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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Fatty acids, tall oil, polymer with benzoic acid; 1,3-propanediol 2,2-bis(hydroxymethyl); 1,3-isobenzofurandione; cyclohexane, 5-isocyanato-1-(isocyanatomethyl)-1,3,3-trimethyl-

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (Cwlth) (the Act) and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the Department of Health and Ageing, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Department of the Environment and Heritage.

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**Director
Chemicals Notification and Assessment**

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FULL PUBLIC REPORT

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1. APPLICANT AND NOTIFICATION DETAILS*Applicant(s)*

T.R. (Chemicals Australia) Pty Ltd of 195 Briens Road, Northmead, NSW 2152

Notification Category

The notified polymer meets the PLC criteria.

Exempt Information (Section 75 of the Act)

No details are claimed exempt from publication.

Variation of Data Requirements (Section 24 of the Act)

No variation to the schedule of data requirements is claimed.

Previous Notification in Australia by Applicant(s)

None

Notification in Other Countries

United States 1990

2. IDENTITY OF CHEMICAL*Chemical Name*

Fatty acids, tall oil, polymer with benzoic acid; 1,3-propanediol 2,2-bis(hydroxymethyl); 1,3-isobenzofurandione; cyclohexane, 5-isocyanato-1-(isocyanatomethyl)-1,3,3-trimethyl-.

Other Name(s)

Urethane Alkyd.

Tall Oil fatty acids, polymer with benzoic acid, pentaerythritol, phthalic anhydride and isophorone diisocyanate.

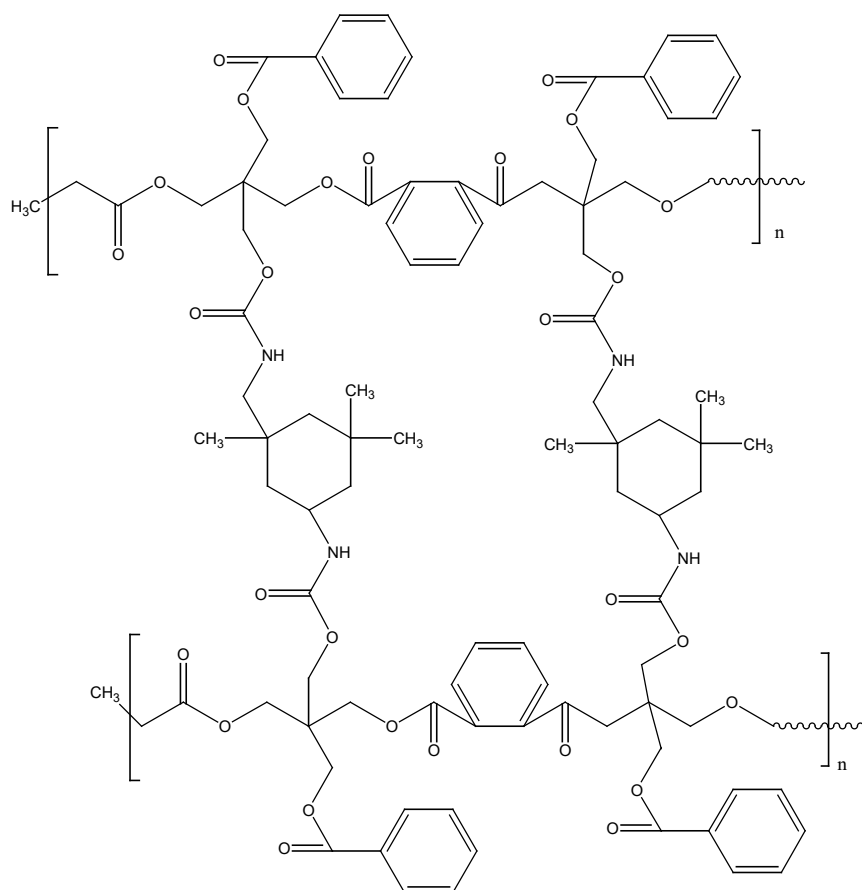
CAS Number

355138-71-5

Molecular Formula

(Unspecified.C₇H₆O₂.C₅H₁₂O₄.C₈H₁₂O₃.C₁₂H₁₈N₂O₂)_x

Structural Formula

*Molecular Weight (MW)*

| | |
|--------------------------------------|-------------|
| Number Average Molecular Weight (Mn) | 3700-6100 |
| Weight Average Molecular Weight (Mw) | 33000-76000 |
| Polydispersity Index (Mw/Mn) | 9-12 |
| % of Low MW Species < 1000 | 7.21 |
| % of Low MW Species < 500 | 1.5 |

Remarks Two sets of GPC data were submitted.

Spectral Data

| | | | |
|---------|---|----------------------|-----------|
| Method | IR | | |
| Remarks | Peaks at | 1732 (sharp, strong) | carbonyl |
| | | 2856, 2928 (sharp) | alkanes |
| | | 3008 (medium) | aromatics |
| | | 1600, 1580 | amides |
| | Peaks in fingerprint region at: 1468, 1388, 1272, 1168, 1120, 1072, 741, 702. | | |

3. COMPOSITION*Hazardous Impurities*

None

Non Hazardous Impurities (> 1% BY WEIGHT)

None

Additives/Adjuvants

| | | | |
|---------------|---|----------|-------|
| Chemical Name | Naphtha, hydrosulphurised heavy. (White Spirit) | | |
| CAS No. | 64742-82-1 | Weight % | 41-43 |

| | | | |
|-----------------------------|---|-----------------|-----|
| <i>Hazardous Properties</i> | Xn; R65; R45; Conc. $\geq 10\%$ (NOHSC, 1999a). Exposure Standard 790 mg/m ³ TWA (NOHSC, 1995) | | |
| <i>Chemical Name</i> | Dimethyl benzene (mixture of isomers) (Xylene) | | |
| <i>CAS No.</i> | 1330-20-7 | <i>Weight %</i> | 2-4 |
| <i>Hazardous Properties</i> | Xn; R10-20/21-38; lowest cut-off concentration (12.5%) (NOHSC, 1999a). Exposure Standard 350 mg/m ³ (80 ppm) TWA, 655 mg/m ³ 150 ppm STEL (NOHSC, 1995). | | |

Polymer Constituents

| <i>Chemical Name</i> | <i>CAS No.</i> | <i>Weight % starting</i> | <i>Weight % residual</i> |
|---|----------------|--------------------------|--------------------------|
| Tall oil fatty acids | 61790-12-3 | 49.93 | ND |
| Benzoic acid | 65-80-0 | 4.78 | ND |
| 1,3-propanediol, 2,2-bis(hydroxymethyl) [Pentaerythritol] | 115-77-5 | 19.64 | ND |
| 1,3-isobenzofurandione [Phthalic anhydride] | 85-44-9 | 17.62 | ND |
| Cyclohexane, 5-isocyanato-1-(isocyanatomethyl)-1,3,3-trimethyl- [Isophorone diisocyanate] | 4098-71-9 | 8.03 | ND |

ND = Not detected

Residual Monomers

All residual monomers are below the relevant cut-offs for classification of the notified polymer as a hazardous substance.

4. INTRODUCTION AND USE INFORMATION

Mode of Introduction of Notified polymer (100%) Over Next 5 Years
Imported.

Maximum Introduction Volume of Notified polymer (100%) Over Next 5 Years

| <i>Year</i> | <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> |
|---------------|----------|----------|----------|----------|----------|
| <i>Tonnes</i> | 14-17 | 14-17 | 14-17 | 14-17 | 14-17 |

Use

•
Ingredient for the manufacture of surface coatings to be applied onto wood and metal substrates, in particular marine craft.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, Transport and Storage

Port of Entry
Sydney

Transportation and Packaging

The notified polymer will be imported by sea as a 55% solvent solution in 205 L drums. The reformulated paints will be packaged into consumer-sized containers of 1 to 20 L.

5.2. Operation Description

The notified polymer will be imported as a component of the product, Unithane 644W, comprising 55% polymer, 42% white spirit and 3% xylene. It will be reformulated into protective coatings at customer sites around Australia. The final concentration of the notified polymer in the protective coatings is 20-55%. Formulated paints are applied by brush, roller or spray (large scale).

5.3. Occupational exposure

Formulation

60 workers (estimate) – dermal exposure from splashes during the handling of the polymer, and/or changing and maintaining of lines and fittings.

End use

Dermal contact with coating when opening containers, stirring contents and applying coating with brush or roller, and inhalation and dermal from overspray during spray applications of coatings when used by DIY painters and small scale operators. Large scale operations will be conducted in spray booths.

Transport and storage

Warehouse personnel (9) – collection and despatch of 200 L drums.

Storemen (18) – unpacking and handling closed containers at 3 possible sites.

Transport workers (8) – transport of 200 L drums.

Contact is not likely to occur except in the case of accidents or spillage.

5.4. Release*Release of Chemical at Site*

It is estimated that up to 800 kg of waste containing the notified polymer will be generated during the manufacture of the coatings formulation. The solvent used to clean formulation equipment will be collected and undergo a process by which the solvent is recycled and the remaining solid waste disposed of in landfill or incinerated.

Release of Chemical from Use

Approximately 30% of the coatings formulation will be released as overspray which equates to a maximum 6 tonnes of the notified polymer per annum, if all the coating products containing the notified polymer are applied by spraying. In practice, some will be applied by brushes and rollers and, as such, wastes may be expected to be much lower. A small quantity of the notified polymer (2% of import volume) will be lost as residues in the import containers. Up to 400 kg of the notified polymer will be released in this fashion per year. A small amount (<< 1%) of the notified polymer will also be released for washing of application equipment such as brushes and rollers.

5.5. Disposal

The notified polymer in waste resulting from coatings formulation and application, solvent reclamation spills, and empty import drums will be disposed of in landfill. Incineration of wastes may also occur.

5.6. Public exposure

Paint products containing the notified polymer will be used by the general public. Dermal, ocular and inhalation exposure to these products is likely to occur during application to wood or metal surfaces. However, exposure to the notified polymer is expected only by dermal and ocular routes. Exposure of the general public is expected to be intermittent and involve only small amounts of products containing the notified polymer. Accidental ingestion may also occur in children. In addition, members of the public will also come into dermal contact with the notified polymer as a part of cured paint films on coated objects.

6. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|---------------------------------|
| Appearance at 20°C and 101.3 kPa | Amber liquid with solvent odour |
| Melting Point/Freezing Point | Not determined |
| Density | 910 kg/m ³ at 20°C |
| Water Solubility | < 0.5 mg/L at 20°C |

Remarks: The notified polymer (125 g) was added to distilled water (500 mL) and allowed to equilibrate for 24 h. The resulting solution was filtered and a sample (250 mL) was evaporated to dryness and the mass of the residue determined.

Flammability

Not determined for polymer

| | |
|---------|--|
| Remarks | Formulation solvent is flammable with a lower flammability limit of 0.6% in air, the upper flammability limit is 9.0%. Flash Point 27°C. |
|---------|--|

Explosive Properties

Not determined for polymer.

| | |
|---------|---|
| Remarks | Formulation solvent has a lower explosive limit of 0.9% and an upper explosive limit of 6.0%. |
|---------|---|

ADDITIONAL TESTS

Hydrolysis as a Function of pH

Not determined

Remarks The notified polymer contains ester and urethane linkages that could be expected to undergo hydrolysis under extreme pH. However, in the environmental pH range of 4 to 9, significant hydrolysis is unlikely to occur.

Partition Coefficient (n-octanol/water)

Not determined

Remarks The notified polymer's low water solubility and its hydrophobic nature is indicative of partitioning into the octanol phase.

Adsorption/Desorption

Not determined

Remarks The notified polymer is expected to be relatively immobile in soil due its low water solubility.

• **Dissociation Constant**

Not determined

Remarks The notified polymer does not contain any groups that are expected to dissociated in the environmental pH range of 4-9.

7. TOXICOLOGICAL INVESTIGATIONS

No toxicological data were submitted.

8. ENVIRONMENT

No ecotoxicological data were submitted.

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

The majority of the notified polymer will be incorporated into a very high molecular weight and stable coating and as such poses little risk to the environment. Ideally, the notified polymer in wastes will be disposed of in landfill or incinerated. In landfill, it is expected that the polymer would become associated with the soil matrix and will not leach from the soil because of its low solubility in water. Incineration of the notified polymer will produce water vapour and oxides of carbon and nitrogen. Equipment used to apply the coatings formulation, such as brushes and rollers, will be cleaned with solvent and these wastes will be disposed of according to local government regulations, either in landfill, by incineration, by solvent reclamation or onto the ground. Given that this product will be used by ‘Do-it-Yourself’ enthusiasts, there is also potential for a portion of equipment cleaning wastes to be discarded into the sewer. However, exposure via this route is expected to be minimal. The notified polymer is not expected to bioaccumulate due to its high molecular weight (Connell 1990).

Abiotic or slow biotic processes are expected to be largely responsible for the degradation of the notified polymer as it is not expected to be readily biodegradable. As a consequence of its low water solubility, the notified polymer is likely to be immobilised through adsorption onto soil particles and sediments.

9.1.2. Environment – effects assessment

No ecotoxicological data were provided.

9.1.3. Environment – risk characterisation

The notified polymer will enter environmental compartments indirectly by disposal of waste to landfill or incineration and through disposal of the substrates to which the coating has been applied at the end of its useful life. Waste from the solvent recycling process includes sludge which is dried and disposed of to landfill.

While no data are available on the likely effects of the notified polymer to organisms in the environment, exposure to these organisms is not expected to be significant. Therefore, the environmental risk from the polymer is expected to be low.

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

Dermal and ocular exposure can occur during certain formulation processes. However, exposure to significant amounts of the notified polymer is limited because of the engineering controls and personal protective equipment worn by workers.

During transport and storage, workers are unlikely to be exposed to the notified polymer except when packaging is accidentally breached.

The surface coating products containing 20-50% notified polymer will be applied by brush, roller-coated or in the case of larger scale commercial activities by the use of high-pressure spray guns. The spraying of coatings may produce a dense aerosol, which could adversely affect human health even in the absence of additional hazardous components. 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, such as impermeable overalls and gloves and a full face shield and respirator. Intermittent, wide-dispersive use with direct handling is expected to occur among non-professional users of the surface coating. Dermal exposure to the polymer, and exposure to solvent vapours may occur.

9.2.2. Public health – exposure assessment

Exposure of the general public as a result of reformulation, transport and disposal of the product

containing the notified polymer is assessed as being negligible. However, products containing the notified polymer are available for use by the general public. Dermal and ocular exposure to the notified polymer are expected during application of paints and accidental oral exposure may also occur in children. It is expected that people will be exposed to only small amounts of products containing the notified polymer and exposure is expected to be intermittent. Dermal exposure to cured paint films containing the notified polymer will also occur. However, at this stage, the polymer is embedded within the paint matrix and is not bioavailable.

9.2.3. Human health - effects assessment

The notified polymer meets the PLC criteria and is therefore of low hazard due to the lack of reactive groups and the inability of the polymer to penetrate biological membranes. The imported solvent solution containing the notified polymer is a Class 3 Dangerous Good due to the presence of flammable solvents (Federal Office of Road Safety, 1998). It is also a hazardous substance due to the solvent.

9.2.4. Occupational health and safety – risk characterisation

The OHS risk presented by the notified polymer is expected to be low due to the low hazard of the polymer and the control measures in place to minimise exposure. The notified polymer may be present in formulations containing hazardous ingredients.

9.2.5. Public health – risk characterisation

As the notified polymer is not expected to represent a significant toxicological hazard based on the physico-chemical information supplied and it is not expected to cross biological membranes, the risk to public health as a result of exposure to the notified polymer is considered to be low.

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.

10.3.2. Public health

There is negligible Concern to public health when used in accordance with the manufacturer's directions.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of the solvent solution containing the notified polymer 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 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 notified polymer provided by the notifier was 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.

12. RECOMMENDATIONS

Control Measures

Occupational Health and Safety

- No specific engineering controls, work practices or personal protective equipment are required for the safe use of the notified polymer itself, however, these should be selected on the basis of all ingredients in the formulation.
 - Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.
- The imported product containing the notified polymer is a Class 3 Dangerous Good. All sources of heat and ignition should therefore be avoided.
- A copy of the MSDS for Unithane 644W 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*, eg the imported product, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Disposal

- The notified polymer should be disposed of in landfill or by incineration.

Emergency procedures

- Spills/release of the notified polymer should be contained as described in the MSDS (ie. Absorb with vermiculite and transfer to a sealable waste container) and the resulting waste disposed of in landfill or incinerated.

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:

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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