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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

URALAC P 5050

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

URALAC P 5050

1. APPLICANT

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

2. IDENTITY OF THE CHEMICAL

Trade name: URALAC P 5050

Other name: Saturated, carboxylated polyester resin

Molecular weight: The number average molecular weight of URALAC P 5050 was determined to be >1000. Percentage number-average molecular weight below 1000 was approximately 8%.

The chemical name, CAS number, molecular and structural formulae have been exempted from publication.

3. PHYSICAL AND CHEMICAL PROPERTIES

URALAC P 5050 will be imported as a clear, odourless, solid flakes (10-12 mm diameter). The polymer contains no more than 0.1% free monomers and no more than 0.5% of additives. Other physical and chemical properties include:

Glass transition temperature: 60°C

Density: 1210 kg/m^3

Water solubility: Not determined, expected to be negligible

Particle size: 10-12 mm (flakes)

Autoignition temperature: Greater than 400°C

Flammability: Combustible material

Explosive potential: If in a fine powder form URALAC 5050 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 support 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 and the high molecular weight of the polymer is likely to prevent it from crossing biological membranes. The molecular weight of the polymer and its expected negligible water solubility suggests the polymer is likely to be immobile in soil. Again measurement and interpretation of a result for this property would be difficult due to the complexity of the substance. The polyester, due to its nature is unlikely to dissociate.

The above reasons for the omission of data 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 5050 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 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 5050 is estimated.

There have been no reported cases of injury or disease related to exposure to URALAC P 5050 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 5050 will be processed at the Dulux Powder Coatings plant, Victoria, which employs 22 operators, and at Paint Industries Pty Ltd (Anzol), NSW, which employs 8 factory operators, two of which are involved in the weighing up.

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

Release of the chemical to the environment during powder manufacture occurs principally from the disposal of dusts collected by the dust collection system used in the factory. A small percentage of powder coating containing the chemical is not collected and 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 land fill by an approved contractor at an EPA (assume Vic EPA) approved site. Anzol may also transport waste to the disposal site at Castlereagh, NSW, where it is landfilled.

With water wash down of equipment a sump is used at Dulux to allow powdered solids to settle prior to discharge of waste water (in accordance with the Vic EPA site licence). Anzol operates a treatment plant to separate dust from water (procedure monitored by NSW Water Board). At Dulux waste sludge is settled until it forms a firm cake and supernatant water removed. The cake sludge is shovelled into heavy wall polyethylene bags and disposed of directly without further treatment as landfill. At Anzol a similar procedure is followed. The dried sludge is disposed of in steel drums, without further treatment, by land fill.

Small environmental releases will occur with applicators using the powder coating. Approximately, 95-98% of the powder is utilised and the remainder is collected as a dust and disposed of by land fill. The company estimates that release into waste water and emission into the air would not be in excess of 0.01%.

If 100 tonnes of polymer were imported annually wastage would be approximately 800-1000 kg at the paint company with a similar quantity by the applicator(s), who are expected to have similar disposal procedures to those at Dulux and Anzol. It is expected 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 will 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 5050. This is acceptable for polymers of NAMW > 1000 according to the Act. However, a report of results from a mutagenicity assay using a polyester resin similar to URALAC P 5050 was submitted.

8.1 Mutagenicity

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

A polyester resin resembling URALAC P 5050, 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 ug/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 main hazard the polymer will pose to the environment is when it 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 during the land fill operation is unlikely to present a hazard as the polymer is likely to be immobile due to its high molecular weight and its insolubility in water.

The polymer is unlikely to present a hazard to the environment at any stage of its use, whether it be when incorporated into the powder coating or applied onto steel products.

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 OCCUPATIONAL HEALTH AND SAFETY EFFECTS

Occupational exposure to URALAC P 5050 is expected to be minimal under normal use. The main routes of exposure are dermal and inhalational. Because of its exposure pattern and high molecular weight the notified polymer is not expected to pose a significant occupational hazard.

12. ASSESSMENT OF PUBLIC HEALTH EFFECTS

The potential for public exposure to Uralac P 5050 is expected to be low in normal circumstances due to its manner of use and disposal. However, no toxicological data on Uralac P 5050 have been included in this submission, thus the hazards are unknown. Due to its high molecular weight, the compound is not expected to cross biological membranes.

13. RECOMMENDATIONS FOR THE CONTROL OF OCCUPATIONAL EXPOSURE

To minimise worker exposure to URALAC P 5050, the following guidelines and precautions should be observed:

Engineering control procedures such as dust extraction devices should be employed in areas where URALAC P 5050 or the finished product is handled.

A dust masks 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 musk, safety glasses, close fitting overalls and PVC gloves should be use. 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 both URALAC P5050 raw material and finished product should be made accessible to people comming in contact with the polymer.

14. MATERIAL SAFETY DATA SHEET (MSDS)

The Material Safety Data Sheets for URAL P 5050 (Attachment 1) were compiled by Robert Decker & Co. Pty Ltd according to Worksafe Australia format (5). They are reproduced here as a matter of public record. The accuracy of this information remains the responsibility of Robert Decker & Co. Pty Ltd.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of URAL P 5050 shall be required if any circumstances stipulated under Subsection 64(2) of the Act arise. No other specific conditions are prescribed.

16. 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.