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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Polyurethane Resin in Misch. Raven 410

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For Enquiries please contact the Administration Coordinator at:

Street Address: 92 Parramatta Rd Camperdown, NSW 2050, AUSTRALIA
Postal Address: GPO Box 58, Sydney 2001, AUSTRALIA
Telephone: (61) (02) 9577-9466 FAX (61) (02) 9577-9465

Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Polyurethane Resin in Misch. Raven 410

1. APPLICANT

Hoechst Australia Limited and Croda Herberts Pty Ltd have jointly submitted a limited notification statement in support of their application for an assessment certificate for Polyurethane Resin in Misch. Raven 410.

2. IDENTITY OF THE CHEMICAL

Polyurethane Resin in Misch. Raven 410 is not considered to be hazardous based on the nature of the chemical and the data provided. Therefore the chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data, details of the polymer composition and details of exact import volume have been exempted from publication in the Full Public Report and the Summary Report.

Other Names:	polyurethane resin
Trade Names:	Daotan VTW 1262 (35% of notified polymer) Misch. Raven 410 (< 10% of notified polymer)
Molecular Weight:	> 1 000
Number-Average Molecular Weight (NAMW):	> 1 000
Maximum Percentage of Low Molecular Weight Species	
Molecular Weight < 500:	very low
Molecular Weight < 1 000:	very low
Method of Detection and Determination:	gel permeation chromatography (GPC)

3. PHYSICAL AND CHEMICAL PROPERTIES

The physico-chemical properties, except where stated, are for Daotan VTW 1262, the polymer emulsion in water. The product is produced in a water phase and is never isolated during production.

Appearance at 20°C and 101.3 kPa:	milky-white liquid of low viscosity
Boiling Point:	approx. 100°C (as for water)
Specific Gravity:	approx. 1.04
Vapour Pressure:	polymer not applicable; emulsion, as for water
Water Solubility:	insoluble; polymer emulsion, miscible with water
Partition Co-efficient (n-octanol/water):	not determined (see comments below)
Hydrolysis as a Function of pH:	not determined (see comments below)
Adsorption/Desorption:	not determined (see comments below)
Dissociation Constant:	not determined (see comments below)
Flash Point:	not determined
Flammability Limits:	not determined
Autoignition Temperature:	not determined
Explosive Properties:	none known
Reactivity/Stability:	temperatures above 170°C promote degradation; degradation products may include carbon dioxide, carbon monoxide, nitrous oxide and isocyanates

Comments on Physico-Chemical Properties

The new polymer will be imported as a component of basecoat tinter products which are coloured viscous liquids.

The notifier claims that the notified polymer is an insoluble emulsion in water. However, the polymer product is claimed to be miscible in water. The polymer has a very large molecular weight and is complex. While it contains the ammonium salt of a carboxylic acid and a free basic amine, these functionalities are only a small proportion and are expected to have minimal effect on the predicted low water solubility.

The notified polymer is not expected to hydrolyse due to the expected low water solubility. It has a number of ester linkages, but hydrolysis in the environmental pH range would be precluded by the expected low water solubility.

It is expected that the notified polymer will have a high partition coefficient. However, due to the polymer's expected low water solubility and molecular weight range, testing to determine the partition coefficient would be very difficult.

The notifier expects that due to the polymer product being insoluble in water, migratory tendencies into the air, water and soil will be relatively low. The polymer is expected to adsorb to, or be associated with, soils.

The notified polymer does contain dissociable functionalities, *ie* basic amine and ammonium salt. However, dissociation of the notified polymer will be precluded by the polymer's expected low water solubility.

3. PURITY OF THE CHEMICAL

Degree of Purity: ~ 40%

Toxic or Hazardous Impurities: none

Non-hazardous Impurities: low percentage

Additives/Adjuvants: water (balance)

4. USE, VOLUME AND FORMULATION

The notified polymer will not be manufactured in Australia. It will be imported as a component of a range of basecoat tinter products for use as in the automotive industry. The notified polymer will be present in these tinter products at concentrations of less than 10%.

It is estimated that up to 100 tonnes of the notified polymer will be imported per annum in the first 5 years.

5. OCCUPATIONAL EXPOSURE

The imported product Misch. Raven 410, containing the notified polymer, will be transported to the notifier's warehouse in 1 L or 4 L cans. The tins will be stored on pallets and transported by mechanical means. Stores and warehouse personnel are unlikely be exposed to the notified polymer under normal conditions.

Training and demonstration personnel may occasionally be exposed to the tinter products, containing the notified polymer, during training of customers or demonstrations to potential new customers. Dermal exposure is the most likely route of exposure to the notified polymer when workers are producing paint formulations containing the basecoat tinters. Accidental splashing could lead to ocular exposure. Periods of exposure are expected to be for 4 hours per week for

approximately 3 months, with no anticipated exposure thereafter.

These tinter products will be applied to vehicles in automotive repair shops by workers using spray equipment. The notifier does not know the exact number of workers who will be involved in spraying operations but it is likely to be a significant number. During these operations there is the potential for dermal, ocular and inhalational exposure. These operations will be conducted in a spraybooth with exhaust ventilation thus reducing the potential for exposure to the notified polymer.

The paint formulations, including a clear top coat which is applied by spraying onto the dried paint, contain potentially hazardous components such as isocyanates and a range of solvents. There is the potential for occupational exposure to these components by dermal, ocular or inhalational routes during spraying operations. As noted above the notifier has stated that the exposure to paint components will be minimised by worker training, good working practice and the use of spray booths and exhaust ventilation.

There may be significant worker exposure to the dried paint on vehicles, however once dried the notified polymer becomes bound in an inert matrix and will not be bioavailable.

7. PUBLIC EXPOSURE

There is negligible potential for public exposure to the notified polymer during its use in automotive sprays. The basecoat tint is covered with an inert film thus preventing public exposure to the notified polymer. Products containing the notified polymer will not be sold to the public. However if accidental public contact occurs, the physico-chemical properties will be sufficient to preclude absorption across the skin or other biological membranes.

8. ENVIRONMENTAL EXPOSURE

Release

The imported basecoat products will be initially stored in a bunded warehouse where all onsite drainage leads to a “first flush” drainage system. The drainage system prevents entry of polluted water into either the stormwater drainage system or the sewer.

Tinter products at automotive repair shops are held on a mixing machine, providing the ability to mix and pour the tinter without any loss. The notifier claims that during application, overspray losses can be as much as 30% of the material sprayed. It is noted that up to 70% of the polymer may be lost through overspray and ‘bounce-back’ at some automotive repair shops (up to 70 tonnes per year of the polymer at maximum import volumes) (1). However, release of the basecoat will be contained within spray booths. The resultant overspray will be captured and collected through the spray booths’ filtering system or water traps.

Cleaning of the spray gun and mixing equipment will generate waste and this will be collected. Based on previous similar submissions, it is estimated that these wastes to be approximately 10 to 20%. Liquid wastes will be collected by licensed waste disposal contractors. The liquid is distilled off, leaving the final solids that are then sent to trade-waste landfill.

Residues of basecoat remaining in paint cans are claimed by the notifier to be extremely low. Based on previous similar submissions, it is estimated that these residues may be 3 to 5%. These residues will dry within the can. Empty tinter cans can be recycled, however some tinter containers may still be disposed of to industrial waste sites.

Fate

The majority of the notified polymer is not expected to be released to the environment until it has been fully cured into a solid polymer matrix. The coating containing the crosslinked polymer will share the fate of the automotive panels to which it is applied. When the polymerised polymer is disposed of, either as a residue or as a coating, no hydrolysis, movement, leaching, biodegradation or bioaccumulation of the polymer is expected.

Incineration of the polymer is expected to produce water and oxides of carbon and nitrogen. Any chips or flakes of the cured paint that occur (due to stone chips, accidents, wear and tear, etc) will be inert, diffuse and form part of the sediments.

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicological data were provided which is acceptable for polymers of NAMW greater than 1 000 according to the Act.

The notified polymer's high NAMW will restrict passage across biological membranes. The levels of low molecular weight species are low (MW < 1 000, < 0.1%; MW < 500, < 0.1%), and the maximum level of residual monomers is also low and considered not to be of toxicological concern.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicology data were provided, which is acceptable for polymers of NAMW greater than 1 000 according to the Act.

Due to the polymer's high molecular weight, the polymer is not anticipated to cross biological membranes (2, 3)

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The main environmental exposure of the polymer arises from the landfill disposal of recovered dry waste paint from the application process. It has been estimated that

up to 43% of the polymer per year may be consigned to landfill at maximum projected import volumes (30% overspray in application, 10% wastage through cleaning and 3% residues in basecoat cans). However, such material will be cured or bound to soil, and remain immobile in the environment. The environmental hazard from such disposal is expected to be low.

The main environmental hazard would arise through spillage in transport accidents that may release quantities of the uncured polymer to drains and waterways. The polymer product will be imported in small cans that should limit the size of any spills. Adequate control procedures are outlined in the Material Safety Data Sheet (MSDS). Any remaining material left after clean-up will quickly become immobile on association with soil/sediment.

The polymer is unlikely to present a hazard to the environment when it is incorporated into basecoats and applied to the panels of cars. The basecoat is topcoated which will further limit environmental exposure of the polymer. Such painted panels will be consigned to landfill or recycled at the end of their useful life. Chips or flakes of the cured basecoat will form part of the sediments. Products of incineration will not pose a significant hazard to the environment. The environmental hazard from such exposure of cured basecoat is expected to be low.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified polymer is present in the imported products at low concentrations and is therefore considered to be of low occupational health risk to warehouse and transport workers.

Workers training and demonstrating to customers may be exposed to the products containing the notified polymer for short periods of time, for a limited period of up to 3 months. The occupational health risk for these workers is considered to be low. The health risk is also low for those mixing and applying paints in the automotive industry.

There may be hazardous solvents and isocyantes present in the paint to which exposure should be minimised. Appropriate exposure standards (4) should be observed in areas where these paints are being mixed and sprayed. Workers should also be aware that some of these components are flammable.

Tinter products will not be sold to the general public. The public will only come into contact when they are an inert component in a paint film on vehicles and therefore Polyurethane Resin in Misch. Raven 410 presents negligible risk to the public.

13. RECOMMENDATIONS

To minimise occupational exposure to Polyurethane Resin in Misch. Raven 410 the following guidelines and precautions should be observed:

- It is good work practice to wear industrial clothing which conforms to the specifications detailed in Australian Standard (AS) 2919 (5) and occupational footwear which conforms to Australian and New Zealand Standard (AS/NZS) 2210 (6) to minimise exposure when handling any industrial chemical;

- Spillage of products containing the notified polymer should be avoided, spillages should be cleaned up promptly with absorbents which should then be put into containers for disposal;

- Good personal hygiene should be practised to minimise the potential for ingestion;

- A copy of the MSDS should be easily accessible to employees.

In addition, the Worksafe Australia document *Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards* (4) should be used as a guide in the control of workplace exposure to other potentially hazardous paint components, and appropriate personal protective equipment should be worn where necessary to minimise exposure to these chemicals (see the product MSDS). Workplace monitoring for these components should be carried out on a regular basis. Workers should also be aware of the flammable nature of some of these components.

14. MATERIAL SAFETY DATA SHEET

The MSDS for the product containing the notified chemical was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (7).

This MSDS was provided by the applicant as part of the notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of the applicant.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act, secondary notification of the notified 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. Environmental Protection Authority 1992, *Draft Environmental Code of Practice for Spray Paining and Powder Coating*, Unpublished, Perth, WA.

2. Anliker, R., Moser, P. & Poppinger, D. 1988, 'Bioaccumulation of dyestuffs and organic pigments in fish. Relationships to hydrophobicity and steric factors', *Chemosphere*, vol. 17, no. 8, pp. 1631-1644.

3. Gobas, F.A.P.C., Opperhuizen, A. & Hutzinger, O. 1986, 'Bioconcentration of hydrophobic chemicals in fish: relationship with membrane permeation', *Environmental Toxicology and Chemistry*, vol. 5, pp. 637-646.

4. 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.

5. Standards Australia 1987, *Australian Standard 2919-1987, Industrial Clothing*, Standards Association of Australia, Sydney.

6. Standards Australia/Standards New Zealand 1994, *Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear*, Standards Association of Australia/Standards Association of New Zealand, Sydney/Wellington.

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