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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Acrylic Polymer Latex WB-111

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For enquiries please contact the Administration Coordinator at:

Street Address: 92 Parramatta Rd Camperdown, NSW 2050, AUSTRALIA
Postal Address: GPO Box 58, Sydney 2001, AUSTRALIA
Telephone: (61) (02) 9577-9466 FAX (61) (02) 9577-9465

Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Acrylic Polymer Latex WB-111

1. APPLICANT

Dulux Australia of McNaughton Road CLAYTON VICTORIA 3168 has submitted a notification statement accompanying their application for assessment of a synthetic polymer of low concern, Acrylic Polymer Latex WB-111.

2. IDENTITY OF THE CHEMICAL

Acrylic Polymer Latex WB-111 meets the definition of a Polymer of Low Concern under the Act, and is not considered to be hazardous according to Worksafe Criteria, based on the nature of the polymer and the data provided. Therefore the chemical name, molecular formula, structural formula, molecular weight, spectral data, monomer identity and formulation details have been exempted from publication in the full public report.

Trade Name: Acrylic Polymer Latex WB-111

3. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is imported as a 35% emulsion in water and is never isolated. The properties below are those of the dispersion except where indicated.

Appearance at 20°C and 101.3 kPa:	milky white liquid
Melting Point/Glass-transition Temperature:	not applicable
Specific Gravity:	1.065 (polymer by calculation) 1.022 (polymer emulsion)
Water Solubility:	< 1 $mg.L^{-1}$ at 20°C
Flammability Limits:	not applicable as the polymer is never isolated from its dispersion in water; the polymer latex in water is not flammable
Autoignition Temperature:	not applicable as the polymer is never isolated from its dispersion in water; the polymer latex in

	water is not flammable
Explosive Properties:	the polymer latex in water is stable and so does not demonstrate explosive properties
Reactivity:	the polymer latex in water is stable but should be segregated from strong oxidisers
Particle Size Distribution:	not applicable; polymer dispersion in water

Comments on Physico-Chemical Properties

The polymer is formed by emulsion polymerisation. The product of this process is termed a latex polymer. Latex polymers are colloidal dispersions of high molecular weight polymer. The resultant polymeric material has low solubility in water and the dispersion is stabilised by the presence of a surfactant (1).

The polymer contains a small amount of carboxylic acid functionality which is expected to have typical acidity and may become anionic at high pH.

The polymer is unlikely to undergo photo or thermal degradation or depolymerisation under the conditions of use. It does contain a small amount of vinyl functional groups which may be expected to undergo further reaction in the curing of the paint.

4. PURITY OF THE CHEMICAL

Maximum weight-percentage of residual impurities: < 0.4%

5. USE, VOLUME AND FORMULATION

The notified polymer will be imported as a polymer emulsion at approximately 35% in water. The notified polymer will be used by industry as a film forming polymer in an automotive coating. The amount of polymer to be imported is one to 3 tonnes per annum for the first year rising to 10 to 20 tonnes per annum by the third year and following.

6. OCCUPATIONAL EXPOSURE

The notified polymer will be imported into Australia in 200 L drums. There is potential for transport workers to be exposed to the polymer solution during transport from the docks to the notifier's site, but this would only occur in the unlikely event of an accident spillage.

There are three main groups of workers that are exposed to the polymer, who are involved in laboratory development, paint manufacture and paint application. Manufacture and testing of paint will be conducted by three workers in the laboratory

working eight hours per day, 20 days per year. Basecoat will be made up by three workers for three hours per day, 30 days per year. Quality control testing and drum filling will be carried out by six workers for eight hours per day, for 30 days per year.

The notified polymer with other basecoat ingredients, will be blended in a mixing tank fitted with exhaust ventilation to capture any volatile materials at the source. The blended product will be filtered and transferred into 200 L steel polylined drums also under exhaust ventilation. During blending, there is the potential for dermal and ocular exposure when hoses are connected and disconnected, and in the unlikely event of spillage.

The notified polymer, as a blend with other basecoat ingredients in 200 L drums will be transported by road to one customer. There is the potential for exposure to the basecoat containing the notified polymer, during transport, in the unlikely event of spillage. The polymer blend is added to a circulation tank at the customer's facility. Dermal and ocular exposure may occur when hoses are connected and disconnected. This work is usually conducted by one worker and it takes approximately one hour per day, 20 days per year.

Paint application involves the use of automatic spray equipment in a spray booth with an effective fume extraction system so that exposure to the notified polymer will be minimal.

Thirteen workers will touch up the basecoat using a hand spray for eight hours per day, 200 days per year and the spray equipment will be cleaned by one worker for one hour per day, 200 days per year. There is the potential for dermal and ocular exposure if spillage of basecoat occurs. Should a spill occur it would be contained within the plant through bunding. Good work practices however, will minimise the probability of spillage occurring.

7. PUBLIC EXPOSURE

No public exposure to the notified polymer is expected to occur during paint formulation operations, transport or during the coating of car bodies. However if accidental spillage occurs during transportation, the notified polymer will be adsorbed with sand or earth, collected and sealed in labelled drums, and disposed at an approved land waste site. Due to the involatile nature of the polymer, there would be negligible release to the atmosphere.

8. ENVIRONMENTAL EXPOSURE

. Release

Releases to the environment will be limited to those that occur during formulation and when the paint containing the polymer is applied.

The notifier has developed a process whereby waste resin and paint are processed to reclaim solvents in which they are dissolved, and the residue converted to an inert solid which is landfilled or incinerated. Waste generated in this manner is expected to be less than 250 kg per annum. If a spill occurs during formulation it will be limited to an on-site sealed surface and contained to the plant by bunding. It will be cleaned up according to the Material Safety Data Sheet (MSDS).

Paint containing the polymer is expected to be used by only one automotive manufacturer and applied in a spray booth. The spray booth is a down draft self contained unit with a water scrubbing system (quoted efficiency of 99.6%) which uses recycled water. The paint products are applied by automatic electrostatic atomised spray. Transfer efficiencies of around 75% are expected. The water from the spray booth is treated by flocculation, which will remove most of the waste paint , with the 'clean' water returned to the spray booth. Solid residue from the flotation tanks, expected to be less than 5,000 kg per annum (25% overspray), will be sent via a licensed waste contractor (Collex) to the Tullamarine Landfill site in Victoria.

The painted vehicles are baked to cure the polymer into a paint film. The cured polymer will be effectively inert and be disposed of with the vehicles. Releases of the cured polymer during vehicle repairs etc. will be diffuse and limited to small quantities of the cured polymer.

Transportation of the paint containing the polymer will be over short distances (within the Melbourne metropolitan area). During transport risk of environmental release is limited to accidents where the drums containing the polymer are ruptured, releasing the notified polymer (a maximum of 4 kg per drum).

Drums containing polymer residues will be disposed of by recycling. The drums will be recycled by a drum reconditioner where they will be incinerated, washed and recycled.

. Fate

Overspray and waste paint from cleaning of spray equipment, scrubber apparatus, and filters will be disposed of to landfill where the polymer would be immobilised in the dry paint. Polymer residues in drums will be incinerated by drum recyclers. Incineration would destroy the polymer by generating water and oxides of carbon. After application the paint dries to form a protective coating. Any waste product of the dry paint through chipping or flaking will be inert and form part of the soil and sediments.

Biological membranes are not permeable to polymers of very large molecular size and therefore bioaccumulation of the notified polymer is not expected (2).

9. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided which is acceptable for polymers of low concern with a NAMW greater than 1000 according to the *Industrial Chemicals (Notification and Assessment) Act* 1989.

10. ASSESSMENT OF ENVIRONMENTAL HAZARD

The polymer is unlikely to present a hazard to the environment when it is incorporated into the paint and applied to automobiles. The automobiles will be consigned to landfill or recycled at the end of their useful life and the paint containing the notified substance will share the fate of the automobile.
The main environmental exposure arises from landfill disposal of recovered waste paint (up to 25% of that manufactured) containing the polymer. Such material will be bound to soil and remain immobile in the environment. Hence, the overall environmental hazard is expected to be low.

11. ASSESSMENT OF OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY EFFECTS

Acrylic Polymer Latex WB-111 has been notified as a synthetic polymer of low concern under section 23 for the purposes of section 24A of the Act. The polymer meets the criteria for a synthetic polymer of low concern specified in regulation 4A of the Act and can, therefore, be considered to be of low hazard to human health.

The occupational risk posed to transport and storage workers is negligible, given the expected negligible exposure to the notified polymer under normal circumstances, and the anticipated low health hazard.

During blending, filtering, filling of drums for transport and spray application, the occupational health risk to workers from the notified polymer is low. Dermal and ocular contact is expected to be the main form of exposure during connecting and disconnecting hoses. Due to the high NAMW of the polymer and its physico-chemical properties it is unlikely to cross biological membranes and therefore presents negligible risk to workers.

Workers should be aware that the solvents in the basecoat may cause skin, eye and respiratory irritation and at high concentrations exposure can result in adverse effects on the central nervous system. The solvents are present at concentrations below the thresholds that would lead to classification by the NOHSC criteria (3). Accordingly, the basecoat containing the polymer is not classified as hazardous. The engineering controls and safety procedures at both the manufacturing site and the application sites will minimise worker exposure and result in low risk to workers exposed to the notified polymer, polymer solution or end-use product.

The potential for public exposure to the notified polymer during transport, formulation and end-use as an automotive basecoat, will be negligible. If public contact does occur, the notified polymer is unlikely to pose a significant hazard since its physico-

chemical properties will be sufficient to preclude absorption across the skin or other biological membranes.

12. RECOMMENDATIONS

To minimise occupational exposure to Acrylic Polymer Latex WB-111, the following guidelines and precautions should be observed:

- Safe practices for handling any chemical formulation, should be adhered to and include:

  - minimising spills and splashes:
  - practising good personal hygiene; and
  - practising good house keeping and maintenance including bunding of large spills which should be cleaned up promptly with absorbents and put into containers for disposal;

- It is expected that in the industrial environment, protective clothing conforming to and used in accordance with Australian Standard (AS)2919 (4) and protective footwear conforming to Australian/New Zealand Standard (AS/NZS) 2210 (5) should be worn as a matter of course. In addition it is advisable when handling the basecoat containing potentially hazardous solvents to wear chemical-type goggles (selected and fitted) according to AS 1336 (6) and meeting requirements of AS/NZS 1337 (7), impermeable gloves AS 2161-1978 (8) and respiratory protection (selected and fitted) according AS/NZS 1715 (9) meeting the requirements of AS/NZS 1716 (10), to protect against any unforseen circumstances.

- A copy of the MSDS should be easily accessible to employees.

In addition, The Worksafe Australia document *Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards* (11) should be used as a guide in the control of any solvent vapours or mists generated during manufacture and application of the basecoat containing the notified polymer. Workplace monitoring for these components should be carried out on a regular basis.

13. MATERIAL SAFETY DATA SHEET

The MSDS for the notified polymer and the product were provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (12).

These MSDS were provided by the notifier 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 notifier.

14. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act secondary notification of [chemical name] shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

15. REFERENCES

1. Beatty LW and Penboss I. 1983, *Film Formation. In: Surface Coatings Raw Materials and Their Use.* Vol 1, The New South Wales University Press, NSW, Australia. pp 325-331.

2. Gobas FAPC, Opperhuizen A & Hutzinger O 1986, *Bioconcentration of hydrophobic chemicals in fish: relationship with membrane permeation*. Environmental Toxicology and Chemistry 5:637-646

3. National Health and Safety Commission 1994, *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(1994)], Australian Government Publishing Service Publ., Canberra.

4. Standards Australia, 1987. *Australian Standard 2919 - 1987, Industrial Clothing,* Standards Association of Australia Publ., Sydney.

5. Standards Australia, Standards New Zealand 1994, *Australian/ New Zealand Standard 2210 - 1994 Occupational Protective Footwear, Part 1: Guide to Selection, Care and Use. Part 2: Specifications,* Standards Association of Australia Publ., Sydney, Standards Association of New Zealand Publ. Wellington.

6. Australian Standard 1336-1994, *Eye protection in the Industrial Environment*, Standards Association of Australia Publ., Sydney.

7. Standards Australia/Standards New Zealand 1992, *Australian/New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, Standards Association of New Zealand Publ, Wellington.

8. Australian Standard 2161-1978, *Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ., Sydney.

9. Standards Australia/Standards New Zealand 1994, *Australian/New Zealand Standard 1715-1994, Selection, Use and Maintenance of Respiratory Protective Devices,* Standards Association of Australia Publ., Sydney, Standards Association of New Zealand Publ, Wellington

10. Standards Australia/Standards New Zealand 1994, *Australian/New Zealand Standard 1716-1994, Respiratory Protective Devices,* Standards Association of Australia Publ., Sydney, Standards Association of New Zealand Publ, Wellington.

11. National Occupational Health and Safety Commission 1995, ' Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment', [NOHSC: 1003(1995)], in *Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards*, Australian Government Publishing Service Publ., Canberra.

12. National Occupational Health and Safety Commission 1994, *National Code of Practice for the Preparation of Material Safety Data Sheets* [NOHSC:2011(1994)], Australian Government Publishing Service, Canberra.