

File No: PLC/172

26 February 2001

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

U 915

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**U 915****1. APPLICANT**

Parbury Technologies of 19 Industrial Avenue, Molendinar, QLD 4214, (ACN 069 961 968) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC), U 915.

2. IDENTITY OF THE CHEMICAL

The chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data and details of the polymer composition have been exempted from publication in the Full Public Report.

Marketing name of imported product: Alberdingk Polyurethane Dispersion U 915.

Number average molecular weight: >1000.

3. POLYMER COMPOSITION AND PURITY

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

Purity (%): Notified polymer is imported as a constituent of a product.

Hazardous impurities (other than residual monomers and reactants):

Chemical name	Synonym	CAS no.	% Weight	Risk phrases
Triethylamine	Ethanamine, N,N-diethyl	121-44-8	0.8	R20/21/22
Dimethylethanolamine	Dimethylamino ethanol	108-01-0	0.6	R36/37/38

Non-hazardous impurities at 1% by weight or more: None

Additives/adjuvants:

Chemical name	Synonym	CAS no.	% Weight	Risk phrases
N-methylpyrrolidone	N-methyl-2-pyrrolidone	872-50-4	9.6	R36/38

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is imported as a 34% emulsion in aqueous medium. Unless otherwise stated, the physical and chemical properties are those of the emulsion.

Property	Result	Comments
Appearance	Milky white emulsion with amine odour.	
Melting/Boiling point	160°C.	Softening point of the pure polymer.
Density	1.05 g/cm ³ .	
Water solubility	<5mg/L.	Solubility of the notified polymer
Flammability	Not flammable.	
Autoignition temperature	Not applicable.	
Explosive properties	Not expected to be explosive.	
Stability/reactivity	Expected to be stable under normal conditions.	The amide and ester linkages in the polymer are expected to undergo hydrolysis under extreme pH conditions. However, due to the low water solubility, this is unlikely in the environmental pH range of 4-9.

5.1 Comments on physical and chemical properties

A water solubility test result (in German) was supplied by Alberdingk Boley GmbH that showed the solubility to be <5 mg/L. The test report was not supplied but it appears that the test was performed following OECD Method 105.

6. USE, VOLUME AND FORMULATION

Use:

The notified polymer will be used as a constituent of timber floor finishes/coatings. It will be imported from Germany as a component (34%) in Alberdingk Polyurethane Dispersion U915 in 120 kg plastic drums or sealed 1000 kg Schuetz containers. The notifier estimates the following import volumes of the polymer dispersion in the first five years:

First year	Second year	Third year	Fourth year	Fifth year
5 tonnes	15 tonnes	25 tonnes	30 tonnes	35 tonnes

Formulation details:

In Australia, the imported product containing the notified chemical will be reformulated into floor finishes. The notifier estimates that the final end-use product will contain 80% of the imported product (27% notified polymer). The reformulated product will be packed in 20L plastic containers (cubes).

7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
Formulation [2 workers; exposed to the notified polymer for 4 hours/batch; 30 batches/year]		
Dermal	Formulation of product will involve transfer of the liquid dispersion, containing 34 % notified polymer, into mixing vessels, where it will be blended with water, co-solvents and other additives. Transfer will be by decantation.	Production site is equipped with an air ventilation system. Overalls, impervious gloves, goggles and masks.
	Exposure due to drips and spills of the product is also possible during container filling (20 L containers).	
End use [Floorsanders; 100 workers; exposure time not provided]		
Dermal and inhalation	The product will be applied with a roller. These workers will be exposed to the finished product containing 27% notified polymer.	Product will be applied in well-ventilated areas. Tyvec or cotton overalls, rubber, PVA or neoprene gloves, goggles and respirator fitted with organic vapour filter canister.

Transport and storage

Dock/Transport workers [Number of workers and exposure time not provided]

Dermal	Workers may be exposed only if packaging is breached.	Not provided
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Warehouse persons (2 workers; 1 hour/delivery; 4 deliveries/year]

Dermal	Workers may be exposed only if packaging is breached.	Not provided
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Warehouse persons to move drums from warehouse to production area (1 worker; half hour/batch; 30 batches/year]

Dermal	Worker may be exposed only if packaging is breached.	Not provided
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Disposal *[Number of workers and duration of exposure not provided]*

Dermal	Exposure is possible when filling the containers with waste and transporting them to landfill.	Not provided.
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8. PUBLIC EXPOSURE

Public exposure to the notified polymer during transport, storage and reformulation is expected to be low. The finished product containing the notified polymer is only available to professional applicators. The polymer cures as it dries, so public contact with the polymer following application is unlikely to result in significant exposure. Despite the main use of the product being in public spaces, direct public contact with the floor is likely to be limited.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

There is potential for release during the finish/coating reformulation and application. The reformulation process will take place at the notifier's site in NSW and any spills that occur will be contained by the plant bunding and collected for disposal, presumably to landfill. The notifier estimates that <0.5% (up to 52.5 kg/annum) of the polymer may be lost due to spills and leaks.

Some residue will also remain in the empty import drums after use. It is estimated that <1% of the import volume, up to 105 kg/annum, will remain as residue in the containers to be disposed to landfill with the drums.

Equipment washings may result in <1% (up to 105 kg/annum) environmental release. The notifier claims that the washings are collected into a holding tank, which is emptied, on a regular basis by licensed contractors for disposal to landfill.

The floor finish/coating containing the notified polymer will be applied by roller to high traffic flooring areas by professional floorsanders. The notifier estimates that approximately 1.4% (up to 147 kg/annum of the notified polymer) of the floor finish/coating product will be lost due to cleaning of the application equipment (roller and bucket) and will be disposed down the drain to the sewer.

The notifier estimates that 1% (up to 105 kg/annum) of the floor coating would remain as residue in the plastic containers after emptying. This will be disposed to landfill along with the containers.

9.2. Fate

The waste generated in the reformulation process (1.5% or up to 157.5 kg/annum), remaining in the empty import drums (1.0% or up to 105 kg/annum) and plastic floor finish containers (1.0% or up to 105 kg/annum) will be disposed of to landfill, or by incineration. Leaching of the polymer from landfill is unlikely, given the low solubility of the substance.

The waste from the floor finish/coating application will be approximately 1.4% of the import volume of the notified polymer or up to 147 kg/annum. All of this waste polymer will be tipped down the drain with the wash water and end up in the sewer. Due to its structural properties, the polymer will likely adsorb to sewage sludge and be removed at the sewage treatment plant.

The polymer floor finish will dry to form an inert coating on the floor surface. It will gradually wear away by human traffic and be slowly dispersed on shoes. At the end of its useful life it will be removed by professional floorsanders and presumably replaced by another coat of a similar product. The coating containing the notified polymer will be broken up into solid particulate matter in the sanding/removal process and most likely disposed to landfill.

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 health hazards of the hazardous impurities and adjuvants are tabulated below.

Chemical	Health hazards	Regulatory controls
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N-methylpyrrolidone	Irritating to eyes and skin	-
Triethylamine	Harmful by inhalation, in contact with skin and if swallowed	NOHSC exposure standard: 12 mg/m ³ , TWA (NOHSC 1995)
Dimethylethanolamine	Irritating to eyes, respiratory system and skin	-

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were submitted. The material safety data sheet (MSDS) for the polymer dispersion U915 includes some ecotoxicity information, namely, fish toxicity, LC50 >500 mg/kg (no details on fish species or method details given), and bacterial toxicity, EC0 >10000 mg/kg (no details on species or methods given).

12. ENVIRONMENTAL HAZARD ASSESSMENT

The environmental hazard presented by the importation and use of the polymer is expected to be low.

The products containing the notified substance are likely to be used throughout Australia. The major environmental exposure to the substance will come from disposal of the waste polymer from the reformulation process and empty containers to landfill but this should be of low hazard to the environment, as the polymer will remain bound within the landfill soils and sediments and slowly degrade by abiotic processes.

The waste polymer produced during the application process is likely to be discharged in domestic wash waters to waste water treatment systems. If 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 (annually):	147 kg
Population of Australia:	18 million
Volume of water/person (daily):	150 L
Dilution factor in receiving water:	1:10
PEC in receiving water:	0.01 µg/L

The brief ecotoxicological data given in the MSDS for the polymer indicates that under normal use, where release is dispersed all over Australia, and with a PEC of approximately 0.01 µg/L, it should be of low concern to aquatic organisms.

Adsorption to sludge, soil and sediment as well as swift dilution in receiving waters should reduce environmental concentrations to negligible levels. The polymer is not expected to

persist in the aquatic environment, and will be removed through a combination of sorption to particulates and eventual chemical degradation.

Polymer spilt on land is expected to immobilise in the soil layer. Contaminated soil can then be collected and disposed to landfill. Polymer disposed to landfill either from spills, the reformulation process or as drum residues which will similarly remain bound in the soil and sediments.

Given the above, environmental exposure and the overall environmental hazard is expected to be low.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

No toxicological information has been provided for the notified polymer. However, due to the high molecular weight and low reactivity, the notified polymer is expected to be of low toxicity and not absorbed through the skin.

The imported polymer dispersion contains 9.6% N-methylpyrrolidone, which is a skin and eye irritant, with a hazardous substance cut-off concentration of 10%. The polymer dispersion is therefore expected to be a moderate eye and skin irritant.

Toxicological information on the MSDS supplied for the final product indicates that the product may cause moderate eye irritation and result in transient corneal damage. In sensitive individuals, skin contact may cause dermatitis. Vapours from the product in poorly ventilated areas may cause slight to moderate irritation to respiratory tract. These effects are anticipated to be associated with the solvents present in the product, rather than related to the notified polymer.

13.2. Occupational health and safety

There is little potential for occupational exposure to the notified polymer during transport and storage or sale of the polymer emulsion or the finished product containing the polymer. However, exposure to the notified polymer during reformulation, use and disposal is possible.

During the reformulation process, the main exposure route for the notified polymer will be dermal. Inhalation exposure is not likely, as the emulsion contains 55% water and ready formation of aerosols is not expected. Skin and eye irritation may occur during transfer of the polymer dispersion to the mixing vessel and during the filling operation, however, the engineering controls and personal protective equipment specified in the notification statement (ventilation, impervious gloves, safety goggles and coveralls) are sufficient to provide protection against the irritating effects. Therefore, the risk of adverse health effects arising from contact with the notified polymer is expected to be very low.

The finished product will not be sold to the general public. It will be available to professional users through distributors. Application of the floor finish by roller coating may lead to dermal exposure to the notified polymer and the organic solvents present in the product. Inhalation exposure to organic vapours is also possible. As exposure may be high and irritation of skin, eye and respiratory tract may occur, workers should be protected from

contamination with the end use product during use. Once the applied coating has cured (dried in air), the polymer will not be separately available for exposure or uptake.

Conclusion

The notified polymer is of low risk to occupational health and safety, however, as the imported emulsion and the final product are eye and skin irritants, appropriate control measures need to be taken to reduce risk from exposure to the dispersion and product during formulation and use.

13.3. Public health

The potential for public exposure to the notified polymer during all stages of its life cycle is considered to be very low. Floor coating containing the notified polymer will not be sold to the public. Once applied to the surface, the crosslinked polymer in the floor sealant hardens and dries, and public exposure by dermal contact with the dried paint film is expected to be negligible.

Based on the above information, it is considered that Alberdinkg Polyurethane Dispersion U915 will not pose a significant risk to public health when used in the proposed manner.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS of the dispersion 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, 1994a). They are 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 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, 1994b). The accuracy of the information on the label remains the responsibility of the applicant.

15. RECOMMENDATIONS

To minimise occupational exposure to U 915, the following guidelines and precautions should be observed:

- Protective eyewear, chemical resistant industrial clothing and footwear and impermeable gloves should be used during occupational use of products containing the notified polymer;
- 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;
- A copy of the MSDS should be easily accessible to employees.

If products containing the notified polymer are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b), workplace practices and control procedures consistent with State and territory hazardous substances regulations must be in operation.

Guidance in selection of protective eyewear 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 2161.2 (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); or other internationally accepted standards.

16. REQUIREMENTS FOR SECONDARY NOTIFICATION

Secondary notification may be required if:

- any of the circumstances stipulated under subsection 64(2) of the Act arise. If any importer or manufacturer of (the notified chemical) becomes aware of any of these circumstances, they must notify the Director within 28 days; or
- the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

17. REFERENCES

Connell D. W. (1990) General characteristics of organic compounds which exhibit bioaccumulation. In Connell D. W., (Ed) *Bioaccumulation of Xenobiotic Compounds*. CRC Press, Boca Raton, USA.

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

National Occupational Health and Safety Commission (1994b) *National Code of Practice for the Labelling of Workplace Substances* [NOHSC:2012(1994)]. Australian Government Publishing Service, Canberra.

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, Canberra.

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Standards Australia (1994) Australian Standard 1336-1994, Eye protection in the Industrial Environment. Standards Association of Australia.

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Standards Australia/Standards New Zealand (1994a) Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994b) Australian/New Zealand Standard 1715-1994, Use and Maintenance of Respiratory Protective Devices. Standards Association of Australia/Standards Association of New Zealand.

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