

File No: NA/484

Date: March 1997

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**Polyacrylate in Misch. Raven 410**

This Assessment has been compiled in accordance with the provisions of *the Industrial Chemicals (Notification and Assessment) Act* 1989 (the Act), 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****Polyacrylate in Misch. Raven 410****1. APPLICANT**

Hoechst Australia Limited of 606 St Kilda Road MELBOURNE VIC 3004 and Croda Herberts Pty Ltd of 15-23 Melbourne Road RIVERSTONE NSW 2765 have jointly submitted a limited notification statement in support of their application for an assessment certificate for Polyacrylate in Misch. Raven 410.

**2. IDENTITY OF THE CHEMICAL**

Polyacrylate in Misch. Raven 410 is not considered to be hazardous based on the nature of the polymer and the data provided. Therefore the chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data, details of the polymer composition and details of exact import volume have been exempted from publication in the Full Public Report and the Summary Report.

**Other Name:** polyacrylate dispersion

**Trade Name:** Additol VXW 1312 (30% notified polymer)  
Misch. Raven 410 (< 1% notified polymer)

**Number-Average  
Molecular Weight (NAMW):** > 1 000 (see comments below)

**Method of Detection  
and Determination:** infrared spectroscopy (IR)

**Comments on Chemical Identity**

The notifier estimates that a large proportion of the notified polymer is in the form of a microgel, which they were unable to analyse by gel permeation chromatography (GPC). The remainder of the polymer was analysed by GPC.

### 3. PHYSICAL AND CHEMICAL PROPERTIES

The data summarised below are for the product Additol VXW 1312, which contains the notified polymer at a concentration of 30% (balance water). The notified polymer is produced in a water phase, and is never isolated.

<b>Appearance at 20°C and 101.3 kPa:</b>	milky white liquid of low viscosity
<b>Boiling Point:</b>	100°C
<b>Specific Gravity:</b>	1.05
<b>Vapour Pressure:</b>	as for water; polymer is expected to have negligible vapour pressure
<b>Water Solubility:</b>	insoluble
<b>Partition Co-efficient (n-octanol/water):</b>	not determined (see comments below)
<b>Hydrolysis as a Function of pH:</b>	not determined (see comments below)
<b>Adsorption/Desorption:</b>	not determined (see comments below)
<b>Dissociation Constant:</b>	not determined (see comments below)
<b>Flash Point:</b>	> 100°C
<b>Flammability Limits:</b>	not determined
<b>Autoignition Temperature:</b>	not determined
<b>Explosive Properties:</b>	none known
<b>Reactivity/Stability:</b>	stable under recommended storage and handling conditions  temperatures above 170°C promote degradation of the polymer; degradation products depend on the degradation conditions and can be: carbon dioxide, carbon monoxide, nitrous oxides and potentially isocyanates; residual monomers may potentially be liberated gradually with and after the evaporation of water during heating approaching degradation temperature

## Comments on Physico-Chemical Properties

Acrylate polymers of high molecular weight are normally totally insoluble in water, and the notifier states that a large proportion of the notified polymer is in the form of microgel, which is insoluble in all solvents. As the remainder of the polymer contains free carboxylic acid functionalities, the water solubility of the notified polymer will depend on the pH of the medium. At low pH values, where the polymer exists predominantly in the free carboxylic acid form, the solubility in water is expected to be very low. However, at higher pH the carboxylic acid groups will be deprotonated and the resulting water solubility of the polymer will be higher.

While the polymer contains ester groups on the side chains, these are not expected to hydrolyse under environmental conditions due to the expected low solubility of the polymer in water.

Due to the complex and insoluble nature of the polymer the partition coefficient, dissociation constant, and adsorption/desorption would be difficult to measure.

The free carboxylic acid functionalities of the polymer are expected to have typical acidity.

## 4. PURITY OF THE CHEMICAL

**Degree of Purity:** 30%; the polymer is manufactured in water and is never isolated

**Non-hazardous Impurities  
(> 1% by weight):** none

**Maximum Content  
of Residual Monomers:** < 1%

### Comments on Residual Monomers:

The residual monomers present can cause burns, skin, eye and respiratory irritation. One of the monomers can cause skin sensitisation and can be harmful if inhaled or swallowed (1). However, the levels of these monomers are not sufficient to classify the notified polymer as hazardous according to Worksafe Australia criteria (1, 2), even when potential cumulative effects are taken into account.

**Additives/Adjuvants:** water (70%)

## 5. USE, VOLUME AND FORMULATION

The notified polymer will not be manufactured in Australia. It will be imported as a component of a range of basecoat tinters which will be used in the automotive repair industry. The notified polymer will be present in these tinter products at concentrations of less than 1%.

It is estimated that up to 10 tonnes of the notified polymer will be imported annually for each of the first 5 years.

## **6. OCCUPATIONAL EXPOSURE**

Tinter products containing the notified polymer will be imported in 1 L and 4 L cans. Waterside, transport, warehouse and sales personnel are unlikely to be exposed to the notified polymer under normal circumstances.

Training and demonstration personnel may occasionally be exposed to tinter products containing the notified polymer during training of customers or demonstrations to potential new customers. Dermal exposure may occur while mixing and applying paint, and ocular and inhalational exposure may occur when spray equipment is used to apply products containing the notified polymer. Exposure is expected to be up to 4 hours per week for approximately 3 months, with no exposure expected thereafter.

Workers in motor vehicle repair shops may be exposed to the notified polymer when using tinter products. There is the potential for dermal exposure to the notified polymer when workers mix tinter products with other paint components. There is also potential for dermal, inhalational and ocular exposure to the notified polymer when workers in automotive repair shops apply paints containing the notified polymer using spray painting equipment. Should contact occur during mixing or application, the products are likely to remain on the skin for some time, hence prolonging exposure.

Workers may also experience dermal, inhalational or ocular exposure to solvent and isocyanate components of the paint systems when mixing and spraying paint components. The notifier states that exposure to paint components will be minimised in professional spray painting shops by worker training, appropriate work practices and the installation of engineering controls such as spray booths with exhaust ventilation.

There may be significant worker contact with dried paints containing the notified polymer, however, the notified polymer will be bound to the paint and will therefore not be bioavailable.

## **7. PUBLIC EXPOSURE**

Products containing the notified chemical will only be sold to customers in the automotive repair industry and will not be available to the general public. In addition, the basecoat tint containing the notified polymer is covered with an inert film. Therefore there is negligible potential for public exposure to the notified polymer due to its use in automotive paints.

## **8. ENVIRONMENTAL EXPOSURE**

### **Release**

Products containing the polymer are to be stored in a bunded area that will prevent an accidental spill from leaving the storage site. These spills should be cleaned up according to the Material Safety Data Sheet (MSDS). All on-site drains lead to a first flush system to prevent entry of polluted water into either the stormwater drainage system or the sewage system.

The tint is drained and scraped from the cans to remove as much as possible. The used cans are expected to be sent to industrial waste sites. The residue tint containing the notified polymer is expected to be disposed of according to statutory requirements.

The finished products will be applied to repaired vehicles by high volume, low pressure spray guns in spray booths. These guns are at least 70% efficient, with maximum of 30% overspray. Most of the overspray is either trapped in air filters or in a water trap. The air filters, containing the collected dry overspray, are bagged from time to time and then disposed of by a waste disposal contractor according to statutory requirements. The water traps use a chemical coagulating agent to precipitate the overspray that is collected in a sump. The sludge from the sump is periodically removed and disposed of by a waste disposal contractor according to statutory requirements. As a result of the use of coagulating agents and the low solubility in water, the concentration of polymer in the waste water is expected to be low ( $< 1$  ppm).

### **Fate**

Paint residues from cans, cleaning of spray equipment, scrubber apparatus, and filters as well as empty cans will be disposed of to landfill where the polymer would be immobilised in the dry paint.

The basecoat containing the notified polymer will be overcoated with a clear topcoat which will form an inert, highly cross-linked polyurethane film when cured. Any waste generated through chipping or flaking of the paint will be inert and form part of the soil or sediments.

It is unlikely that the notified polymer will reach the sewer through any form of disposal. Given the relatively low water solubility of the polymer it would be expected that it will be removed from solution by adsorption onto sludge. Little, if any is likely to be contained in treated waste water. Sludge containing the notified substance will be incinerated or landfilled. Incineration would destroy the polymer, and create typical decomposition products of water and oxides of carbon and nitrogen.

## **9. EVALUATION OF TOXICOLOGICAL DATA**

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

The notified polymer is insoluble in water and has a molecular weight greater than 1 000. The levels of low molecular weight species are low, and the maximum level of residual monomers is no more than 1%. While a number of these monomers are potentially hazardous (see notes in preceding section), the levels are not sufficient to classify the notified polymer as hazardous according to Worksafe Australia criteria (1, 2), even when potential cumulative effects are taken into account.

## **10. ASSESSMENT OF ENVIRONMENTAL EFFECTS**

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

The polymer is not expected to show ecotoxicity effects as it has a high molecular weight and is expected to have a low water solubility. It is therefore of low concern to the environment (3).

## **11. ASSESSMENT OF ENVIRONMENTAL HAZARD**

The environmental hazard from articles coated with the polymer, where it will be sealed under the topcoat and cured, is rated as negligible.

Up to 10 tonnes of the polymer will be imported, and a maximum of 30% of the import volume will be lost as overspray. This overspray is expected to be collected in either air filters or in water traps. As there will be a large number of end users, it is not possible to quantify the amount of polymer trapped in each of these systems. However, almost all of the overspray is expected to be collected for disposal. The air filters and the sludge from the water traps are expected to be disposed of by incineration or landfill. Any spray droplets not trapped by the air filter will dry out and polymerise to an inert particle which will then partition to the soils or be disposed of to landfill. The waste water from the water trap is expected to be discharged to sewer, where it will be diluted by several orders of magnitude. The solids are disposed of by landfill or incineration.

Incineration of the polymer will generate oxides of carbon and nitrogen as well as water. The environmental hazard posed by these products can be rated as negligible. As the polymer is expected to be insoluble in water, the polymer waste consigned to landfill is unlikely to leach and will stay in the landfill. The side chains on the polymer could hydrolyse in landfill but this process will be extremely slow due to the low solubility in water. The environmental hazard from the disposal of paint waste containing the polymer is rated as low.

The overall environmental hazard from the use of the polymer is rated as low.

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

The occupational health risk posed by the notified polymer to waterside, warehouse, transport and sales workers will be negligible, due to the negligible exposure under normal circumstances, the expected low toxicity of the notified polymer and the low concentration of the notified polymer in the tinter products.

There is a low occupational health risk for training and demonstration staff, who may occasionally be exposed to products containing the notified polymer for a period of approximately 3 months after their introduction. Likewise, there is a low health risk for workers who will handle paint components on a more regular basis while mixing and spraying paints in automobile refinish shops. Based on information provided by the notifier, the polymer and the formulation containing it are not expected to be hazardous (see above discussion and product MSDS). In addition, the concentration of the notified polymer in the tinter products will be no more than 1%, hence the levels of low molecular weight species and residual monomers will be correspondingly reduced to negligible levels.

Exposure to other potentially hazardous solvent and isocyanate components of paint products may also occur, and appropriate guidance material should be referred to when working with these substances (eg: (4, 5)). In addition, appropriate exposure standards should be observed (6) (see Recommendations section). Workers should also be aware of the flammable nature of some of these components.

Based on the use pattern and physico-chemical characteristics of the notified polymer, it is considered that Polyacrylate in Misch. Raven 410 will not pose a significant risk to public health when used in the proposed manner.

## **13. RECOMMENDATIONS**

To minimise occupational exposure to Polyacrylate in Misch. Raven 410 the following guidelines and precautions should be observed:

- It is good work practice to wear industrial clothing which conforms to the specifications detailed in Australian Standard (AS) 2919 (7) and occupational footwear which conforms to Australian and New Zealand Standard (AS/NZS) 2210 (8) to minimise exposure when handling any industrial chemical;
- Spillage of products containing the notified polymer should be avoided, spillages should be cleaned up promptly with absorbents which should then be put into containers for disposal;
- Good personal hygiene should be practised to minimise the potential for ingestion;
- A copy of the MSDS should be easily accessible to employees.



In addition, the Worksafe Australia document *Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards* (6) should be used as a guide in the control of workplace exposure to other potentially hazardous paint components, and appropriate personal protective equipment should be worn where necessary to minimise exposure to these chemicals (see product MSDS). Workplace monitoring for these components should be carried out on a regular basis, and appropriate guidance material should be referred to when using these substances (e.g. (4, 5)). Workers should also be aware of the flammable nature of some of these components.

#### **14. MATERIAL SAFETY DATA SHEET**

The MSDS for a product containing the notified polymer was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (9).

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 polymer 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:10005(1994)]*, Australian Government Publishing Service, Canberra.
2. National Occupational Health and Safety Commission 1994, *Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]*, Australian Government Publishing Service, Canberra.
3. Nabholz, J.V., Miller, P. & Zeeman, M. 1993, 'Environmental Risk Assessment of New Substances under the Toxic Substances Control Act Section Five', in *Environmental Toxicology and Risk Assessment, American Society for Testing and Materials*, ASTM STP 1179, Philadelphia, pp. 40-55.
4. National Industrial Chemicals Notification and Assessment Scheme 1996, *2-Butoxyethanol in Cleaning Products*, Australian Government Publishing Service, Canberra.
5. National Occupational Health and Safety Commission 1990, *Isocyanates*, Australian Government Publishing Service, Canberra.

6. National Occupational Health and Safety Commission 1995, 'Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment, [NOHSC:1003(1995)]', in *Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards*, Australian Government Publishing Service, Canberra.
7. Standards Australia 1987, *Australian Standard 2919-1987, Industrial Clothing*, Standards Association of Australia, Sydney.
8. Standards Australia/Standards New Zealand 1994, *Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear*, Standards Association of Australia/Standards Association of New Zealand, Sydney/Wellington.
9. 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.