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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Carboset 560 Polymer

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Carboset 560 Polymer

1. APPLICANT

Australian Vinyls Corporation Limited of 65 Leakes Road, LAVERTON, VIC 3028 (ACN 078 558 595) has submitted a Polymer of Low Concern notification statement in support of their application for an assessment certificate for Carboset 560 Polymer.

2. IDENTITY OF THE CHEMICAL

The chemical name, CAS number, molecular and structural formulae, residual monomers, details of the polymer composition, import volume and sites of reformulation have been exempted from publication in the Full Public Report.

Marketing name: Carboset 560 Polymer

Molecular weight (MW):

Number-average MW	*Weight-average MW*	*% MW < 1000*	*% MW < 500*	*Method*
8 600	40 300	2.2	0.6	GPC

Structural identification method: IR

Peaks at 2925, 2875, 1775, 1450, 1375, 1250, 1200, 1110, 950, 750, 610 cm^{-1}

3. POLYMER COMPOSITION AND PURITY

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

Purity (%): High

Additives/adjuvants:

Chemical name	Synonym	CAS no.	% weight
water		7732-18-5	73

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

The polymer is manufactured as an emulsion in water. It is never isolated. The properties reported below are those of the polymer solution unless stated.

Property	Result	Comments
Appearance	Emulsion, milky white, slightly translucent liquid.	
Boiling point	Not provided.	
Density	1.0-1.2 kg/m^3.	
Water solubility	Not provided.	See below
Particle size	Not applicable.	The polymer exists in solution.
Flammability	Not provided.	
Autoignition temperature	Not provided.	
Explosive properties	Not explosive.	
Stability/reactivity	Stable under normal conditions of use.	
Partition coefficient	Not provided.	
Hydrolysis as a function of pH	Not provided.	See below
Adsorption/desorption	Not provided	
Dissociation constant	Not provided.	
Flash point	Not provided.	

5.1 Comments on physical and chemical properties

The notifier claims that the notified polymer is not soluble but it is dispersible in water. The polymer surface amine provides dispersion stability as water is added. The polymer becomes more insoluble as the water content increases.

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

6. USE, VOLUME AND FORMULATION

Use:
The notified polymer will be used as a component of an automotive temporary protective coating to protect the newly painted surfaces of vehicles.

Manufacture/Import volume:
The notifier estimates that the import volume will be a maximum of 100 tonnes per year in the first five years of importation.

Formulation details:
The notified polymer at < 30% will be imported as an aqueous emulsion dispersion as Carboset 560 in 200 L drums. The emulsion dispersion will be reformulated at one site in Australia to produce the automotive temporary protective coating, containing less than 20 % (w/w) notified polymer. The finished coating product will be stored and transported in 200 L containers in automotive manufacturers in Australia. It is used undiluted.

7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
Importation and distribution		
Unloading at wharf (2 workers)		
none	less than 30% solution, 4 h/day, 6 days/year; no exposure expected except in case of accident	none
Delivery to warehouse (2 workers)		
none	less than 30 % solution, 4 h/day, 6 days/year; no exposure expected except in case of accident	none
Drum handling (6 workers)		
none	less than 30 % solution, 2 h/day, 240 days/year; residues in drums and in case of accident	none
Reformulation		
Addition to mixing vessel and mixing (10 workers)		
dermal, ocular	less than 30 % solution, 4 h/day, 30 days/year workers will be exposed to drips and spills	drum cradle for dispensing; local exhaust ventilation and automated filling lines gloves, goggles and rubber aprons
QC testing (2 workers)		
dermal, ocular	less than 20 % solution, 4 h/day, 30 days/year	fume cupboard gloves, goggles and rubber aprons
Storage and drum recycling		
storage (2 workers)		
none	less than 20 % solution, 1 h/day, 30 days/year; no exposure expected except in case of accident	none
recycling of drums (3 workers)		
dermal	less than 20% solution, 4 h/day, 30 days/year; residues in drums	none
Application		
coating	*(20 workers)*	
dermal, ocular	less than 20% solution, 4 h/day, 240 days/year; open containers	enclosed spray booths with high volume low pressure equipment operated externally by a worker; exhaust extraction system
Removal		
	(2000 workers)	
dermal, ocular	less than 20% solution, 6 h/day, 240 days/year; washed off at car dealership before delivery to the customers	automatic or manual car wash – no details provided

8. PUBLIC EXPOSURE

The notified polymer is not available for sale to the general public. The potential for public exposure to the notified polymer during transport, storage, use or disposal is assessed as negligible. Members of the public making dermal contact with automobiles coated with products containing the notified polymer will not be exposed, as the notified polymer as part of the temporary surface coating will be removed at dealership in car wash stations.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

Except in the case of accident no exposure to the environment is expected from this polymer during transportation. The Material Safety Data Sheet (MSDS) for the notified polymer gives adequate instructions for cleaning up such spills.

Reformulation

The notifier has estimated that up to 0.1% of the polymer may be washed out of the mixing equipment during cleaning and sent to the on-site effluent plant for treatment before being released to the sewer, as will the 0.1% lost to spills and the residues remaining in the drums after 'emptying' (this volume is not estimated by the notifier but is also likely to be approximately 0.1%). This includes the polymer washed out of mixing equipment during cleaning, the 0.1% lost to spills and the residues (estimated for this assessment at 0.1%) remaining in the drums after 'emptying'.

Application

The coating will be applied by high volume low pressure spray equipment at the vehicle manufacturing sites. The notifier estimates that 0.1% of the polymer will be lost as residues in the drums after 'emptying' and will be washed out into the sewers by licensed drum recyclers. Licensed waste disposal contractors will dispose of residues from cleaning of the spray equipment (up to 0.5% of the polymer) and overspray (up to 30% of the product).

Removal

The temporary coating containing the notified polymer and applied to the new vehicles is removed at vehicle dealerships around Australia in car wash stations. It is removed using an aqueous solution and is disposed to the sewer after treatment by an on-site treatment system. All of the polymer that has been applied to the motor vehicle (60-70% of the import volume) will be removed and disposed of at this time.

The entire import volume of the polymer will be released to the sewer after some kind of pre-treatment (not defined by the notifier), in a disperse manner.

9.2. Fate

All of the import volume of the notified polymer will be released to sewers around Australia as a dispersible ammonium salt. It will remain suspended in the water fraction until the ammonia partitions to water and the polymer gradually becomes insoluble and drops out of

solution due to its high molecular weight. It will eventually become associated with the sediments in the rivers, creeks or the ocean floor. Some may be removed during the sewage treatment process, but the extent is not possible to predict due to the lack of information or data regarding the conditions and time involved in the settling process.

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

10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological data were submitted.

The notified polymer is not classified as a hazardous substance according to the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999a). It contains low levels of residual monomers and no hazardous impurities.

The notified polymer as manufactured is an aqueous solution. It is not classified as a hazardous substance according to NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999a).

Ammonia is released in curing and carries a NOHSC exposure standard of 17 mg/m^3 (15 ppm). Some polymer constituents found at very low residual levels also carry NOHSC exposure standards.

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were submitted.

The notified polymer contains carboxylic acid functional groups which have a FGEW of approximately 600. These groups are considered to be of low concern to the environment.

Polycarboxylate polymers with adjacent groupings are known to be toxic in the environment (Nabholz, 1993) but this is unlikely to occur to a great extent for this polymer.

Ammonia is toxic to the environment. It is highly toxic to many species of fish (0.5-8 mg/L), moderately toxic to algae (2.5-2.8 mg/L) and bacteria (5.2 mg/L) but slightly to practically non-toxic (24-189 mg/L) to crustacea (Verschueren, 1996).

12. ENVIRONMENTAL RISK ASSSESSMENT

All of the polymer imported into Australia will be disposed of to the sewer, 30% as overspray during application and 70% when the temporary coating is removed at the vehicle dealerships. If it presumed as a worst case scenario that there is no removal of the polymer in the sewage treatment plant, the resultant Predicted Environmental Concentration (PEC) in receiving waters would be:

Amount released to sewer;	confidential
Population of Australia:	18 million
Volume of water/person:	150 L
Dilution factor in receiving water:	1:10
PEC in receiving water:	0.01 mg/L

Without any ecotoxicological data it is difficult to determine the actual environmental hazard posed by this polymer. However, under normal use where release is dispersed across Australia with a PEC of approximately 0.01 mg/L, the structure of the notified polymer indicates that it should be of low concern to aquatic organisms. The concentration of the ammonia in the polymer is 3% equating to a PEC release of the ammonia of approximately 0.0003 mg/L, which is below toxic levels and minor when compared to the background ammonia levels that will be released in the sewage treatment plant outflow

The overall environmental hazard from the proposed use of the polymer should be acceptable.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

No toxicological information has been provided for the notified polymer and therefore the substance cannot be assessed against the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999a). The MSDS for the polymer dispersion lists a number of potential health effects, namely skin, eye and respiratory irritation, dizziness, headaches, nausea and flu-like symptoms, particularly when used in confined and poorly ventilated areas and at high temperatures. These relate mainly to decomposition products, rather than the notified polymer.

13.2. Occupational health and safety

There is little potential for occupational exposure to the notified polymer in the transport and storage of metal surface coatings. There will be exposure during manufacture and application of metal surface coatings, and disposal of the coating.

During the reformulation process, the main exposure route for the notified polymer will be dermal. Ready formation of aerosols is not expected. The polymer is not expected to be hazardous by dermal exposure as the high molecular weight will preclude absorption through the skin. Control measures indicated by the notifier should provide sufficient protection against the notified polymer.

The reformulated mixture is used undiluted to form a temporary surface coating. The spraying procedure may produce 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 formulations requires the use of stringent engineering controls, such as a correctly constructed and maintained spray booth, and of a high level of personal protective equipment where exposure is not adequately curtailed. The use of the paint containing the notified polymer should be in accordance with the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999b). The level of protection from exposure afforded by the standard protective measures will provide adequate protection from the notified polymer.

Once the applied coating has dried, the polymer is not likely to be separately available for exposure or absorption.

All of the temporary coating applied to the vehicle is removed by washing which amounts to 60-70% of the product delivered to the vehicle manufacturer. Automatic or manual car washing is assumed; no details on exposure control were provided.

The MSDS indicates that ammonia vapour could be released during curing. There is a NOHSC exposure standard for ammonia. The employer is responsible for ensuring that this exposure standard is not exceeded in the workplace.

13.3. Public health

The notified polymer is not available for sale to the general public and will be used in automotive surface coating products. The notified polymer forms part of a protective coating between completion of manufacture and point of sale. The coating is removed at the dealership before vehicles are transferred to the public. As the possibility for public exposure limited to accidental spills during transport, the potential for public exposure to the notified polymer throughout its use is considered low.

Based on the use pattern of the notified polymer and its physico-chemical properties, it is considered not to pose a significant hazard to public health.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS for the notified polymer in aqueous solution 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 notified polymer in aqueous solution 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

To minimise occupational exposure to Carboset 560 Polymer, the following guidelines and precautions should be observed:

- Use of the metal surface coating containing the notified polymer by spray application should be in accordance with the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999c);
- Employers should ensure that NOHSC exposure standards for components of the coating and decomposition products are not exceeded in the workplace.
- 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;
- 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 (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

Under the Act, the Director of Chemical Notification and Assessment must be informed if the polymer characteristics cease to satisfy the criteria under which it has been accepted as a

Synthetic Polymer of Low Concern, and secondary notification may be required under subsection 64(1). The Director must be informed if any of the circumstances stipulated under subsection 64(2) of the Act arise, and secondary notification of the notified polymer may be required. No other specific conditions are prescribed.

17. REFERENCES

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