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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME
(NICNAS)**

FULL PUBLIC REPORT

Polymer in Emulsion EXP-3913

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**Director
Chemicals Notification and Assessment**

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FULL PUBLIC REPORT**Polymer in Emulsion EXP-3913****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

Rohm and Haas Australia Pty Ltd, 4th Floor, 969 Burke Rd CAMBERWELL VIC 3124

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Identity and compositional information, Molecular weight, Customer identity and sites.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

No variation to the schedule of data requirements is claimed.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

None

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Emulsion EXP-3913

MOLECULAR WEIGHT

Number Average Molecular Weight (NAMW) > 1000

3. COMPOSITION

PLC CRITERIA JUSTIFICATION

Functional Group	Category	Equivalent Weight (FGEW)
Carboxylic acid	Low Concern	Not required

Charge Density	The notified polymer has low charge density.
Elemental Criteria	The notified polymer contains only approved elements.
Degradability	The notified polymer is not biodegradable.
Water Absorbing	The notified polymer is not a water-absorbing polymer.
Residual Monomers	All residual monomers are below the relevant cut-off.
Hazard Category	The notified polymer is not classified as a hazardous substance.

The notified polymer meets the PLC criteria.

4. INTRODUCTION AND USE INFORMATION

MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

Year	1	2	3	4	5
Tonnes	30-100	100-300	100-300	100-300	100-300

USE

The notified polymer is intended to be used as a pressure-sensitive adhesive for labels.

5. OPERATION DESCRIPTION

The notified polymer will initially be imported as a 51% component of the aqueous emulsion EXP-3913. Later the notified polymer will be manufactured in Australia. It will be packaged in 1000 L Schulz semi-bulk tanks.

The emulsion will be supplied to the adhesive applicator in a ready-to-use form. The emulsion containing the notified polymer will be pumped into storage tanks at the customer's site and then applied to paper via a largely automated process. Adhesive is pumped from a small holding tank to a coating machine tray where it is picked up in the reverse gravure coating process by a roller which transfers it to an etched gravure roller, which in turn transfers the adhesive to paper label stock. The labels are heated and dried, a non-stick backing sheet is applied, and the labels are wound onto rolls. The labels are later cut to size.

6. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	The emulsion containing the notified polymer is a white milky liquid.
Melting Point/Glass Transition Temp	Not applicable. The polymer is supplied as an emulsion in water.
Density	1000-1200 kg/m ³ (polymer emulsion)
Water Solubility	<p>The test report provided was conducted in accordance with the Korean Polymer Test Guideline. Samples in pH 2 and pH 9 buffers were tested at room temperature, and sample at pH 7 was tested at room temperature and 37°C. A blank was also conducted for each set of experiment without the polymer. Triplicate analysis was performed at each pH. The polymer solubility was calculated based on TOC data assuming that soluble polymer is the only source of carbon.</p> <p>The water solubilities of the notified polymer were determined to be 1.9 (pH 2 at room temperature), 1.3 (pH 7 at room temperature) and 5.5 (pH 9 at room temperature) mg/L.</p> <p>The notified polymer is considered to be slightly soluble (Mensink. <i>et al</i> 1995).</p>
Particle Size	Not applicable as polymer is present only as liquid emulsion.
Degradation Products	The polymer is expected to be stable.
Loss of monomers, other reactants, additives impurities	None expected

Considering the low solubility, the esters in the polymer is unlikely to hydrolyse in the environmental pH range of 4-9 and should associate with the octanol or soil/sediment phases. The notified polymer is expected to be adsorbed to, or associate with soil and sediment.

7. HUMAN HEALTH IMPLICATIONS

7.1 Toxicology

Toxicological Investigations

No toxicological data were submitted.

Human Health Hazard Assessment

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard.

7.2 Occupational Health and Safety

Occupational Exposure

- Skin contact with polymer emulsion by plant operators during manufacture if spills occur.
- Skin contact with small amounts of polymer emulsion by laboratory staff when sampling and testing
- Skin contact with polymer emulsion by adhesive applicators during transfer to coating machine trays
- Skin contact with polymer emulsion when cleaning machinery and during breakdown
- Incidental skin contact with adhesive during application to labels

Exposure Assessment

In the first three years of introduction, the notified polymer will be imported at a concentration of 51% in 1000L IBCs. Exposure to the notified polymer during importation, transport and storage is unlikely except in the unlikely event of an accident where the IBC may be damaged.

Following the period of importation, the notified polymer is to be manufactured at a single site in Geelong Victoria. Polymerisation of the polymer constituents takes place within a sealed reaction vessel that is vented to a scrubber to eliminate any vapours. Worker exposure is unlikely except in the unlikely event of a spill or pressure build up in which case the notified polymer may be released through the pressure rated burst disk.

Workers involved in the sampling and testing of samples for quality assurance purposes, although exposed to small quantities of the notified polymer, wear protective equipment such as safety helmets, safety glasses, impervious gloves, coveralls and safety boots.

During the transfer of the polymer to the holding tank workers may be exposed to small quantities of the notified polymer during connecting and disconnecting hoses. These workers wear safety helmets, safety glasses, impervious gloves, coveralls and safety boots to mitigate exposure.

Application of the notified polymer at the label-manufacturing site is highly automated and adhesive applicators and label cutters wear safety glasses, impervious gloves, coveralls and safety boots. Misting of the polymer emulsion may occur as a result of the gravure coating process, however, inhalation exposure will be minimised by local exhaust ventilation present above the roller tray and application rollers.

Exposure to the notified polymer is likely to occur during maintenance and cleaning of the coating equipment. These workers are also expected to wear safety glasses, impervious gloves, coveralls and safety boots

The main route of exposure to the notified polymer is via the dermal route during manufacturing, quality assurance, and label manufacturing activities. The PPE worn by these workers is expected to provide adequate protection against exposure.

7.3 Public Health

Public Exposure

- Incidental skin contact with adhesive when using labels coated with adhesive containing the notified polymer.

Exposure Assessment

The imported product containing the notified polymer is not directly available to the public. Members of the public are likely to be exposed to very small quantities of the notified polymer in a dry form as it occurs in used labels coated with the formulation. In dry form, it is not expected that significant amounts of the notified polymer will be released from the label

8. ENVIRONMENTAL IMPLICATIONS

8.1 Ecotoxicology

Ecotoxicological Investigations

No toxicological data were submitted.

Environmental Hazard Assessment

The notified polymer is a member of a subclass of polyanionics which is of concern only for their indirect moderate toxicity to green algae. Toxicity toward fish and aquatic invertebrates is consistently low with LC50 values >100 mg/L (Boethling and Nabholz 1997). Given the low percentage (<2%) of the acrylic acid present in the notified polymer and the low concentration of the notified chemical (<1 mg/L) in the effluent water, there is unlikely to be an environmental hazard to aquatic organisms.

Due to its low water solubility, the notified polymer is expected to be adsorbed onto soil/sediments and thus unlikely to leach in soil. The notified polymer will ultimately degrade via biotic and abiotic processes to form oxides of carbon.

Due to its high molecular weight and the low water solubility, the notified polymer has little potential for bioaccumulation (Connell 1990).

8.2 Summary of Environmental Exposure

At the manufacturing site, washings from reaction vessels and piping will be flocculated and the majority of the notified polymer will precipitate during this process. The supernatant waste water is adjusted to neutral pH and pumped to a lagoon for evaporation and some is used for irrigation of the on-site vegetation. The final concentration of the notified polymer in the irrigation water is expected to be <1 ppm. The flocculated polymer is disposed of to a licensed waste landfill site. It is estimated that 2250 kg of the notified polymer will be lost in this manner per annum and almost all will go to landfill. Assuming this occurs at one manufacturing site at Geelong and >95% will go to landfill, the remaining 5% (112 kg) will release into 150 ML of effluent water. The concentration of the notified polymer is determined to be $112 \text{ kg}/150 \text{ ML} = 8 \times 10^{-1} \text{ mg/L}$. Minor spills will be taken by absorbent material and ultimately be sent to landfill.

During the adhesive application process, there is potential for spillage of the product to occur. It is expected that <50 kg/year would be lost in this manner. This spill will be taken up by absorbent material and be disposed of through industrial solid waste to a licensed waste landfill site. Wash water from equipment cleaning will be treated at the on-site treatment plant. It is estimated that 10 kg/day of the notified polymer will go to effluent for treatment. If the adhesive is applied 200 days/annum, then approximately 2000 kg/annum of the notified polymer will go to the effluent treatment plant where the notified polymer will be precipitated with flocculants. The precipitated sludge from the treatment plant will be taken to a licensed waste landfill site. Treated supernatant liquid will be released to the sewer. It is estimated that >95% of the notified polymer will be precipitated in this manner. Therefore, up to 1850 kg/annum of the notified polymer will go to landfill via spills and cleaning and up to 100 kg/annum (very similar to the manufacturing site) may be lost to the sewer in supernatant liquid.

9. RISK ASSESSMENT

9.1. Environment

Wastes generated from the manufacturing sites would be disposed of by licensed waste contractors. Wastes released into sewer from the manufacturing sites are likely to be adsorbed to sludge and be landfilled ultimately. However, because of the high volume usage of the notified polymer, the concentration of the notified polymer in the effluent water approaches its maximum water solubility level of 1.3 mg/L and therefore the polymer is not considered to pose an environmental risk to aquatic organisms.

In landfill the notified polymer is unlikely to leach and will degrade over time, posing minimal risk to the soil environment.

9.2 Occupational health and safety

The notified polymer is not hazardous and worker exposure is limited by engineering controls such as local exhaust ventilation, sealed reaction vessels and automated application processes.

Worker exposure to the notified polymer during transport and storage is only possible in the event of an accidental spillage.

The OHS risk associated with the notified polymer is assessed as low.

9.3 Public health

The notified polymer will not be available to the public. Members of the public may make dermal contact with labels containing the notified polymer. However, the risk to public health will be negligible because the notified polymer is of high molecular weight, not hazardous, and not expected to be released from dried labels.

10. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS

10.2. Environmental risk assessment

The polymer is not considered to pose a risk to the environment based on its reported use pattern.

10.3. Human health risk assessment

10.3.1. Occupational health and safety

There is low concern to occupational health and safety under the conditions of the occupational settings described.

10.3.2. Public health

There is negligible concern to public health when used in the manner proposed.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The notifier has provided MSDS in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets*. The accuracy of the information on the MSDS remains the responsibility of the applicant.

12. RECOMMENDATIONS

CONTROL MEASURES

Occupational Health and Safety

- No specific engineering controls, work practices or personal protective equipment are required for the safe use of the notified polymer itself, however, these should be selected on the basis of all ingredients in the formulation.
 - Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.
- A copy of the MSDS should be easily accessible to employees.
- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Environment

Disposal

- The notified polymer should be disposed of by landfill or be incinerated.

Storage

- Keep from freezing; material may coagulate. The minimum and maximum temperatures recommended for storage are 1 and 49°C respective.

Emergency procedures

- Keep spectators away. Floor may be slippery; use care to avoid falling. Contain spills immediately with inert materials (eg sand, earth). Transfer liquids and solid diking material to separate suitable containers for recovery or disposal. Keep spills and cleaning runoff out of municipal sewers and open bodies of water.

12.1. Secondary notification

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

- (1) Under subsection 64(1) of the Act; if
 - the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

or

- (2) Under subsection 64(2) of the Act:
 - if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

No additional secondary notification conditions are stipulated.