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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

POLYMER IN EXP-3188 PMN

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

POLYMER IN EXP-3188 PMN

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 of Polymer in EXP-3188 PMN.

2. IDENTITY OF THE CHEMICAL

Based on the nature of the chemical and the data provided, Polymer in EXP-3188 PMN is not considered to be hazardous. Therefore, the chemical identity, composition and import volume, residual monomers components and impurities have been exempted from publication in the Full Public Report and Summary Report.

Trade name: Emulsion EXP-3188 PMN (contains the notified polymer)

Number-average molecular weight: > 1000

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	milky white liquid (imported emulsion)
Odour:	ammonia-like (imported emulsion)
Melting Point:	not determinable (like most polymers, this material softens and flows over a wide temperature range)
Glass-transition Temperature:	the polymer has a broad glass transition temperature range
Density:	1137 kg/m^3 - for the polymer
Vapour Pressure:	negligible due to its high NAMW
Water Solubility:	< 4.0 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:	polymer is hydrolytically stable at environmentally relevant pHs
Adsorption/Desorption:	not determined

Dissociation Constant
pKa**:** 9.3

Flash Point: not flammable

Flammability Limits: not flammable

Explosive Properties: not explosive

Reactivity: 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 "less than 10 % of the ester groups were hydrolysed @ 50 ^{o}C over a 7 day period. The only polymer component seen to hydrolyse only comprises ~ 8% of the polymer. The preliminary hydrolysis test found that the typical esters of the polymer are stable". Hydrolysis under environmental conditions is expected to be to be very slow.

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 contains 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 : 98%

Non-hazardous impurities: None

Additives/Adjuvants: None

5. INDUSTRIAL USE

The notified acrylic polymer is a component of an aqueous polymer emulsion, EXP-3188 PMN. The notified product containing the chemical is intended to be used as a binder for surface coatings over wood in industrial applications. It is designed to replace existing solvent-borne protective coatings.

EXP-3188 Polymer will be imported in 200 kg drums as a 41% component of an aqueous polymer emulsion. The volume of import for the emulsion is expected to be greater than 10 tonnes/yr during the first 5 years.

6. OCCUPATIONAL EXPOSURE

The notified polymer will be imported in 200 litre drums. The polymer emulsion will be supplied to approximately 5 customer facilities for reformulation into paint within enclosed blending pots, and then repackaged for distribution and sale to furniture manufacturers.

Categories of workers potentially exposed to the polymer include paint blending workers, quality control testing staff, packaging workers, 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. Twenty five operators are expected to be involved in paint manufacture and will be required to wear as a minimum, neoprene gloves, coveralls and chemical splash goggles. At the reformulation sites local exhaust ventilation will be provided for sampling, blending pot fill and container filling at the fill point. The spray application process is designed to minimise drift. Applicators will be industrial users only 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 EXP-3188 Polymer arising from paint formulation processes.

Most EXP-3188 Polymer will enter the public domain in a fully cured state, forming approximately 40% of the coating on painted furniture. 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 washing would enter the sewerage system. Negligible public exposure to EXP-3188 Polymer is expected to arise from these sources.

8. ENVIRONMENTAL EXPOSURE

Release

The product will be imported into Australia in 200 L drums. The formulation of paints and other surface coatings using the notified polymer will be performed at approximately 5 customer facilities.

The notified polymer 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 mixing vessel. Following high speed dispersing, the emulsion is mixed mechanically with other paint ingredients. The finished surface coating is then automatically packaged into containers for sale to the end users.

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, production losses for similar types of coatings the notifier estimates approximately 4000 kg acrylic polymer based on 100 tonne of emulsion imported. It is expected that these losses would include drum/storage container residues (the empty drums containing EXP-3188 PMN Polymer 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 4200 kg maximum total loss of the acrylic polymer (4000 kg in reformulation and 200 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

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 wood.

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 approximately 4000 kg maximum per annum of the acrylic polymer in reformulation. 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 contains 2.3% of species with a NAMW less than 1000 with less than 1% of species with a NAMW below 500. The residual monomer content is < 0.4%. 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 according to the supplied MSDS.

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.

There is negligible potential for public exposure to the notified polymer arising from paint formulation and application by industrial users. There may be widespread public contact with the notified polymer on painted furniture, but under these conditions it will be in a cured, inert solid matrix from which absorption cannot occur.

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.

13. RECOMMENDATIONS

To minimise occupational exposure to the notified polymer the following guidelines and precautions should be observed:

- impervious 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 practises 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 Emulsion EXP-3188 PMN was provided in a suitable format.

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 EXP-3188 PMN 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.