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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

URALAC P 2064

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For enquiries please contact Ms Mai Le Houng at:

Street Address: 92 Parramatta Rd Camperdown, NSW 2050, AUSTRALIA
Postal Address: GPO Box 58, Sydney 2001, AUSTRALIA
Telephone: (61) (02) 565-9466 **FAX (61) (02) 565-9465**

Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

URALAC P 2064

1. APPLICANT

ROBERT DECKER & CO PTY LTD, 68 Alexander Street, Crows Nest, NSW 2065.

2. IDENTITY OF THE CHEMICAL

Trade name: URALAC P 2064

Other name: Saturated, carboxylated polyester resin

Molecular weight: The number average molecular weight of URALAC P 2064 was determined to be >1000. Percentage number-average molecular weight below 1000 was approximately 10%.

URALAC P 2064 is classified as a non-hazardous chemical to human health. For this reason the chemical name, CAS number, molecular and structural formulae have been exempted from publication.

3. PHYSICAL AND CHEMICAL PROPERTIES

URALAC P 2064 will be imported in the form of clear, odourless, solid flakes. The ploymer contains <0.1% free monomers and <0.5% of additives. Other physical and chemical properties include:

Glass transition temperature: 65°C

Density: 1210 kg/m^3

Water solubility: Not determined, expected to be negligible.

Particle size: Raw material 10-12 mm (flakes). Particle size distribution of finished product was not reported.

Autoignition temperature: Greater than 400°C

Flammability: Combustible material

Explosive potential: If in a fine powder form URALAC 2064 can be dispersed in air to form an explosive mixture. The lower explosive limit for polyester powder coating resins is generally taken as 10 g/m^3 (powder-air concentration).

Reactivity: The polymer contains carboxylic acid groups which may react under extreme conditions with alcohols, amines, and oxirane containing compounds such as epoxy resins and glycidyl ethers. The chemical should be stored away from strong oxidising agents.

Comments on physico-chemical properties:

No data were provided for vapour pressure, water solubility and hydrolysis on the grounds that "the solubility of polyesters in water under normal conditions is very low". The company has provided literature supporting the assertion that polyesters of this kind are highly insoluble and difficult to hydrolyse.

No data were provided for partition coefficient, adsorption/desorption and dissociation constant on the grounds that the polymer is insoluble. The determination of the octanol-water partition coefficient would be difficult to perform and interpret. Lack of information on this property for the notified polymer is acceptable since it is likely that its high molecular weight will prevent it from crossing biological membranes.

Measurement and interpretation of the mobility in soil of the polymer would be difficult due to the complexity of the substance. The high molecular weight of the polymer and its expected negligible water solubility suggest that the polymer is unlikely to dissociate and is likely to be immobile in soil.

Reasons for the omission of the above properties are acceptable.

4. METHODS OF DETECTION AND DETERMINATION

The methods used for detection and identification are infrared (IR) and ultraviolet (UV) spectroscopy and gel permeation chromatography (GPC).

5. INDUSTRIAL USES

URALAC P 2064 as the raw material is to be further processed by adding hardener, pigments and other additives. It is then melted, cooled and ground to obtain the finished powder which is used for the coating of steel products. The powder is applied by electrostatic powder gun and this is followed by stoving in an air circulated oven.

An import volume of up to 100 tons per year of URALAC P 2064 is estimated.

The notifier sates that there have been no reported cases of injury or disease related to exposure to URALAC P 2064 or other polyester powder coatings in other countries. Allergic reactions have not been reported.

6. OCCUPATIONAL AND PUBLIC EXPOSURE

Transport and storage of the compound is in 25 kg plastic bags which are palletised and shrink wrapped.

URALAC P 2064 will be processed at the Dulux Powder Coatings plant, Victoria, which employs 22 operators. Processing, involves:

1) weighing of the raw material,

2) addition of the raw material into a mixing hopper,

3) addition of other additives,

4) extrusion of the blended ingredients through a compounding extruder (at 120°C),

5) cooling of the extrudate on a conveyor belt,

6) flaking of the cooled extrudate,

7) grinding of the compounded flakes into a fine powder using a pin disc mill,

8) filling off the powder into plastic lined cardboard boxes.

The only manual activities are the weighing of the raw material and the closing of the boxes filled with finished product. Both these activities are carried out under a dust hood. Since 1,3,5-triglycidyl isocyanurate (TGIC) is added to the polymer, protective clothing and air respirators are worn in the factory and the laboratories.

Inhalation of fine powder may aggravate respiratory conditions. Dusts of similar polyester resins have a maximum exposure limit of 10 mg/m^3.

Spillage is cleaned up by shovelling granulated polymer into plastic bags or steel drums, and the remainder is collected using an industrial vacuum cleaner. Air respirators, close fitting overalls and PVC gloves are worn by the operator during clean up. The disposal is through an approved contractor and is by land fill.

The final formulation will be stored and transported in plastic lined cardboard boxes or 200 kg sealed plastic lined steel drums. The formulated product is to be distributed to applicators in Australia.

7. ENVIRONMENTAL EXPOSURE

Release

The release of the chemical to the environment during powder manufacture occurs principally from the disposal of dusts collected by the dust collection system in the factory. A small quantity of powder coating containing the chemical not collected by this system passes to a final filter where it is collected for disposal. Waste dust is collected in heavy wall plastic bags or steel drums and disposed of by a contractor at an approved landfill.

In accordance with the Victorian EPA site licence, a sump is used at Dulux to allow powdered solids contained in wash down of equipment to settle prior to discharge of waste water. Waste sludge is settled until it forms a firm cake and supernatant water removed. The sludge is shovelled into heavy wall polyethylene bags and disposed of directly without further treatment by landfill.

Environmental release will occur with applicators using the powder coating. The fraction thus released (up to 5%) is collected as a dust and disposed of by land fill. The company estimates that release into waste water and emission into the air will not be in excess of 0.01% of the quantity imported.

The notifier states that the annual wastage at the company site would be approximately 800-1000 kg with a similar quantity by the applicators, who are expected to have similar disposal procedures. It is expected that the disposal will be dispersed among a large number of sites located in the major urban centres of Australia.

Fate

Under ambient conditions no degradation of the polymer is expected occur and no loss of monomers, additives and/or impurities is known to take place. By nature of the application, the polymer is required to be stable under a range of conditions.

As the substance is a fully saturated polymer which is combined with other materials to form a coating resistant to weather and environmental conditions, biodegradation of the paint is expected to be an extremely slow process. The notifier states that at temperatures above 150 °C the polyester may hydrolyse under humid conditions.

8. TOXICOLOGICAL DATA

No toxicological data were provided for URALAC P 2064. This is acceptable for polymers of NAMW > 1000. However, a report of results from a mutagenicity assay using a polyester resin similar to URALAC P 2064 was submitted.

8.1 Mutagenicity

***Salmonella typhimurium* Histidine Reversion Assay** (1)

A polyester resin resembling URALAC P 2064, resin 60.005-22 (containing terephthalic acid, neopentylglycol, isophthalic acid and trimethylolpropane monomer units), was tested for potential mutagenic activity in *Salmonella typhimurium* strains TA98, TA100, TA1535, TA1537 and TA1538. The polymer was tested both in the presence and absence of rat liver S9 fraction. The test material at concentrations of up to 20,000 µg/plate did not cause a significant increase in the number of revertant colonies. Appropriate positive controls were used. The test material does not appear to be mutagenic in this test system. However, this result should be interpreted with caution since the test material was tested as a suspension in water. It is not known if the cells were adequately exposed to the test material.

9. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided, which is acceptable for polymers of NAMW > 1000 according to the Act.

10. ASSESSMENT OF ENVIRONMENTAL HAZARD

The polymer is unlikely to present a hazard to the environment during formulation or use.

The main exposure to the environment is when the collected waste is disposed to landfill. However, the hazard is likely to be low as the waste will be contained in steel drums or heavy wall plastic bags.

Any spillage or leakage of the polymer in the land fill is unlikely to present a hazard as the polymer is likely to be immobile due to its high molecular weight and insolubility in water.

The notified substance is not expected to exhibit toxic characteristics because large polymers of this nature are not readily absorbed by living organisms.

11. ASSESSMENT OF PUBLIC HEALTH AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

Occupational and public exposure to URALAC P 2064 is expected to be minimal under normal use and disposal. The main routes of exposure are dermal and inhalational. No toxicological data on Uralac P 2064 have been included in this submission. Although the majority of the polymer is not expected to cross biological membranes, it should be pointed out that a significant proportion (approximately 10%) of the polymer has a molecular weight below 1000, and these shorter chains may cross biological membranes. However, the use pattern indicates that the potential hazard of the polymer will be low..

12. RECOMMENDATIONS FOR THE CONTROL OCCUPATIONAL EXPOSURE

To minimise worker exposure to URALAC P 2064, the following guidelines and precautions should be observed:

Engineering control procedures such as dust extraction devices should be employed in areas where URALAC P 2064 or the finished product is handled.

A dust mask AS1716-1991 (2), safety glasses AS1716-1984 (3), close fitting overalls and PVC gloves AS2161-1978 (4) should be used during weigh-up and fill-off activities.

During clean-up of spillage, a dust mask, safety glasses, close fitting overalls and PVC gloves should be used. Fine powder should be collected with a suitable vacuum cleaner, insuring the minimum amount of dust is generated.

Any waste should be placed in placed in tightly sealed, sturdy containers.

A copy of the MSDS for URALAC P 2064 should be made accessible to workers comming in contact with the polymer.

13. RECOMMENDATIONS FOR MATERIAL SAFETY DATA SHEET (MSDS)

The MSDS for URALAC P 2064 (Attachment 1) was compiled by Robert Decker & Co. Pty Ltd according to Worksafe Australia format (5).

It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of Robert Decker & Co. Pty Ltd.

14. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of URALAC P 2064 shall be required if any circumstances stipulated under Subsection 64(2) of the Act arise. No other specific conditions are prescribed.

15. REFERENCES

1. Hoorn A. J. W., *Polyester resin 60.005-22 in the Ames salmonella/microsome reverse mutation assay.* Data on file, Hazleton Laboratories, The Netherlands, Study No: E-9778-0-401, 1987.

2. Australian Standard 1716-1991, "Respiratory Protective Devices", Standards Association of Australia Publ., Sydney, 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. National Occupational Health and Safety Commission, *Guidance Note for the Completion of a Material Safety Data Sheet*, 2nd. edition, AGPS, Canberra, 1990.