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## **NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME**

### **FULL PUBLIC REPORT**

#### **ACRYLIC POLYMER**

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 Commonwealth Environment Protection Agency 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.

Under subsection 34(2) of the Act the Director of Chemicals Notification and Assessment is to publish this Report in the Chemical Gazette on .

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Director  
Chemicals Notification and Assessment

**FULL PUBLIC REPORT****ACRYLIC POLYMER****1. APPLICANT**

Dupont Australia of 49-59 Newton Road, Wetherill Park NSW 2164 has submitted a notification for assessment of a synthetic polymer of low concern, Acrylic polymer.

**2. IDENTITY OF THE POLYMER**

Based on the nature of the chemical and the data provided, Acrylic polymer, is not considered to be hazardous. Therefore, the chemical identity, molecular and structural formulae, CAS number, polymer constituents, impurities and spectral data have been exempted from publication in the Full Public Report.

**Other name:** Acrylic polymer

**Method of detection and determination:** The polymer can be separated by gel permeation chromatography and identified by infra-red spectroscopy

**3. PHYSICAL AND CHEMICAL PROPERTIES**

The notified polymer at 50% concentration will be imported into Australia as a part of a multi-component liquid mixture containing toluene at 12.4%, xylene 9.8% and other constituents at approximately 27.8% (acetone, butyl acetate, ethyl acetate, magnesium silicate, isopropyl alcohol, titanium dioxide, zinc oxide and zinc phosphate). All properties listed below refer to the multi-component liquid mixture unless otherwise specified.

**Appearance at 20°C and 101.3 kPa:** Colourless liquid

**Glass-transition Temperature:** Not known

**Density:** 1320 kg/m<sup>3</sup>

**Water Solubility:** < 1 ppm at 20°C

**Hydrolysis as a function of pH:** The chemical is hydrophobic and unlikely to react with water phase. No readily hydrolysable groups are present.

**Explosive Properties:** not expected to be explosive

**Reactivity:** Not reactive. The polymer is not expected to break down by hydrolysis, thermal degradation, photodegradation or depolymerisation. The polymer does not contain reactive functional groups that are intended or reasonably likely, to undergo further reaction.

**Particle size distribution:** not in solid form

**. comments on physico-chemical properties**

Due to the notified chemical's molecular weight ( $M_n = 29,000$ ) and composition (comprising > 98% hydrophobic acrylic monomer), this polymer is expected to have a water solubility estimated at less than 1 ppm.

The notified polymer contains a low percentage of a monomer. This type of monomer is typically used to promote adhesion and will be found in the majority of currently used coating formulations. Due to the fact that the polymer has negligible water solubility, it is not expected that the presence of this low level of potentially cationic monomer is likely to constitute a significant environmental risk.

Also, the polymer is stable under normal conditions of use. It will not hydrolyse, undergo thermal or photo degradation or depolymerization.

The above comments provided by the notifier are adequate. The sterically hindered nature of the amino group should limit potential to quaternarize in the environment, and consequent increase in water solubility. Further the majority of the polymer will only reach the environment in a cured or an insoluble form.

#### **4. INDUSTRIAL USE**

The polymer will be a component of a paint formulation which is to be sold as part of a paint system for use by professional spray painters. The principal use will be in the automotive refinish industry.

#### **5. OCCUPATIONAL EXPOSURE**

The notified polymer as a component of a paint formulation, will be imported at a rate of 3000 L per year in pint (0.45 L), quart (0.95 L) and gallon (3.78 L) tins for direct sale through 12 distributor outlets. Approximately 4000 professional spray shops will be using the paint containing the notified polymer without reformulation. Depending on the type of application, paint may be mixed manually with other ingredients, in well ventilated areas of spray shops. Typically, industrial applications will involve the use of spray coaters in an enclosed ventilated booth with a filtered exhaust system. There will be approximately 8000 professional spray painters, exposed to the notified polymer at the rate of 2 per spray shop.

## **6. PUBLIC EXPOSURE**

The public should not be directly exposed to the polymer during application or disposal.

## **7. ENVIRONMENTAL EXPOSURE**

### **. Release**

Waste paint containing the notified polymer may be generated in the following ways.

Unused/leftover paint after mixing with thinners, hardener, etc, if not used when mixed will be disposed of to a waste drum. This material is typically sent to a waste disposal company for solvent recovery. A solidified residue is obtained as a result of this which is then disposed of to landfill.

Overspray is caught in filters of the spray booth and may constitute from 20 - 50% of total paint sprayed. Solid residues are trapped in the filter which when due for replacement is disposed of to landfill.

In approximately 30% of spray shops, a "wet floor" arrangement is used in place of or in combination with dry filters. In this instance, a water trap is used to catch overspray. Periodically (this may typically be every three to six months), water from the trap is collected by a waste disposal company for treatment. This usually involves flocculation or centrifugation of the suspended material which is then disposed of to landfill.

The painted vehicles are baked to cure the polymer into a paint film. The crosslinked polymer will be effectively inert and be disposed of with the vehicles. Releases of the cured polymer during vehicles repairs etc. will be diffuse and limited to small quantities of the cured polymer.

### **. Fate**

The low water solubility of the notified polymer indicates leaching from landfill sites is not expected. Any incineration of the notified polymer is expected to produce water and oxides of carbon and nitrogen.

The majority of the notified polymer is not expected to be released to the environment until it has been cured into a solid polymer matrix. The resultant matrix structure should limit the hydrolysis or biodegradation of the polymer. Bioaccumulation of the polymer is unlikely due to the high molecular weight of the polymer even before curing.

## **8. ASSESSMENT OF ENVIRONMENTAL EFFECTS**

No ecotoxicological data were supplied, which is acceptable for polymers of low concern. Due to its high NAMW the polymer is not expected to cross biological membranes.

## **9. ASSESSMENT OF ENVIRONMENTAL HAZARD**

Disposal of the notified polymer to landfill is unlikely to present a hazard to the environment, as it will be in a solid matrix and is not expected to biodegrade or leach.

The main environmental hazard would arise through spillage in transport accidents that may release quantities of the uncured polymer to drains and waterways. However, the polymer would quickly become immobile on association with soil/sediment layer.

The low environmental exposure of the polymer as a result of the proposed use, together with its expected low environmental toxicity, indicate the overall environmental hazard should be negligible.

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

Acrylic polymer has been notified as a synthetic polymer of low concern under section 23 for the purpose of section 24A of the *Industrial Chemicals Notification and Assessment Act 1989*.

The notified polymer has a number average molecular weight well above 1000 and, as such, is not expected to cross biological membranes. As a result adverse health effects would not be expected to result from exposure to the polymer. However, the Material Safety Data Sheet (MSDS) states the product containing the polymer is an eye and a skin irritant. This could be attributed to the hazardous ingredients of the product rather than to the polymer.

The polymer would not be classified as a hazardous substance on the basis of the levels of residual monomers.

Exposure of workers to the polymer during paint application is expected to be low as a result of engineering controls. Therefore, exposure to the notified polymer will be limited only to spills and splashing, during mixing with ingredients prior to spray painting.

The low expected intrinsic toxicity of the polymer and low exposure suggests that the occupational health risk is minimal. However, the Material Safety Data Sheet (MSDS) for the product, carries exposure standards (1) for number of ingredients (acetone, butyl acetate, ethyl acetate, toluene and xylene), which are toxic through skin, eye and inhalation routes. Therefore, eye and skin contact, as well as inhalation of the product should be avoided.

There is limited chance for public contact with the notified chemical, either during transport or in the application of paint coatings. The properties of the chemical suggest that there should be negligible absorption and therefore low risk to public safety. After coating and curing, the polymer forms an inert film on the coated vehicle and would be unlikely to present any hazard to public exposed to coated vehicle.

The polymer meets the criteria for a synthetic polymer of low concern specified in regulation 4A of the Act and can therefore be considered to be of low hazard to human health.

## **11. RECOMMENDATIONS**

To minimise occupational exposure to the product containing the notified polymer the following guidelines and precautions should be observed:

- . if engineering controls and work practices are insufficient to reduce exposure to a safe level, then personal protective devices which conform to and are used in accordance with Australian Standards (AS) for eye protection (AS 1336, AS 1337) (2,3) and impermeable gloves (AS 2161) (4) should be worn. Industrial clothing (AS 2919) (5) and footwear (AS 2210) (6) also should be worn;
- . good work practices should be implemented to avoid spillages and splashing;
- . good housekeeping and maintenance should be practised. Spillages should be cleaned up promptly with absorbents which should then be put into containers for disposal in accordance with Local or State government regulations;
- . good personal hygiene should be observed; and
- . a copy of the Material Safety Data Sheet (MSDS) should be easily accessible to employees.

## **12. MATERIAL SAFETY DATA SHEET**

The attached Material Safety Data Sheet (MSDS) for product containing the Acrylic polymer was provided in an acceptable format.

This MSDS was provided by Dupont Australia 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 Dupont Australia.

## **13. REQUIREMENTS FOR SECONDARY NOTIFICATION**

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

## **14. REFERENCES**

1. *Exposure Standards for Atmospheric Contaminants in the Occupational Environment, National Exposure Standards, [NOHSC:1003 (1991)], 2nd Edition, October 1991.*

2. Standards Australia, 1994, *Australian Standard 1336-1994, Recommended Practices for Eye Protection in the Industrial Environment*, Standards Association of Australia Publ., Sydney, Australia.
3. Standards Australia, 1992, *Australian Standard 1337-1992, Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, 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, 1987, *Australian Standard 2919 - 1987 Industrial Clothing*, Standards Association of Australia Publ., Sydney, Australia.
6. Standards Australia, 1994, *Australian Standard 2210 - 1994 Occupational Protective Footwear, Part 1: Guide to Selection, Care and Use. Part 2: Specifications*, Standards Association of Australia Publ., Sydney, Australia.