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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

ACRYLIC RESIN

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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
November 3, 2000

FULL PUBLIC REPORT**ACRYLIC RESIN****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 resin.

2. IDENTITY OF THE POLYMER

Based on the nature of the chemical and the data provided, Acrylic resin, 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 resin

3. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer at 39% concentration will be imported into Australia as a part of a multi-component liquid mixture containing xylene at 10-30%, aromatic hydrocarbon at 10-30% and other constituents at approximately 4-20% (amyl acetate, 2-butoxyethanol, methyl isobutyl ketone and 3-ethoxyethyl propionate). All properties listed below refer to the multi-component liquid mixture unless otherwise specified.

Appearance at 20°C and 101.3 kPa: Clear liquid

Glass-transition Temperature: Not known

Density: 990 kg/m³

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

Flash Point: 25°C

Autoignition Temperature: 340°C

Explosive Properties: Not expected to be explosive

Reactivity: Stable.

Particle size distribution: Not applicable

comments on physico-chemical properties

Due to the notified chemical's molecular weight ($M_n = 4,488$) and composition this polymer is expected to have a water solubility estimated at less than 1 ppm.

The notifier claims that reactive functional groups such as hydroxy groups enable hardening of the polymer film with a reduction in the amount of solvents that need to be used. Groups such as hydroxy groups are not considered highly reactive per se and because of this are not expected to be of concern to the environment. The activator or hardener used to crosslink the polymers in these formulations is usually a highly reactive isocyanate compound and will rapidly react with any OH containing molecule including water. Hence, it is considered the term "reactive" applies more to the hardener than the polymer binder.

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 EPA notes that the notified polymer contains a CO_2H moiety which may become anionic. The hydrophobic styrene comprises the greatest proportion (44%) of the monomer units. However, the effects of the side chains containing hydroxy groups (25% in total) and the 5.5% of free carboxylic acid on the water solubility is unclear. However, most of the polymer reaching the environment will be in a cured, very 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 (0.48 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 (see above) 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.

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 resin 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 (Amyl acetate, n-Butyl acetate, 2-Butoxyethanol, Methyl isobutyl ketone 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 polymer, 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 vehicles.

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.

13. MATERIAL SAFETY DATA SHEET

The attached Material Safety Data Sheet (MSDS) for Acrylic resin was provided in Worksafe Australia format (7).

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.

14. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of Acrylic resin 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. *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.
7. National Occupational Health and Safety Commission, *Guidance Note for Completion of a Material Safety Data Sheet*, 3rd edition, Australian Government Publishing Service Publ., Canberra, 1991.