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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polyester Resin LPR 1063

This Assessment has been compiled in accordance with the provisions of *the Industrial Chemicals (Notification and Assessment) Act 1989* and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by Worksafe Australia which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Arts, Sport, the Environment and Territories and the assessment of public health is conducted by the Department of Health, Housing and Community Services.

For the purposes of subsection 7B(1) of the Act, copies of this full public report may be inspected by the public at the Library, Worksafe Australia, 92-94 Parramatta Road, Camperdown NSW 2050, between the hours of 10.00 a.m. and 12.00 noon and 2.00 p.m. and 4.00 p.m. each week day except on public holidays.

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**Polyester Resin LPR 1063****1. APPLICANT**

Dulux Australia, McNaughton Rd, Clayton, Vic, 3168.

2. IDENTITY OF THE CHEMICAL

Based on the nature of the chemical and the data provided, Polyester Resin LPR 1063, is considered to be non-hazardous. Therefore, the chemical name, molecular structure, molecular formula, molecular weight and spectral data have been exempted from publication in the Full Public Report and the Summary Report.

Other name: Polyester Resin LPR 1063

**Maximum percentage of low
molecular weight species**

(molecular weight < 1000): <2.5

Method of detection and determination: Infra-red spectrometry.

3. PHYSICAL AND CHEMICAL PROPERTIES

Unless otherwise stated all physico-chemical properties listed below relate to a 60% polymer solution in xylene/Solvesso 150.

Appearance at 20C and 101.3 kPa: the polymer solution is a viscous liquid of clear golden brown colour

Odour: solvent-like odour

Boiling Point: expected to be 138⁰C based on the boiling point of xylene

Specific Gravity/Density:	1064 kg/m ³ for the polymer solution; calculated at 1077 kg/m ³ for the polymer itself
Vapour Pressure:	expected to be 1.2 kPa at 20°C based on the vapour pressure of xylene
Water Solubility:	expected to be insoluble in water based on analogy with similar polymers
Partition Co-efficient:	not required as polymer is insoluble in water
Hydrolysis as a function of pH:	the notified polymer is not expected to hydrolyse based on analogy with similar polymers
Adsorption/Desorption:	no information available, however the polymer solution is expected to bind to soil and become immobilized as the solvent component evaporates and the solution becomes increasingly viscous and sticky
Dissociation Constant	not required as the polymer is insoluble in water
Flash Point:	estimated to be 27°C based on the flash point of xylene
Flammability Limits:	estimated to be 1-7% based on xylene
Combustion Products:	not known, however expected to be carbon dioxide and carbon monoxide

Autoignition Temperature:	estimated to be 500°C based on xylene
Explosive Properties:	forms explosive mixtures with air
Reactivity/stability:	reacts with strong oxidising agents
Particle size distribution:	not applicable as polymer exists only in solution

4. PURITY OF THE CHEMICAL

Degree of purity: The notified polymer is 100% pure.

Additives (> 0.1%):

(a) Chemical name:	xylene
Synonyms:	benzene, dimethyl; dimethylbenzene; methyl toluene; NCI-C55232; RCRA waste number U239; violet 3; xylol
CAS No.:	1330-20-7
Weight percentage:	10-<30
(b) Chemical name:	heavy aromatic naphtha; (polyethyl) benzenes
Synonym	Solvesso 150
CAS No.:	64742-94-5
Weight percentage:	<10

5. INDUSTRIAL USE

The notified polymer will be manufactured in Australia in a reaction vessel as a solution in organic solvent (xylene/Solvesso 150 blend). The polymer itself will never be isolated. The polymer solution will be used to formulate a paint which will be applied to the inside surface of aluminium cans. It is estimated that approximately 1-10 tonnes of polymer will be manufactured in the first year, increasing in subsequent years to meet the export market.

6. OCCUPATIONAL EXPOSURE

The notified polymer, Polyester Resin LPR 1063, will be manufactured in Australia as a 30–60% solution in xylene/solvesso 150 blend. Manufacture of the resin and coating containing the resin (11%) will be carried out at the Dulux Australia resin plant in Clayton, Victoria. Three main groups of workers will be exposed to the polymer at this site. These workers are involved with laboratory development (8 workers, 8 hours/day, up to 30 days/year), resin manufacture (8 workers, 8 hours/day, up to 30 days/year) and paint manufacture (12 workers, up to 8 hours/day, 30 days/year).

During the manufacturing processes the potential for worker exposure is minimised by the use of enclosed reaction vessels for the production of polymer, and vented mixers during paint production. Mixers are fitted with exhaust ventilation which capture any vapour generated at the source. All filling operations are also carried out under exhaust ventilation. Worker exposure will result in the event of spills during transfer, sampling and filling operations.

The organosol can coating (paint containing Polyester Resin LPR 1063) will be transported by road to the client in 200 L drums. At this site 8 workers (8 hours/day, 160 days/year) are involved in thinning the paint and applying the substrate by roller coater, and an additional 8 workers (1 hour/day, 160 days/year) will be involved in cleaning the roller coaters. Solvent emissions from the roller coaters will be collected using a fume extraction system. Worker exposure will be limited to contact during spillages (during most operations), as well as contact during roller coater cleaning.

7. PUBLIC EXPOSURE

There is little potential for public exposure to the notified polymer during road transport. Production of the polymer occurs in closed vessels and is also unlikely to result in public exposure. Mixing and filling operations are carried out under exhaust ventilation, capturing any vapour generated at the source. Accidental liquid releases arising during manufacture, mixing or filling will be contained in pits, by solid absorbent followed by incineration, or treated via the "Dusol" process to reclaim solvent. Inert residue from this process is suitable for landfill.

The public may be exposed to the polymer after it has been applied to, and becomes a hard internal film, coating aluminium cans. The company claims that the coating is very durable, although supporting evidence was not made available.

8. ENVIRONMENTAL EXPOSURE

Release

The company states that the polymer is manufactured in a closed reactor. There is a potential for spillage during the filtration and drum filling stage at the end of the reaction process. Releases into the factory environment during resin and paint manufacture will be contained by on-site bunding. Due to the non-volatile nature of the resin there would be negligible release to the atmosphere. Drum filling and paint manufacture processes are carried out in well ventilated areas where atmospheric concentrations of vapours from the solvents are monitored and extracted from the exhausted air.

The release of polymer into the factory during paint manufacture may come from: accidental spillage during filling of the blender, batch testing final filtration and drum filling, and mill cleanup operations.

Areas in the plant where spill may occur are adequately bunded and cleanup materials are available on site.

The company states that it has developed a "Dusol" process whereby waste resin and paint can be processed to reclaim the solvents with the residue converted to an inert solid. This process would be used to treat waste from both polymer and paint manufacture with an estimated 250 kg of polymer being treated in this manner. The inert solid is expected to be disposed of to landfill.

The potential for release of polymer in the customer's factory occurs where the paint is first thinned then applied via a pump and roller system to the metal substrate which is heat cured. The plant utilises an air ducting system connected to an incinerator for control of solvent vapour emissions and good work practices are encouraged to minimise paint spills.

Empty paint drums are recycled through a reconditioning plant where an estimated maximum of 500 kg of paint is disposed of by incineration (an approved Victorian EPA method).

Fate

The manufacturer states that the resin in the paint formulation when applied and heat cured is in a form that is not susceptible to breakdown in the environment. The use of the coating in the base of aluminium drink containers conforms with USA Food and Drugs Administration codes as safe for the food contact surfaces for articles holding food and therefore must be inert to biodegradation. The used drink containers coated with the paint containing the notified polymer are either eventually disposed of in landfill or recycled by smelting the aluminium can resulting in substance incineration.

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicity data were provided for the notified polymer which is acceptable for a synthetic polymer with number-average molecular weight > 1000.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided, which is acceptable for polymers of number-average molecular weight > 1000 according to the Act.

11. 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 the metal can bases.

The polymer is also unlikely to present a hazard to aquatic organisms due to the end-use application and the polymer's high molecular weight.

The main environmental exposure arises from landfill disposal of approximately 250 kg per annum of recovered waste resin. However, since it is immobilised prior to disposal, environmental hazard is expected to be low.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified chemical is a high molecular weight polymer in xylene/Solvesso 150 blend. The polymer itself is therefore unlikely to cross biological membranes and as such is expected to pose a low health hazard. The polymer contains no hazardous impurities, but does contain 2.46% (w/w) low molecular weight (<1000) polymeric species. With appropriate engineering controls, however, the notified polymer should not pose a significant concern to workers.

The polymer solution (resin in xylene/Solvesso 150) is flammable, may form explosive mixtures with air, reacts with strong oxidising agents, and may form toxic products upon combustion. Furthermore, the solvent solution contains the toxic additive xylene (1). Therefore, special care should be exercised by all workers when handling this product to avoid all direct contact and inhalation of the solution.

The potential for public exposure is moderate, given that persons drink from aluminium cans which are coated with the polymer. However, as the notified polymer becomes an integral part of a hard durable coating, there should be negligible risk to public safety.

Based on the above information, it is considered that Polyester Resin LPR 1063 will not pose a significant hazard to public or occupational health and safety when used in the proposed manner.

13. RECOMMENDATIONS

To minimise occupational exposure to the notified polymer in xylene/Solvesso 150 blend the following guidelines and precautions should be observed:

- Engineering control procedures such as local exhaust ventilation should be used to meet component occupational exposure limits (2) as described in the MSDS for Polyester Resin LPR 1063 during paint mixing processes or filling and transfer operations.
- Suitable personal protective equipment which complies with Australian Standards should be worn such as chemical-type goggles with face shield recommended to prevent eye contact (3),

chemically resistant gloves (4) and protective clothing (5) to prevent skin contact.

- Good work practices should be implemented to avoid splashing or spillages.
- Good personal hygiene practices, such as washing of hands prior to eating food, should be observed.
- A copy of the MSDS for products containing the notified polymer in Polyester Resin LPR 1063, such as Organasol Can Coating, should be easily accessible to employees working with products containing the chemical.

14. MATERIAL SAFETY DATA SHEET

The Material Safety Data Sheet (HSDS) for Polyester Resin LPR 1063 (Attachment 1) was provided in Worksafe Australia format (6). This MSDS was provided by Dulux Australia as part of their notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of Dulux Australia.

15 .REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act), secondary notification of maine of chemical) shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

16. REFERENCES

1. *Dangerous Properties of Industrial Materials*, 7th Ed., Sax N. I. and Lewis R. J. Sr Eds, Van Nostrand Reinhold, 1989.
1. *Dangerous Properties of Industrial Materials*, 7th Ed., Sax N. I. and Lewis R. J. Sr Eds, Van Nostrand Reinhold, 1989.
2. National Occupational Health and Safety Commission, *Exposure Standards for Atmospheric Contaminants in the Occupational Environment*, 2nd Edition, Australian

Government Publishing Service Publ., Canberra, 1991.

3. Australian Standard 1337-1984 *Eye Protectors for Industrial Applications*, Standards Association of Australia Publ, Sydney, 1984.
4. Australian Standard 2161-1978 *Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ, Sydney, 1978.
5. Australian Standard 3765.1-1990 *Clothing for Protection against Hazardous Chemicals Part 1 Protection against General or Specific Chemicals* Standards Association of Australia Publ, Sydney, 1990.
6. National Occupational Health and Safety Commission, *Guidance Note for Completion of a Material Safety Data Sheet*, 3rd Edition, Australian Government Publishing Service Publ., Canberra, 1991.