – exposure assessment

There will be no manufacturing of the notified polymer in Australia, and therefore no release during this stage.

It will be initially imported in ready-to-use paint but at a later stage may be imported in a solution for use in paint manufacture. This is taken into account in the environmental assessment and it is presumed that the paint will all be used in Australia as a worst case scenario (i.e. no allowance has been made for export of manufactured paint).

Approximately 1.5 tonnes of notified polymer is expected to enter the environment each year due to paint manufacture, while up to 315 tonnes of notified polymer will released due to wastes generated during paint use in motor vehicle workshops. It is expected that waste generation and disposal will occur in a diffuse manner owing to the nationwide use of the paint products, with the majority being released through overspray (accounting for up to 250 tonnes annually), which will be directly disposed of to landfill. 41.5 tonnes will initially go to solvent recovery companies and then to landfill in the sludge that is generated. In landfill the notified polymer will adsorb to the soil. In soil environments, the notified polymer is not expected to be mobile or leach from the soil into ground or surface water, but rather is expected to bind to the organic phases in soils. Under these conditions it would be slowly degraded to gases such as carbon dioxide through the agency of abiotic and biotic processes.

Under normal usage, the notified polymer is not expected to enter the aquatic environment. Most of the polymer will be incorporated into automotive re-finish paint, which upon drying will become inert. The polymer incorporated in this matrix will ultimately be disposed of along with the car, which will generally go to metal recycler. Thus, the paint matrix will be destroyed via incineration generating water and oxides of carbon.

Due to the nature of the release pattern a Predicted Environmental Concentration (PEC) cannot be estimated.

In the event that the polymer enters the aquatic environment, it is expected to partition mainly into sediment and sludge owing to its low water solubility

9.1.2. Environment – effects assessment

Only ecotoxicological data for fish using a close analogue polymer were available for the notified polymer. Since there is only data for 1 trophic level a safety factor of 1000 is used to calculate a PNEC with the LC_{50} for fish of 316 mg/L. The PNEC is 0.316 mg/L.

Since the MW is below 1000, there is the potential for the notified polymer to bioaccumulate. However, under normal usage, the notified polymer is not expected to enter the aquatic environment and to pose a hazard to aquatic organisms.

9.1.3. Environment – risk characterisation

A risk quotient cannot be calculated as an accurate PEC cannot be estimated. However, the notified polymer is not expected to pose any significant hazard to the environment. The usage pattern, and the anticipated nationwide use of the product indicate that the levels of release of the polymer to the environment will be low. Under normal usage there will be no release into the aquatic environment.

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

There is little potential for occupational exposure to the notified polymer in the transport and storage of the paint component containing the polymer. There may be exposure during the reformulation of the polymer, mixing of paint components and in the use and disposal of the paints.

During reformulation, paint mixing and paint application, the main exposure route for the notified polymer will be dermal. The paints and the polymer solution will be viscous, and ready formation of aerosols is not expected, except when decanting from drums (an activity of short duration). Splashes are also not likely during filling operations. Most processes involving the notified polymer are likely to be enclosed and automated except for transfer of paint from containers to mixing vessel, filling spray gun and cleaning spray equipment.

Due to the low toxicological hazard posed by the notified polymer, protective measures used to prevent exposure to the solvents, namely personal protective equipment and exhaust ventilation, should provide sufficient protection against the notified polymer.

However, once fully mixed, the final paint mix could contain a wide variety of additional ingredients. This is likely to introduce human health hazards from a range of potentially toxic solvents. 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.

Once the final paint mix, containing a maximum of <10% notified polymer, is applied and the paint film is cured, the polymer will not be separately available for exposure or absorption.

There are NOHSC exposure standards for butyl diglycol, xylene, trimethyl benzene and methyl amyl ketone, identified as ingredients in the polymer solution. The employer is responsible for ensuring that these exposure standards are not exceeded in the workplace.

9.2.2. Public health – exposure assessment

Paint products containing the notified polymer will only be used by industrial spray painters. The polyester is a component in automobile paint and is reacted with a polyisocyanate to form a film of infinite molecular weight anchored to the cars steel shell and unavailable to the general public. Therefore, the risk to the public induced by the notified polymer is considered to be low.

9.2.3. Human health - effects assessment

No toxicological information has been provided for the notified polymer and therefore the polymer cannot be assessed against the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999). The polymer is not expected to be hazardous by dermal exposure as the high molecular weight will preclude absorption through the skin.

The polymer solution containing ~80% notified polymer, as manufactured, is a hazardous substance because of its solvent content (~20% methyl amyl ketone). Associated solvents and isocyanate used with ChromaClear HC-7600S paint system provide the most significant risk to users. The MSDS for the paint product (Chromaclear HC-7600S) lists a number of potential health effects, namely skin, eye and respiratory irritation, contact dermatitis, lung damage, dizziness, nausea, and headache. These relate mainly to the solvents, rather than the notified polymers. Due to the high molecular weight, low concentration of low molecular weight species and low reactivity of the polymer, the toxicological hazard of the notified polymer is expected to be low.

9.2.4. Occupational health and safety – risk characterisation

The OHS risk presented by the notified polymer is expected to be low, given the low hazard of the chemical, the automated process and engineering controls, the good work practices and

safety measures including use of appropriate personal protective equipment by workers.

The notified polymer may be present in formulations containing hazardous ingredients. If these formulations 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.

9.2.5. Public health – risk characterisation

The resin is to be used as a clear topcoat on motor vehicles. The fully cured finished topcoat will come in contact with the general public. However, at that stage the polymer will be fully cured and cross-linked by isocyanate cure and adhered to the vehicles outer surface forming a continuous totally insoluble molecule of infinite size and is consequently rendered non-hazardous and immobile.

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

10.1. Hazard classification

Based on the available data the notified polymer is not classified as hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances*.

10.2. Environmental risk assessment

The polymer is not considered to pose a risk to the environment based on its reported use pattern.

10.3. Human health risk assessment

10.3.1. Occupational health and safety

There is Low Concern to occupational health and safety under the conditions of the occupational settings described in the notification.

10.3.2. Public health

There is negligible concern to public health when used as described in the notification.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of the notified polymer and product containing the notified polymer provided by the notifier were in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 2003). They are published here as a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

11.2. Label

The label for the 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, 1994). The accuracy of the information on the label remains the responsibility of the applicant.

12. RECOMMENDATIONS

CONTROL MEASURES
Occupational Health and Safety

- Employers should implement the following engineering controls to minimise occupational exposure to the notified polymer:
  - Exhaust ventilation when the containers are opened and the polymer solution poured into mixing vessels, and enclosed system for blending/packaging.
  - Enclosed spray paint application system for industrial use.

- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer as introduced and as diluted for use in the products:
  - Protective gloves,
  - safety glasses or goggles,
  - half-facepiece respirator and
  - industrial clothing

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

- 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 paint manufacturer to minimise environmental exposure during paint manufacture of the notified polymer:
  - Undertake work in bunded areas only
  - Collect all wastes and recycle where possible, otherwise contain in open drums and allow material to dry and then dispose to landfill.

Disposal

- The notified polymer should be disposed of to landfill, preferably once it has dried.

Emergency procedures

- Spills/release of the notified polymer should be handled by containment with absorbent material, collection and storage in sealable, labelled container.

12.1. 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 Section 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.

No additional secondary notification conditions are stipulated.

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