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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

EXP-3257 PMN

This Assessment has been compiled in accordance with the provisions of *the Industrial Chemicals (Notification and Assessment) Act 1989*, and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by Worksafe Australia which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment, Sport, and Territories and the assessment of public health is conducted by the Department of Health, Housing, Local Government and Community Services.

For the purposes of subsection 78(1) of the Act, copies of this full public report may be inspected by the public at the Library, Worksafe Australia, 92-94 Parramatta Road, Camperdown NSW 2050, between the hours of 10.00 a.m. and 12.00 noon and 2.00 p.m. and 4.00 p.m. each week day except on public holidays.

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**EXP-3257 PMN****1. APPLICANT**

Rohm and Haas Australia Pty Ltd, 969 Burke Road, Camberwell, Victoria 3124.

2. IDENTITY OF THE CHEMICAL

Based on the nature of the chemical and the data provided, EXP-3257 PMN is not considered to be hazardous. Therefore, the details of chemical name, molecular formula, structural formula, molecular weight, spectral data, composition, import volume and identity of sites have been exempted from publication in the Full Public Report and the Summary Report.

Other name: Acrylic copolymer

Trade name: EXP-3257 PMN (refers to the polymer emulsion)

Maximum percentage of low molecular weight species (molecular weight < 1000): < 1.0%

Method of detection and determination:

The polymer can be separated by gel permeation chromatography and identified by infrared spectroscopy.

3. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is manufactured as the major component (46-48%) in EXP-3257 PMN. The physical and chemical properties listed below are for the polymer unless otherwise stated.

Appearance at 20°C and 101.3 kPa: Light yellow, milky liquid (polymer emulsion)

Odour: Ammonia odour (polymer emulsion)

Density: 1139.5 kg/m³

Vapour Pressure: Not applicable (high molecular weight polymer)

Water Solubility: The solubility of the polymer could not be determined using the OECD Test Guidelines or its equivalent. The water extractability was determined to be 13.88 ppm

Partition Co-efficient (n-octanol/water) log P_{ow}:	Not determined (due to low water solubility)
Hydrolysis as a function of pH:	The polymer was tested for hydrolysis using OECD Test Guidelines 111 and found to be hydrolytically stable
Adsorption/Desorption:	Not determined
Dissociation Constant pKa:	Not applicable
Flash Point:	Not applicable
Flammability Limits:	Not determined
Combustion Products:	Oxides of carbon and hydrogen, incomplete combustion may yield acrylic monomers
Pyrolysis Products:	At elevated temperatures the polymer will undergo thermal degradation yielding acrylic monomers.
Decomposition Temperature:	177°C
Decomposition Products:	Not determined
Autoignition Temperature:	Not determined
Explosive Properties:	A fine dust cloud of the polymer may be explosive. However, dust formation is unlikely as the polymer will be in emulsion form
Reactivity:	Polymer is stable under ambient conditions.
Particle size distribution:	Not applicable

Comment on Physical/Chemical Properties

Data for dissociation constant and adsorption/desorption of the notified polymer were not provided due to the low water solubility and lack of a suitably sensitive analytical procedure. The polymer contains a low proportion of free carboxylic groups expected to have typical acidity.

The water extractability test result is likely to be due to the low molecular weight fraction of the polymer and the bulk of the polymer is probably not water soluble (much < 1 ppm).

4. INDUSTRIAL USE

The notified polymer will be used as a binder in paints. The notified polymer will comprise up to 46-48% w/w of the emulsion product and will be further diluted when the emulsion product is blended into paint products.

5. OCCUPATIONAL EXPOSURE

The notified polymer is manufactured as a component of a polymer emulsion. The process is an exothermic thermal polymerisation of acrylic monomers in water. The reaction is carried out in a closed pressure vessel vented to a caustic scrubber. The polymer emulsion is filtered and is then transferred through a hard pipe system into bulk storage tanks.

Exposure to the notified polymer during manufacture:

- . five laboratory workers and two transport workers will be exposed up to 30 hours per year at the rate of 1 hour/day;
- . eighteen reactor operators and filtration operators will be exposed up to 48 hours and 12 hours per year at the rate of 4 hours and 1 hour/day respectively; and
- . two transport workers will be exposed up to 30 hours/year at the rate of 1 hour/day.

The product containing the notified polymer is transported in bulk tankers or in 200 litre drums to reformulation sites where it is mixed with other ingredients under exhaust ventilation.

Exposure to the notified polymer during reformulation:

- . three laboratory workers will be exposed up to 240 hours/year at the rate of 8 hours/day;
- . twelve paint formulators will be exposed up to 180 hours/year at the rate of 6 hours/day; and
- . twenty five packaging workers and nine quality control personnel will be exposed up to 240 hours per year at the rate of 8 hours/day.

The paint will be stored and transported in 1, 4 and 10 litre epoxy lined tin plate cans by road and rail.

It is anticipated that approximately 1000 professional painters and thousands of home handymen, will be exposed to the paint containing the notified polymer during spray, brush and roller applications.

6. PUBLIC EXPOSURE

Public exposure to the polymer is unlikely during manufacture, transport and formulation.

The public will be exposed, mainly by dermal contact, to the polymer in retail paint products. It is estimated that approximately 500 kg of the polymer in paint will be disposed of by tradesman and home handymen, by equipment washings with copious amounts of water, and disposal of empty cans to household garbage. The polymer is not volatile, and will be bound in the paint after drying.

7. ENVIRONMENTAL EXPOSURE

. Release

It has been indicated by the notifier that approximately 500 kg of the polymer emulsion (230-240 kg of the polymer) will be lost through washing of equipment and minor spills for each batch of the polymer emulsion produced. These washings and spills will be treated in the plant's latex disposal

system where the polymer will be flocculated and the solids disposed of by landfill or incinerated. The waste water is sand filtered before being evaporated in an evaporation lagoon.

Spillage of the polymer emulsion during formulation of the final paint products containing the polymer is expected to be contained within the formulator's plant through the plant's bunding. These spills, estimated at 100 kg of polymer per year, will be treated by a licensed waste contractor before the solids are disposed of by landfill.

The major releases will be when painting equipment i.e. brushes, rollers etc. are cleaned and when paint cans containing excess paint are disposed of. The washings are likely to enter the drain with copious quantities of water, followed by treatment at a sewage treatment plant. Empty cans and excess paint in cans are likely to be disposed of with the normal household garbage by landfill.

. Fate

Most of the notified polymer will be used to coat walls etc. and should have limited environmental exposure once cured. The resultant matrix structure should limit the hydrolysis and biodegradation of the polymer. The ultimate fate of the cured polymer is unknown. Waste generated during manufacture will be consigned to landfill, as will as any unused paint residues in cans. Most of the polymer washed down drains when brushes and rollers etc. are cleaned will be contained in the sewage sludge which will be landfilled or incinerated.

As Experimental Emulsion EXP-3257 PMN is a polymer with low water solubility, degradation or leaching from landfill sites is not expected. Bioaccumulation of the polymer is unlikely due to the high molecular weight (> 1000) of the polymer even before curing. Incineration of the notified substance is expected to produce water, and oxides of carbon and nitrogen.

8. EVALUATION OF TOXICOLOGICAL DATA

No toxicology data have been provided for EXP-3257 PMN which is acceptable under the Act for a polymer with number average molecular weight >1000 .

9. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No aquatic toxicity data were provided, but none are required according to the Act, since the notified polymer has a number average molecular weight (NAMW) > 1000 .

Due to its high NAMW the polymer is not expected to cross biological membranes.

10. ASSESSMENT OF ENVIRONMENTAL HAZARD

The polymer is unlikely to present a hazard to the environment at any stage of its use. Of the original quantity of polymer emulsion manufactured it is expected that $>98\%$ will not be released to the environment. The ultimate fate of all cured polymer is not known but the majority will be permanently bound to the buildings and other structures when they are coated with paints containing the polymer.

There is expected to be 5.3 tonnes per annum of uncured polymer wastes from the manufacturing process and formulation of paint products. This uncured polymer waste will be disposed of by landfill or incineration. The notifier has estimated that another 500 kg per annum of polymer will be disposed of when brushes and rollers etc. are washed and empty cans are disposed of by painters and handymen. This estimate seems conservative and 1-2% is more realistic for the amount of paint

disposed by domestic consumers. The uncured polymer that is disposed via the drains when brushes etc. are washed out will be treated in the sewage treatment plant, where most, if not all, of the polymer will be removed with the sludge and disposed of by incineration or landfill. Empty cans of paint are normally disposed of by landfill with the household garbage.

Any spills or accidents involving the polymer dispersion when cleaned up according to the MSDS sheets should not be an environmental hazard.

The low level environmental exposure of the polymer as a result of normal use, together with its expected lack of biological activity, indicate that the overall environmental hazard should be negligible.

11. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

There is no information on the effects of the notified polymer on human health. It is a high molecular weight polymer with a number average molecular weight of > 1000. Therefore, it is unlikely to cross biological membranes and is expected to present a low health hazard. Even though no toxicity data were available for the notified polymer and this is acceptable for a polymer with NAMW >1000, the Material Safety Data Sheet (MSDS) for the product (containing 46-48% notified polymer) states that it is a slight skin and eye irritant which could be attributed to ammonia in the polymer emulsion.

The notified polymer is non flammable, non explosive and stable. Under normal use conditions it will not pose a flammable, explosive, or a reactive hazard as a component in EXP-3257 PMN or in paint.

The most likely routes of exposure are skin and eye contact during manufacture, formulation and application of the paint. Under normal use conditions, and correct handling procedures, the potential for occupational exposure to the notified polymer appears to be low and is not expected to pose a significant health and a safety risk to humans.

Due to the isolated nature of the manufacturing process any leakage of acrylic monomers due to elevated temperatures are considered minimal.

The public will not be exposed to the polymer during manufacture, transport and formulation. However, public exposure will occur during the use of the retail products containing the polymer but absorption of the high molecular weight polymer is unlikely.

12. RECOMMENDATIONS

To minimise occupational exposure to the notified polymer in EXP-3257 PMN the following guidelines and precautions should be observed:

- . if engineering controls and work practices are insufficient to reduce exposure to a safe level, the following personal protective equipment which comply with Australian Standards should be worn: Safety glasses (AS 1336-1982 (1), AS 1337-1984 (2)) and Neoprene gloves (AS 2161-1978) (3)) during manufacture;
- . good work practices should be implemented to avoid spills;
- . good personal hygiene should be observed;
- . clean up spills promptly; and
- . a copy of the Material Safety Data Sheet (MSDS) should be easily accessible to all employees.

13. MATERIAL SAFETY DATA SHEET

The Material Safety Data Sheet (MSDS) for EXP-3257 PMN was provided in Worksafe Australia format (4). 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.

14. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act), secondary notification of EXP-3257 PMN shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

15. REFERENCES

1. Australian Standard 1336-1982, "Recommended Practices for Eye Protection in the Industrial Environment", Standards Association of Australia Publ., Sydney, 1982
2. Australian Standard 1337-1984, "Eye Protectors for Industrial Applications", Standards Association of Australia Publ., Sydney, 1990.
3. Australian Standard 2161-1978, "Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)", Standards Association of Australia Publ., Sydney, 1978.
4. National Occupational Health and Safety Commission, *Guidance Note for the Completion of a Material Safety Data Sheet*, 2nd. edition, AGPS, Canberra, 1990.