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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Polymer in Hydrholac 3089

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Polymer in Hydrholac 3089

1. APPLICANT

Rohm and Haas Australia Pty Ltd of 969 Burke Road CAMBERWELL VIC 3124 has submitted a limited notification statement in support of their application for an assessment certificate for Polymer in Hydrholac 3089.

2. IDENTITY OF THE CHEMICAL

Polymer in Hydrholac 3089 is not considered to be hazardous based on the nature of the chemical and the data provided. Therefore the chemical name, structure, spectral data, purity, impurities, specific use and details of exact import volume have been exempted from publication in the Full Public and Summary Reports.

Other Names:	Polymer in Hydrholac 3089 Polyurethane polymer
Trade Name:	Hydrholac 3089
Method of Detection and Determination:	infrared spectroscopy, gel permeation chromatography

3. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is imported into Australia as a component of a water-based dispersion. The properties given below are of the dispersion unless otherwise specified.

Appearance at 20^0C and 101.3 kPa:	opaque mauve liquid
Boiling Point:	100^oC
Specific Gravity:	not determined
Vapour Pressure	not determined

Water Solubility:	not determined
Fat Solubility:	not determined
Partition Co-efficient (n-octanollwater):	not determined
Hydrolysis as a Function of pH:	not determined
Adsorption/Desorption:	not determined
Dissociation Constant:	not determined
Particle size:	not applicable
Flash Point:	not determined
Flammability Limits:	not flammable
Autoignition Temperature:	not determined
Explosive Properties:	not explosive
ReactivitylStability:	not reactive

Comments on Physico-Chemical Properties

The notifier expects the polymer to be insoluble based on the structure of the polymer and its molecular weight. Based on the supplied structure, it is estimated that the notified polymer contains around 6% free carboxyl groups which could impart some solubility to the polymer. However, given the relatively high molecular weight of the notified polymer it is not expected to have significant solubility in water

The notifier indicates the polymer is not expected to hydrolyse in water at pH 2 or pH 10. While some degradation of the low molecular weight fractions may occur at pH 14 with hot caustic NaOH, this is claimed not to be representative of the greater part of the polymer fractions. The polymer is not expected to hydrolyse under environmental conditions due to the expected low solubility of the polymer.

The polymer is a polyurethane dispersed in water. The notifier claims the polymer is surface active making it difficult to measure the partition coefficient. While it is agreed that partition coefficient will be difficult to measure for this complex polymer, reasons for surface activity are unclear

The polymer would be expected by the notifier to adsorb strongly to organic matter and charged particles in soil as it is ionically surface active in an aqueous environment.

The notified polymer contains carboxylic acid groups that are expected to have a typical pKa of between 4.5 and 5.0.

4. PURITY OF THE CHEMICAL

Degree of Purity: high

Additives/Adjuvants: none

5. USE, VOLUME AND FORMULATION

The notified chemical will not be manufactured in Australia. It will be imported as a water based dispersion in quantities greater than 1 tonne per annum for the first five years. The water based dispersion will be imported in 200 L open-head drums.

The notified chemical will be used as a component of a formulation, for application by rotary spray or roller to leather. The notified chemical is to be used as a component of 'finishing mixes" containing other ingredients such as water, pigments, waxes, wetting agents, fillers and pigment extenders. The finishing mixes are prepared at the sites where they will be used. It is expected that there will be between 1 to 4 users (two are confirmed) of the notified chemical.

6. OCCUPATIONAL EXPOSURE

The aqueous dispersion containing the notified polymer will be transported in open head 200 L drums by truck, to customers who are experienced in formulation into finishing mixes and application of the mixes onto leather.

At each customer site it is expected that approximately 11 workers may be exposed to the notified polymer during formulation, application and transfer of retained leathers. Of these, 5 are expected to be involved in formulation, 2 in application and 4 in feeding and removing the leather. Formulation is expected to contain < 10% w/w of the notified polymer. Formulators are expected to be exposed for about 3 hrs/day, 144 days/yr. and other workers 3 hrs/day, 240 days/yr.

Minimal exposure to other workers may occur, these being involved in supervision, storage, transport and drum recycling.

Formulation is carried out in an open top mixer by addition of binders, flow modulators, water and pigments to the polymer dispersion. Once the finishing mixes have been formulated they are applied to the other unfinished leather by roll coating or rotary spray. The.finishing mixes are manually added to the rolling and spray machines followed by curing in catalytic gas dryers at 70^{o}C.

Local exhaust ventilation is present in the mixing room above the reciprocating spray machines but not at the roll coat machine as aerosols are not expected to be generated there. Overspray during spray application, cleaning equipment and disposal of use drums is collected by water curtains.

Occupational exposure to the notified polymer would be greatest during formulation and spray coating. In this situation expected dermal and occular exposure may occur with minimal inhalational exposure.

7. PUBLIC EXPOSURE

Dermal contact with car seats will be the primary avenue of public exposure. As the NAMW of the notified polymer is greater than 1 000 it is unlikely that the unbound polymeric material would cross biological membranes and pose a hazard to the public.

Minor public exposure may result from disposal of unused product, which contains the notified polymer, or accidental spillage of the product during transport and storage. However, adequate measures described in the Material Safety Data Sheet (MSDS) would minimise risk of public exposure during disposal, or in the event of an accidental spillage

8. ENVIRONMENTAL EXPOSURE

Release

Release to the environment could occur at the tanneries during blending into the “finishing mix” and transferal into the mixing vessels, during cleaning and during application. If spillage was to occur, it is likely that it would be limited to an on-site sealed surface from which it would be cleaned and disposed of appropriately.

Losses of polymer from transferal between vessels and cleaning would range from 5 to 10%. The major release results from cleaning application equipment and disposal of used drums. Losses resulting from overspray are expected to lead to the release of an extra 5% of polymer, most of which is expected to be collected by a water curtain with subsequent disposal as trade waste. Minimal releases resulting from roller application are expected as losses are restricted to roller washings that are collected and disposed of as trade waste.

The notifiers experience with similar products indicates that total losses during processing could be as high as 15%, corresponding to 3 000 kg of the notified polymer at the maximum

rate of import. Most of the polymer lost during equipment washing, as overspray, etc and disposed of as trade waste, is expected to be trapped by coagulation and settling of solids (which are usually disposed of to landfill) before washings, etc are discharged to the sewer. More polymer is removed at the sewage treatment works.

Fate

The fate of the bulk of the polymer will be tied to the fate of the finished leather. Leather that has been treated with the polymer is expected to be used in making leather products. Most of the treated leather will be landfilled, either as trimmings during the making of leather articles, or when the goods are finally disposed of.

The expected low water solubility and surface active nature of the polymer, indicates that any polymer that is released to the sewer is likely to adsorb strongly to sewerage sludge. Hence, little, if any, is likely to remain in treated waste waters or be released to natural waters. The solids and sludges from waste water treatments are normally disposed of by landfill or incineration.

The anticipated low solubility of the polymer and its high molecular weight should ensure that residues remain immobile in landfill or spillage areas. Curing of the polymer will only serve to increase the molecular weight, and decrease the solubility still further. Both these factors will also result in lowered biodegradation potential.

9. EVALUATION OF TOXICOLOGICAL DATA

Toxicological data are not required for polymers of NAMW greater than 1 000 according to the Act, and no data were submitted for the notified polymer.

The notifier's MSDS states that data obtained from similar materials indicates that the notified polymer is likely to be of low oral and dermal toxicity in rats and rabbits, respectively. Data from similar substances indicates that the notified polymer may cause inconsequential eye irritation, but is not expected to be a primary skin irritant. No primary or analogue data is available on other toxicological parameters.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicology data were provided, which is acceptable for polymers of NAMW greater than 1000 according to the Act.

Biological membranes are not permeable to polymers of very large molecular size and therefore bioaccumulation of the notified polymer is not expected (2,3).

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

Most of the polymer will share the fate of the leather product, and be disposed of to landfill. There will be negligible environmental hazard from such cured polymer.

Polymer which reaches the sewer as a result of washing equipment will be removed from solution by adsorption onto sediment or sludge with little, if any, is likely to remain in treated waste waters or be released to natural waters. The solids and sludges from waste water treatments are normally disposed of by landfill or incineration. The polymer is expected to be inert and immobile in the former and degrade to water and oxides of carbon and nitrogen in the latter.

Overall, the environmental hazard from the proposed import rates and use of the polymer is low.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified polymer has a NAMW greatly in excess of 1 000 and should not be able to be absorbed across biological membranes to cause systemic effects. The levels of low molecular weight species (3.7%) and residual monomers (0.08%) would not render the polymer hazardous according to the criteria of Worksafe Australia (4). Local effects such as skin and eye irritation are not expected to occur based on the toxicity profiles of aqueous dispersions compositionally similar to those containing the notified polymer according to the supplied MSDS (see attachment).

Exposure of workers to aerosols is recognised as a risk factor by the customers employing the notified polymer for leather finishing. Local exhaust ventilation is employed in those processes which may generate aerosols (formulation and spray coating). Significant dermal and/or eye exposure could occur during formulation, coating, feeding or removing leather. Hand and eye protection is routinely worn by workers as protection against potentially hazardous components, of the emulsion and finishing mixes, (other than the notified polymer). This protection would also serve to minimise exposure to the notified polymer.

The risk of workers suffering adverse health effects from exposure to the notified polymer during formulation, coating operations or leather handling is expected to be low.

While public contact with Polymer in Hydrholac 3089 may be significant, it will be bound to treated leather, and therefore, no public exposure is expected to occur.

13. RECOMMENDATIONS

To minimise occupational exposure to Polymer in Hydrholac 3089 the following guidelines and precautions should be observed.

- When using the notified chemical the following protective equipment should be worn:

  - impervious gloves conforming to Australian Standard (AS) AS 2161 (5),

  - protective eye goggles conforming to AS 1336 (6), and AS/NZS 1337 (7)

  - protective clothing conforming to AS 2919 (8), and

  - protective footwear conforming to AS/NZS 2210 (9).

- Safe work practices should be implemented to prevent splashing and spillages.

- Good personal hygiene practices should be observed.

- Copies of the MSDS should be easily accessible to employees.

- When using the formulated product containing the notified polymer

  If mist, vapour or aerosols are generated, and engineering controls are not sufficient to control exposure, the following protective equipment should also be worn:

  - respiratory protection conforming to AS/NZS 1715 (10) and AS/NZS 1716(11).

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* (12).

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.

14. REFERENCES

1 National Occupational Health and Safety Commission 1994, *List of Designated Hazardous Substances* [NOHSC: 10005(1994)] Australian Government Publishing Service Publ., Canberra.

2. Anliker R, Moser P & Poppinger D 1988 *"Bioaccumulation of dyestuffs and organic pigments in fish. Relationships to hydrophobicity and steric factors".* Chemosphere 17(8):1631-1644.

3. Gobas FAPC, Opperhuizen A & Hutzinger 0 1986 *"Bioconcentration of hydrophobic chemicals in fish: relationship with membrane permeation"* Environmental Toxicology and Chemistry 5:637-646.

4. National Health and Safety Commission, *Approved Criteria for Classifying Hazardous Substances,* NOHSC:1008 (1994), AGPS, Canberra, Australia

5. Standards Australia, 1978, *Australian Standard 2161-1978, Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves),* Standards Association of Australia Publ., Sydney, Australia.

6. Standards Australia, 1994, *Australian Standard 1336-1994, Recommended Practices for Eye Protection in the Industrial Environment,* Standards Association of Australia Publ., Sydney, Australia

7. Standards Australia, Standards New Zealand 1992, *Australian! New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications,* Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ. Wellington, New Zealand.

8. Standards Australia, 1987 Australian Standard 2919 - 1987 industrial Clothing, Standards Association of Australia Publ., Sydney, Australia.

9. Standards Australia, Standards New Zealand 1994, *Australian/New Zealand Standard 2210 - 1994 Occupational Protective Footwear, Part 1: Guide to Selection, Care and Use. Part 2: Specifications,* Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ. Wellington, New Zealand.

10. Standards Australia, Standards New Zealand, 1994, *Australian/New Zealand Standard 1715 - 1994 Selection, Use and Maintenance of Respiratory Protective Devices,* Standards Association of Australia PubI., Sydney, Australia, Standards Association of New Zealand PubI., Wellington, New Zealand.

11. Standards Australia, Standards New Zealand, 1991, *Australian/New Zealand Standard 1716 - 1991 Respiratory Protective Devices,* Standards Association of Australia PubI., Sydney, Australia, Standards Association of New Zealand PubI., Wellington, New Zealand.

12. National Occupational Health and Safety Commission, 1994*, National Code of Practice for the Preparation of Material Safety data Sheets*, [NOHSC:2011] AGPS, Canberra, Australia