

File No: NA/586

February 1998

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in Emulsion E-3467

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**Polymer in Emulsion E-3467****1. APPLICANT**

Rohm and Haas Australia 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 Emulsion E-3467.

2. IDENTITY OF THE CHEMICAL

Polymer in Emulsion E-3467 is considered not 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 and details of the polymer composition have been exempted from publication in the Full Public Report and the Summary Report.

Trade Name: Polymer in Emulsion E-3467 (products containing 39 % of notified polymer)

Method of Detection and Determination: Gel Permeation Chromatography (GPC) and infrared (IR) spectra were provided by the notifier

3. PHYSICAL AND CHEMICAL PROPERTIES

Unless stated otherwise, the characteristics given below refer to the product, Polymer in Emulsion E-3467 containing the notified polymer.

Appearance at 20°C and 101.3 kPa: milky white liquid with a acrylic odour

Boiling Point: 100°C

Specific Gravity: 1.0 to 1.2

Vapour Pressure: 2.27 kPa at 21°C (see comments below)

Water Solubility: not determined (see comments below)

| | |
|--|---|
| 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 applicable |
| Flammability Limits: | not determined (see comments below) |
| Autoignition Temperature: | not determined (see comments below) |
| Explosive Properties: | non-explosive |
| Reactivity/Stability: | notified polymer is considered to be stable, but contact with strong oxidants should be avoided |

Comments on Physico-Chemical Properties

The polymer is a high molecular weight, surface active, acrylic with less than 1% low molecular weight species. The molecules have no significant net charge on them. Most of the structure is hydrophobic with very little hydrophilic functionalities. Due to these characteristics solubility of the polymer can be expected to be very low.

The polymer contains hydrolysable groups but hydrolysis under the environmental pH range (4-9) is not expected due to the low solubility.

The partition coefficient has not been determined due to the low solubility and surface active nature of the polymer. Considering the low solubility, its partition coefficient can be expected to be high.

Due to the expected high partition coefficient, the polymer would bind strongly to soil particles and be immobile.

Measurement of the dissociation constants would not be possible due to its low solubility. Notifier estimates the pKa values of the acid/base groups to be approximately 4.9 and 11.0 respectively. The emulsion has a pH range 8.8 to 9.5.

5. USE, VOLUME AND FORMULATION

The notified polymer is intended to be used as a water based, one pack, self-crosslinking agent for clear wood floor finishes. It has been specially designed for sport surfaces but has potential for use in general timber finishes. It will not be manufactured in Australia but will be imported in Polymer in Emulsion E-3467 at a concentration of 39%. Import volumes in the first four years will be between 12 and 40 tonnes, rising to 50 tonnes per annum for years four to five respectively. The emulsion containing the polymer is expected to be used by flooring contractors, timber flooring merchants and possibly timber and flooring finishers.

6. OCCUPATIONAL EXPOSURE

The notified polymer will be imported as a product emulsion and transported from the docks by road to the notifier's warehouse where it will be stored for up to three months. The notified polymer will be contained in sealed 215 kg steel drums. Four to seven transport and storage workers will be handling the containers for approximately 3 hours per day, 6 to 12 days per year, but are unlikely to be exposed to the notified polymer during normal working conditions.

During formulation of the end-use product, three to four material handlers, operators and maintenance workers, will be exposed to the notified polymer for approximately 3 hours per day, 20 days per year. Initially the steel drums containing the notified polymer will be connected to blending tanks by tubing and pumped manually. Other components are added and then mechanically mixed. The blending tanks are open but fully guarded. Therefore there is the potential for workers to be exposed to the notified polymer during transfer of the notified polymer when fitting and disconnecting lines. If exposure occurred it would most likely be via the dermal route.

Quality control workers will sample the blended end-use products and there is the potential to be exposed to the notified polymer during this process. These workers are expected to be involved in the process for approximately one hour per day, 20 days per year. Once again the dermal route is the most likely for exposure.

Blended product which contains 20% of the notified polymer is mechanically drummed off into 20 L pails before transport to customers. There is the potential for occupational exposure during the transfer process or when disconnecting lines.

Maintenance of pumps and tanks will be carried out for intermittent, short periods of time. During this phase there is the potential for dermal exposure to the notified chemical.

At customer sites the reformulated product will most likely be handled by flooring contractors and timber and furniture finishing workers, for approximately 8 hours per day, 250 days per year. Once again, dermal contact is likely to be the main

route of exposure, and any contact with the end-use product is likely to be prolonged.

7. PUBLIC EXPOSURE

The public will be exposed (via dermal contact) to the notified polymer either by use of the product or by contact with flooring to which the product, containing the notified polymer, has been applied. In such instances the polymer, which has a NAMW of

8 600, will be immobilised in the hardened emulsion and should not cross biological membranes. Therefore the notified polymer should pose negligible hazard to the public.

Minor public exposure may result from disposal of unused emulsion, or accidental spillage of the emulsion during transport and storage. However, adequate measures are described by the notifier in the Material Safety Data Sheet (MSDS) to minimise the risk of public exposure during disposal, or in the event of accidental spillage.

8. ENVIRONMENTAL EXPOSURE

Release

It is estimated that at the single customer site formulating the product, up to 2% (to a maximum of 1 tonne per year) would be lost as residues in drums, pipelines and washing down fluids, spills and leaks. However, the notifier states that environmental procedures are in place at the formulation site to trap such waste disposal by an approved waste contractor such that minimal amount of the chemical will be released to the sewer.

During the use of the formulated paint product, waste would result from empty containers, residues on brushers and rollers, rinsing from washing containers and equipment, and spill and leaks. The is estimated to amount to 5% of the import volume (to a maximum of 2.5 tonnes per year).

Although the instructions to end users in the MSDS are to coagulate the waste polymer using ferric chloride and lime and prevent entry of the polymer into the sewer, it is unlikely that the users will be able to adhere to this strictly. As such some proportion of the polymer from the wastes generated during paint application is likely to enter the sewer, through washing of brushers, rollers, containers, equipment, etc.

Fate

The polymer in the paint applied to wooden structures will remain encapsulated in a durable matrix for long periods.

Up to one tonne of the polymer lost as a waste at the formulation site will largely be trapped using inert material and/or by the treatment plant on site. The solid material will be disposed of by approved methods, most likely incineration or landfilling. Up to five tonnes of waste generated during application of the paint is expected to be trapped using inert material or coagulated using ferric chloride and lime as per MSDS instructions. Again the solid matter with trapped polymer may be disposed either to landfill or incinerated.

Small amount of the polymer entering the sewer will bind strongly to the sediment and sludge which in turn will be landfilled or incinerated.

In landfill the polymer will remain associated with the soil and undergo slow degradation. Incineration will destroy the polymer converting it to water vapour and oxides of carbon, nitrogen and silicon.

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicological data were provided, which is acceptable for polymers of NAMW greater than 1 000.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

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

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

Up to 3.5 tonnes of the polymer can be lost per annum as waste generated during formulation and application to wooden surfaces. Although a part of this may be recycled, the rest may find its way to landfill sites or be incinerated. As an acrylic, the polymer is expected to present a low hazard to the environment when disposed of to the landfill because of its lack of mobility and the inability to cross biological membranes. Incineration will destroy the polymer. Polymers with NAMW greater than 1 000 but with surface activity have the potential to show aquatic toxicity through reaction with biological membranes, but not when they are highly insoluble (2).

The use of the notified polymer in wood paint will result in its encapsulation in a durable and cross linked acrylic resin of low hazard.

The environmental hazard from the notified polymer can therefore be rated as low.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified polymer has a high molecular weight greater than 1 000 and will exist as a crosslinked network. Therefore, transmission across biological membranes is unlikely if exposure occurs. The polymer has a low percentage of low molecular weight species (MW 1 000, < 1.1%; MW 500, < 1.0%). Although some of the monomers may have the potential for skin and eye irritation as well as sensitisation effects they are present at very low concentrations (< 0.1) and therefore the notified polymer is considered unlikely to be of significant toxicological concern.

Under normal working conditions transport, storage and handling workers are unlikely to be exposed to the notified chemical and the occupational risk for these workers is considered negligible.

During reformulation, quality control, drum filling and maintenance procedures, dermal exposure may occur. However, given the low hazards associated with the notified polymer and short processing periods for each category of worker the notified polymer is considered to be of low risk to workers performing these tasks.

For flooring contractors, timber and furnisher finishing workers using the end-use product as a self-crosslinking agent, exposure to the notified chemical also presents low occupational risk.

The public will be exposed to the polymer by use of the emulsion product, or by contact with the flooring to which the emulsion has been applied. The notified polymer, will be immobilised in the hardened emulsion, and will not cross biological membranes, and as such would pose a negligible public health risk. The potential for minor public exposure exists during transport, and disposal of the emulsion if accidentally spilt. If recommended practices on MSDS are followed this will minimise the potential for public exposure.

13. RECOMMENDATIONS

To minimise occupational exposure to Polymer in Emulsion E-3467 the following guidelines and precautions should be observed:

- Spillage of the notified chemical should be avoided, spillages should be cleaned up promptly with absorbents and put into containers for disposal;
- Good personal hygiene should be practised to minimise the potential for ingestion; and
- A copy of the MSDS should be easily accessible to employees.

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* (3)

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. National Occupational Health and Safety Commission 1994, '*List of Designated Hazardous Substances*, [NOHSC:1005(1994)]', Australian Government Publishing Service, Canberra.
2. Nabholz, J.V., Miller, P., and Zeeman, M. (1993) *Environmental Risk Assessment of New Substances under the Toxic Substance Control Act Section Five*. In W.G. Landis, Hughes J.S. and Lewis M.A., (Eds) *Environmental Toxicology and Risk Assessment, American Society for Testing and Materials*, ASTM STP 1179, Philadelphia, pp 40-55.
3. 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.