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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**Modified Acrylic Polymer E-2803**

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 and Family Services.

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Director  
Chemicals Notification and Assessment

**FULL PUBLIC REPORT****Modified Acrylic Polymer E-2803****1. APPLICANT**

Rohm and Haas Australia Pty Ltd of 969 Burke Road CAMBERWELL VIC 3124 has applied for a limited notification for assessment of Modified Acrylic Polymer E-2803.

**2. IDENTITY OF THE CHEMICAL**

Based on the nature of the chemical and the data provided, Modified Acrylic Polymer E-2803, is not considered to be hazardous. Therefore, the identity of the chemical, its composition and purity, use, import volume and details of the manufacturing process have been exempted from publication in the Full Public Report and the Summary Report.

**3. PHYSICAL AND CHEMICAL PROPERTIES**

The modified acrylic polymer is imported into Australia as a component in a water-based emulsion. The properties given below are of the emulsion unless otherwise specified.

<b>Appearance at 20°C and 101.3 kPa:</b>	milky white liquid
<b>Odour:</b>	ammonia-like
<b>Boiling point:</b>	expected to be similar to that of water
<b>Specific gravity:</b>	1.1 (calculated)
<b>Vapour pressure:</b>	expected to be that of water
<b>Water solubility:</b>	expected to be very low (polymer)
<b>Combustion products:</b>	oxides of carbon, hydrogen and nitrogen may be produced
<b>Pyrolysis products:</b>	acrylic monomers may be produced

**Decomposition temperature:** > 177°C  
**Decomposition products:** acrylic monomers

### **Comments on Physico-Chemical Properties**

Acrylate polymers are known to be very insoluble in water and in this case there is only a small proportion of free acid. The cross-linking of the polymer would further reduce the solubility.

Hydrolysis of the polymer could be expected as the notified polymer has esters and nitrile groups on the side chains. However, hydrolysis under environmental conditions is expected to be slow due to the expected low solubility in water.

The partition coefficient would be difficult to measure but is expected to be high due to the low solubility in water.

The polymer has a small number of acidic side groups but determination of a dissociation constant would be difficult due to the expected low solubility in water. Typical acidity is expected.

## **4. USE, VOLUME AND FORMULATION**

The applicant expects to import more than one tonne of the notified polymer per annum for the first five years. The finished products will be imported in 200 L open-head drums.

The imported products will be used as topcoat components for application to leather. They are to be used as components of "finishing mixes" containing other ingredients such as water, pigments, waxes, wetting agents, fillers and pigment extenders. The finishing mixes are prepared at the sites where they will be used.

## **5. OCCUPATIONAL EXPOSURE**

The aqueous emulsions will be transported in open head 200 L drums by truck to customers who are experienced in reformulation into finishing mixes and application of the mixes onto leather.

At each customer site it is expected that approximately 11 workers may be exposed to the notified polymer during formulation, application and transfer of retanned leathers. Of these, 5 are expected to be involved in formulation, 2 in application and 4 in feeding and removing the leather. Formulators are expected to be potentially exposed for about 3 hrs/day, 144 days/yr and other workers 3 hrs/day, 240 days/yr.

Workers involved in supervision, storage, transport and drum recycling may be minimally exposed to the notified polymer.

Formulation of topcoat (3rd coat) is carried in an open top mixer by addition of binders, flow modulators, water and pigments to the polymer emulsion. Once the finishing mixes have been formulated they are applied to the unfinished leather by rotary spray. The finishing mixes are manually added to the spray machines followed by curing in catalytic gas dryers at 70°C.

Local exhaust ventilation is present in the mixing room and above the reciprocating spray machines. Overspray during spray application is collected by water curtains.

## **6. PUBLIC EXPOSURE**

No public exposure to the notified polymer is expected to occur during storage or transport.

No public exposure is expected to occur during the processing of the leather or during the disposal of any liquid or solid residue containing the polymer.

Public contact with products made from the treated leather may be extensive. However, when cured, the polymer becomes bound to the leather and is not expected to migrate from the leather, and therefore, no public exposure is expected to occur.

## **7. ENVIRONMENTAL EXPOSURE**

### **Release**

Release of the polymer to the environment is expected to be < 15% of the total imported from residues in containers, blending operations, cleaning of application equipment and losses during application. Liquid wastes containing the polymer are expected to be disposed of as either trade waste (after coagulation and settling of solids), or collected by a licensed liquid waste disposer (when concentrated). Solid residues containing the polymer are expected to be disposed of by landfill or incineration.

Other possible releases of the polymer could occur as spills during formulation or during use of the finishing mixes. These operations are performed on industrial sites using appropriate equipment designed to reduce possible spills etc. This together with the instructions on the clean up of spills in the Material Safety Data Sheet (MSDS) should limit the possibility of environmental release to a minimum.

### **Fate**

The fate of the majority of the polymer (> 85% of that imported) will be tied to the fate of the finished leather. Most of the treated leather will be landfilled, either as trimmings when the final leather article is formed or when the leather goods are disposed of.

The solid waste containing the polymer which is generated during the formulation and application of the finishing mixes is expected to be disposed of according to the

appropriate local, state and federal legislation, normally either to landfill or by incineration.

No bioaccumulation of the polymer is expected as the very large molecular size is likely to inhibit membrane permeability and prevent uptake during exposure (1, 2)

## **8. EVALUATION OF TOXICOLOGICAL DATA**

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

## **9. ASSESSMENT OF ENVIRONMENTAL EFFECTS**

No ecotoxicity information for the polymer was presented by the notifier. This is acceptable according to the Act for polymers with NAMW > 1000.

## **10. ASSESSMENT OF ENVIRONMENTAL HAZARD**

Most of the polymer will be disposed of to landfill with the leather to which it is cured. The majority of the remaining polymer will be trapped in solids and disposed of by incineration or landfilled. There could be a small amount of polymer disposed of as trade waste via the municipal sewer.

Incineration of the polymer will produce water together with oxides of carbon and nitrogen and is unlikely to present an environmental hazard. Polymer disposed of in landfills could undergo hydrolysis to give the backbone polymer but this process will be very slow. The polymer is not expected to leach from the landfill. The environmental hazard from disposal of the polymer by incineration or landfill is expected to be low.

Most of the polymer lost due to washing equipment, overspray or disposal as trade waste is expected to be trapped by coagulation and settling of solids before discharge to the sewer. More polymer will be removed at the sewage treatment works. These solids and sludges from waste water treatments are normally disposed of by landfill or incineration. Assuming that no polymer is trapped or removed in treatment processes, calculations show that the concentration entering the environment could be approximately 1 ppb, which is unlikely to cause significant environmental effects. As most will be trapped, the concentration of the polymer entering the environment is expected << 1 ppb, environmental effects are expected to be negligible.

The only other sources of environmental contamination is from accidental spills etc. during transport. The recommendations contained in the MSDS are adequate to limit the environmental exposure.

Overall the environmental hazard can be rated as low.

## **11. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS**

The notified polymer has a NAMW greatly in excess of 1000 and should not be able to be absorbed across biological membranes to cause systemic effects. The levels of low molecular weight species (undetectable by GPC) and residual monomers (maximum of 0.02%) would not render the polymer hazardous according to the criteria of Worksafe Australia (3). Local 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 (see attachments).

Exposure of workers to aerosols is recognised as a risk factor by the customers employing the notified polymer for leather finishing 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 formulation, coating, feeding or removing leather. 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 formulation, coating operations or leather handling is expected to be low.

While public contact with Polymer E-2803 may be significant, it will be bound to treated leather, and therefore, no public exposure is expected to occur.

## **12. RECOMMENDATIONS**

To minimise occupational exposure to Modified Acrylic Polymer E-2803 the following guidelines and precautions should be observed.

- . When using the notified chemical the following protective equipment should be worn:
  - impervious gloves conforming to Australian Standard (AS) AS 2161 (4),
  - protective eye goggles conforming to AS 1336 (5), and AS/NZS 1337 (6)
  - protective clothing conforming to AS 3765.2 (7), and
  - protective footwear conforming to AS/NZS 2210 (8).
- . 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 (9) and AS/NZS 1716 (10).
- . 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 (9).
- . Safe work practices should be implemented to prevent splashing and spillages.
- . Good personal hygiene practices should be observed.
- . Copies of the MSDS should be easily accessible to employees.

### **13. MATERIAL SAFETY DATA SHEETS**

The attached MSDS for formulations containing Modified Acrylic Polymer E-2803 were provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (11).

These MSDS were provided by Rohm and Haas Australia Pty Ltd as part of the notification statement. They are 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 Act, secondary notification of Modified Acrylic Polymer E-2803 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. Anliker et al. 1988. *Chemosphere*, 17, 1631-1644.
2. Gobas et al. 1986. *Environmental Toxicology and Chemistry*, 5, 637-646.
3. National Health and Safety Commission, *Approved Criteria for Classifying Hazardous Substances*, NOHSC:1008 (1994), AGPS, Canberra, Australia
4. Standards Australia, 1978, *Australian Standard 2161-1978, Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ., Sydney, Australia.

5. Standards Australia, 1994, *Australian Standard 1336-1994, Recommended Practices for Eye Protection in the Industrial Environment*, Standards Association of Australia Publ., Sydney, Australia
6. 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.
7. Standards Australia, 1990 Australian Standard 3765 - 1990 *Clothing for Protection Against Chemical Hazards*, Part 1, *Protection against General or Specific Chemicals*; Part 2, *Limited Protection Against Specific Chemicals*, Standards Australia Publ., Sydney, Australia.
8. Standards Australia, Standards New Zealand 1994, *Australian/ New Zealand Standard 2210 - 1994 Occupational Protective Footwear, Part 1: Guide to Selection, Care and Use. Part 2: Specifications*, Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ. Wellington, New Zealand.
9. 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.
10. 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.
11. National Occupational Health and Safety Commission, *National Code of Practice for the Preparation of Material Safety Data Sheet*, NOHSC:2011 (1994) AGPS, Canberra, Australia.