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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

POLYMER IN PRIMAL CL-104

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

POLYMER IN PRIMAL CL-104

1. APPLICANT

Rohm and Haas Australia Pty Ltd of 969 Burke Road CAMBERWELL VIC 3124 has submitted a limited notification statement with their application for an assessment certificate for Polymer in Primal CL-104.

2. IDENTITY OF THE CHEMICAL

Based on the nature of the chemical and the data provided, Primal CL-104 is not considered to be hazardous. Therefore, the chemical identity, composition and import volume and impurities have been exempted from publication in the Full Public Report and Summary Report.

Trade name: Primal CL-104 (imported emulsion containing the notified polymer)

Number-average molecular weight: > 50000

Method of detection and determination:

The notified polymer is separated by gel permeation chromatography and identified by infra-red spectroscopy.

3. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer will be imported into Australia at a concentration of 38-39% of a polymer emulsion. The properties given below are those of the emulsion unless otherwise specified.

Appearance at 20°C and 101.3 kPa:	milky white liquid
Odour:	ammonia-like
Melting Point:	not determinable (like most polymers, this material softens and flows over a wide temperature range)
Glass-transition Temperature:	the polymer has 2 glass transition temperatures, the first is very broad and starts at about 20°C and ends approximately at 40°C. The second is at 91°C
Density:	1071 kg/m^3 - for the polymer

Vapour Pressure:	expected to be negligible for the polymer
Water Solubility:	< 4.2 mg/L (water extractability analysis) - for the polymer
Partition Co-efficient (n-octanol/water) log P_{OW}:	not applicable
Hydrolysis as a function of pH:	
Adsorption/Desorption:	not provided
Dissociation Constant pKa**:**	6.7
Flash Point:	not determined
Flammability Limits:	not flammable
Autoignition Temperature:	not determined
Explosive Properties:	the polymer is not explosive
Stability:	the polymer is non-reactive

Comments on Physico-Chemical Properties

By analogy with similar polymers, this polymer is not volatile under conditions of use due to the high molecular weight.

With regard to hydrolysis, the notifier indicates that "Preliminary hydrolysis test found that the typical acrylic and methacrylic esters of the polymer are stable as it has no sterically accessible hydrolysable functionalities".

No data on partition coefficient (n-octanol/water) was provided as the polymer is not soluble in water or organic solvents.

No data was supplied on adsorption/desorption. However, as the solvent evaporates from the polymer solution it will become more viscous and sticky and will readily bind to the soil, thereby becoming immobilised.

The polymer contain a small amount of a free carboxylic acid, and therefore has typical acidity.

These explanations are acceptable for this formulation and class of polymer.

4. PURITY OF THE CHEMICAL

Degree of purity: 99%

Non-hazardous impurities: None

Additives/Adjuvants: None

5. INDUSTRIAL USE

The notified polymer is a component in water-based paints for use on wood, metal, plastic and paper substrates. It will be imported as a component of an aqueous polymer emulsion. Import volume of the notified chemical is expected to be > 3 tonnes per year for the first five years.

6. OCCUPATIONAL EXPOSURE

The product will be imported into Australia in 200kg drums and directly supplied to customers without repackaging.

Categories of workers potentially exposed to the polymer include paint blending workers, QC testing staff, maintenance personnel, drum/can fill operators, paint applicators, supervisory personnel as well as personnel involved in waste disposal.

Transport and storage workers will only be exposed in the event of accidental spillage.

At the reformulation sites, blending will take place in a closed blending pot. Thirteen operators are expected to be involved in paint manufacture and will be (required to wear appropriate personal protection. At the reformulation sites local exhaust ventilation will be provided for sampling, blending pot fill and container filling. The spray application process is designed to minimise drift. Operators applying the finished product will be industrial users who are expected to wear as a minimum, impervious gloves, coveralls and safety glasses.

7. PUBLIC EXPOSURE

There is negligible potential for public exposure to Primal CL-104 arising from paint formulation processes.

Most Primal CL-104 will enter the public domain as a fully cured solid polymer matrix on the surface of treated items. Losses of the notified polymer could arise from overspray, container residues or washings from application equipment. Empty paint drums would probably be disposed of by landfill, while equipment washings would enter the sewerage system. No significant public exposure to Primal CL-104 is expected to arise from industrial paint application.

An unspecified amount of paint containing Primal CL-104 may be sold to domestic users, who would potentially be exposed to the polymer via dermal contact, or by inhalation if applying by spray.

8. ENVIRONMENTAL EXPOSURE

Release

The product will be imported into Australia in 200 kg drums. The formulation of paints and other surface coatings using the Primal CL-104 will be performed at approximately 3 customer facilities.

Primal CL-104 will be supplied to customers in the form that it is imported and no repackaging will take place. At these sites where reformulation occurs (and which are not controlled by the notifier), blending will take place in closed blending pots. Local exhaust ventilation is generally provided for the following operations at these sites:

i) Sampling,
ii) Blending pot filling, and
iii) Container filling - at the fill point.

Residue from the filter will either be disposed of separately, or together with the filter, to landfill.

The polymer emulsion will be pumped into the paint mixing vessel. Following high speed dispersing, the emulsion is mixed mechanically with other paint ingredients. The finished surface coating is then automatically packaged into 205 L, 20 L or 1 L containers.

No losses to the environment are expected during storage at Rohm and Haas facilities as the product is in sealed containers. The notifier claims that "in the event of a spill, the acrylic polymer is expected to be easily contained on site". Storage at the customer facilities of both the polymer emulsion and finished surface coating is expected to be in sealed areas with adequate spill containment and in accordance with state legislation (see below).

As the sites of reformulation are not controlled by the notifier, they are unable to identify any specific mechanism of release. However, the notifier estimates that polymer loss may be up to 2000 kg/yr. It is expected that these losses would include drum/storage container residues (the empty drums containing Primal CL-104 residues may be sent to a recycler), transfer piping and blending tank residues, samples and filter residues. The vapour pressure of the notified substance is very low and therefore losses by volatilisation are expected to be negligible.

There will be some loss of polymer during application (by spraying) which is stated to be "< 1% when proper environment controls are utilised". Filters and enclosed spray booths will probably not be used on all occasions (especially in home applications) and the resultant loss of the polymer may be in excess of the quoted figure. The notifier claims that the major releases from application "shall occur as the result of cleaning paint application equipment and the disposal of paint cans which may contain small residual quantities of the paint". Washings from the equipment are likely to be washed down the drain with copious quantities of water, while the paint cans are expected to be disposed of to landfill. The notifier estimates that this will amount to less than 100 kg per. Losses during application seem low in comparison with similar submissions.

For the estimated 2100 kg maximum total loss of the acrylic polymer (2000 kg in reformulation and 100 kg in application), the notifier states that "Disposal will be in accordance with relevant local, state and federal legislation". Further, the notifier concludes that the "Concentrated liquid and solid residues are expected to be disposed of by incineration and/or to landfill (possibly in a pretreated form)". The Material Safety Data Sheet suggests that the emulsion should first be coagulated with stepwise addition of ferric chloride and lime. The clear supernatant that is left is then flushed to a chemical sewer. The contaminated liquid and solids are disposed of by incineration in accordance with local, state and federal regulations.

Fate

The main environmental exposure to the free polymer resin will result from disposal to landfill of the residue from paint manufacture and application.

As the notified substance is an acrylic polymer with low water solubility, degradation in or leaching from landfill sites is not expected. Incineration of the notified substance is expected to produce water and oxides of carbon and nitrogen.

Most of the notified acrylic polymer is not expected to be released to the environment until it has been fully cured into a solid polymer matrix on the surface of the treated item. Bioaccumulation is unlikely due to the high molecular weight of the polymer.

9. EVALUATION OF TOXICOLOGICAL DATA

Toxicological data are not required for polymers of number-average molecular weight (NAMW) > 1000 according to the *Industrial Chemicals (Notification and Assessment) Act, 1989* and no data were submitted for the notified polymer.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

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

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The acrylic polymer is unlikely to present a hazard to the environment when it is formulated into surface coatings and applied to the various substrates.

The polymer is also unlikely to present a hazard to aquatic organisms due to the end-use application, and the polymer's high molecular weight and expected low solubility in water.

The main environmental exposure arises from disposal of maximum of 2100 kg per annum of the acrylic polymer in reformulation and use. However, since it is stable and immobile in soil, and expected to have low water solubility, together with its high molecular weight, environmental hazard is expected to be low.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified chemical is a high molecular weight polymer (NAMW >1000), therefore, it is unlikely to pass biological membranes and cause systemic effects. The notified polymer does not contain any species with NAMW less than 1000, and the residual monomer content is < 0.1%. These are present at levels well below the cut-off concentrations necessary to classify the polymer as hazardous according to the criteria of Worksafe Australia (1). Acute effects such as skin and eye irritation are not expected to occur based on the toxicity profiles of aqueous emulsions compositionally similar to those containing the notified polymer.

Exposure of workers to aerosols is recognised as a risk factor by the customers employing the notified polymer for use as a binder for clear and pigmented paints used on wood, metal and paper substrates and 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 blending, coating and application. Hand and eye protection is routinely worn by workers as protection against components of the emulsions and finishing mixes other than the notified polymer and this protection would serve to minimise exposure.

The risk of adverse health effects to workers from exposure to the notified polymer during blending, coating and application operations is expected to be low.

There is negligible potential for public exposure to Primal CL-104 arising from paint formulation and paint application by industrial users. Members of the public using paint containing Primal CL-104 are likely to be exposed to the uncured polymer, primarily via the dermal route. However, the high molecular weight of the notified polymer should prevent its absorption. There may be widespread public contact with Primal CL-104 on painted articles, but under these conditions the notified polymer will be a cured, inert solid matrix from which absorption cannot occur.

13. RECOMMENDATIONS

To minimise occupational exposure to Polymer in Primal CL-104 the following guidelines and precautions should be observed:

- neoprene gloves conforming to Australian Standards (AS) AS 2161 (2)
- protective eye goggles conforming to AS 1336 (3), and AS/NZS 1337 (4)
- protective clothing conforming to AS 2919 (5)

. 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 (6) and AS/NZS 1716 (7)

. when entering poorly ventilated enclosed spaces, tanks or vessels the following protective equipment should be worn:
  - self-contained breathing apparatus conforming to AS/NZS 1715 (6)

. good work practices should be implemented to prevent splashing and spillages.

. good personal hygiene practices should be observed.

. a copy of the Material Safety Data Sheet (MSDS) should be easily accessible to employees.

14. MATERIAL SAFETY DATA SHEET

The attached MSDS for Primal CL-104 Emulsion containing the notified chemical was provided in Worksafe Australia format (8).

This MSDS was provided by Rohm and Haas Australia Pty Ltd as part of their notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of Rohm and Haas Australia Pty Ltd.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of Polymer in Primal CL-104 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. National Health and Safety Commission, 1994, *Approved Criteria for Classifying Hazardous Substances*, NOHSC:1008, AGPS, Canberra, Australia

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

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

4. 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.

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

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

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

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