

File No: NA/343

Date: 19 January 1996

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**POLYMER IN ACRYDIC TU-794**

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 Human Services and Health.

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.

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Director  
Chemicals Notification and Assessment

**FULL PUBLIC REPORT**  
**POLYMER IN ACRYDIC TU-794**

**1. APPLICANT**

DIC Australia Pty Ltd of 21 McDonalds La, Mulgrave, Victoria 3170 has submitted a limited notification statement with their application for an assessment certificate for Polymer in Acrylic TU-794.

**2. IDENTITY OF THE CHEMICAL**

Polymer In Acrylic TU-794 is not considered to be hazardous based on the nature of the chemical and the data provided. Therefore the chemical name, CAS number, molecular and structural formulae and exact import volume have been exempted from publication in the Full Public Report and the Summary Report

**Trade name:** Acrylic TU-794 is a formulation containing the notified polymer at 60%

**Number-average molecular weight:** 4741

**Weight-average molecular weight:** 14149

**Maximum percentage of low molecular weight species (molecular weight < 1000):** 3%

**Methods of detection and determination:**

Infra-red spectroscopy, gel permeation chromatography

**3. PHYSICAL AND CHEMICAL PROPERTIES**

The notified polymer is imported as a solvent solution and is never isolated. The physico-chemical properties listed below are those of the formulation.

**Appearance at 20°C and 101.3 kPa:** viscous, clear solution

**Specific Gravity:** 1.01 - 1.03 at 20°C

**Water Solubility:** insoluble (polymer)

**Flash Point:** 23°C

**Flammability Limits:** 1.7 -15% Vol% (butyl acetate)

**Reactivity:** reactive in the presence of isocyanates

**Comments on Physico-Chemical Properties**

Hydrolysis, Partition Coefficient, Adsorption/Desorption and Dissociation Constant have not been determined because the notified polymer is water insoluble.

Acrylic polymers are known to be highly insoluble. The ester linkages in acrylic polyesters are very stable under a wide range of pH values and will not undergo hydrolysis. The notifier has produced literature support for these two properties.

On the basis of the notified polymer's low water solubility and high molecular weight it is likely to adsorb to or be associated with soil/sediment and be immobile in soil. The polymer contains about 0.05% of free carboxylic acid groups expected to have typical acidity.

#### **4. PURITY OF THE CHEMICAL**

**Degree of purity:** 98%

**Residual Monomers:**

Residual monomers and polymerisation initiators are estimated to be at a concentration of <0.1% in the notified polymer.

**Non-toxic impurities:** nil

**Additives/Adjuvants:** nil

#### **5. INDUSTRIAL USE**

The notified polymer is to be used in an automotive refinish paint.

#### **6. OCCUPATIONAL EXPOSURE**

The formulated resin solution containing the notified polymer at a concentration of 60% in butyl acetate and xylene will be imported in 200 L steel drums at a rate of < 10 tonnes per year for the first five years and transported by road to the notifier's warehouse prior to transport to a single site for mixing with solvents, silicone oils and UV stabilisers.

At the reformulation site the drums are placed in drum cradles for decanting into the mixing vessel. Mixing takes place at room temperature in a closed 200 kg stirring vat, followed by decanting into 1-4 kg packs ready for use.

At the autorepair shops mixing and spraying of the paint takes place in a down draft spray booth.

## **7. PUBLIC EXPOSURE**

Paints containing the notified polymer will not be available to the public. No public exposure to the notified polymer is expected to result from exposure to the hardened paint coating. Waste paint collected at the paint mixing plant will be processed to reclaim the solvents and the residue containing the notified polymer will be disposed of to landfill. Waste generated at automotive repair shops and the used cans will also be disposed of to landfill. The polymer is insoluble in water, and leaching of the polymer at landfill sites is not expected to occur. Therefore, public exposure to the notified polymer is expected to be negligible.

## **8. ENVIRONMENTAL EXPOSURE**

The polymer will be released to the environment in two main ways; (a) as the finished paint on vehicles and (b) in the form of waste from spillage during paint manufacture, overspray during application, unused paint, washing of spray equipment, etc. As an acrylic polymer encapsulated in an automotive top-coat paint designed to last, it will not undergo degradation. Up to 17.5% of the annual import of the polymer may be lost to the environment as waste. Like other acrylic polymers, it is expected to have minimum mobility in the soil environment because of its high molecular weight and low water solubility. Residues consigned to landfill will therefore remain immobile. Incineration of residues will result in the destruction of the polymer as oxides of carbon and water.

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

Toxicological data are not required for polymers of number-average molecular weight (NAMW) > 1000 according to the *Industrial Chemicals (Notification and Assessment) Act, 1989* and no data were submitted for the notified polymer.

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

Environmental effects testing is not required for polymers with NAMW >1000. Acrylic polymers with MW > 1000 are too large to cross biological membranes.

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

As an acrylic, the polymer is expected to present a negligible hazard to the environment when disposed of to landfill because of its lack of mobility and inability to cross biological membranes. Polyanionic polymers of NAMW > 1000 can be considered to be of low environmental concern (2). The use of the polymer in vehicle paint will result in its encapsulation in a durable and cross-linked acrylic resin of negligible environment hazard.

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

The notified polymer has a NAMW greater than 1000 and should not be able to be absorbed across biological membranes to cause systemic effects. The levels of low

molecular weight species (< 3%) and residual monomers (maximum of 0.1% for each monomer) would not render the polymer hazardous according to the criteria of Worksafe Australia (3).

Exposure to the notified polymer during paint manufacture is expected to be low through the use of enclosed systems required to minimise the exposure to solvents. Exposure to the formulated paint is expected to be minimal as the paint is mixed with hardener in a down draft spray booth and the final mixture is applied in the same booth.

The risk of adverse occupational health effects is expected to be minimal given the likely low hazard of the notified polymer coupled with low exposure as a result of the requirement to minimise exposure to solvents. Similarly, the risk of adverse public health effects is expected to be minimal given the likely low exposure. No exposure to the notified polymer should result from exposure to the hardened coating after application. In case of accidental spillage during transport the public may be exposed to the polymer but this is expected to be minimised by the recommended cleanup procedures.

### **13. RECOMMENDATIONS**

To minimise occupational exposure to Polymer In Acrylic TU-794 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 equipment as described in Australian (AS) or Australian/New Zealand (AS/NZS) Standards as follows should be worn:
  - eye protection should be selected and fitted in accordance to AS 1336 (4) and meet the requirements of AS/NZS 1337 (5);
  - impermeable gloves should conform to AS 2161 (6);
  - protective clothing should conform to AS 2919 (7);
  - protective footwear should conform to AS/NZS 2210 (8).
- . 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;
- . storage should be in robust sealed containers away from sources of ignition or high temperatures;
- . the workplace should be well ventilated;
- . good personal hygiene should be observed; and

a copy of the relevant Material Safety Data Sheets (MSDS) should be easily accessible to employees.

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

The attached MSDS for Acrylic TU-794 containing the notified polymer was provided in Worksafe Australia format (9).

This MSDS was provided by DIC Australia Pty Ltd 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 DIC Australia Pty Ltd.

#### **15. REQUIREMENTS FOR SECONDARY NOTIFICATION**

Under the Industrial Chemicals (Notification and Assessment) Act 1989, secondary notification of Polymer In Acrylic TU-794 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. *Dangerous Properties of Industrial Materials*, 7th Ed., Sax N. I. and Lewis R. J. Sr Eds, Van Nostrand Reinhold, 1989.
2. Nabholz, J V, Miller, P, and Zeeman, M 1993, 'Environmental Risk Assessment of New Substances under the Toxic Substances Control Act Section Five' In W G Landis, J S Hughes and M A Lewis (Eds), *Environmental Toxicology and Risk Assessment*, American Society for Testing and Materials, ASTM STP 1179, Philadelphia. pp 40-55.
3. National Occupational Health and Safety Commission 1994, *Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]*, Australia Government Publishing Service, Canberra, Australia.
4. Standards Australia, 1994, *Australian Standard 1336-1994, Recommended Practices for Eye Protection in the Industrial Environment*, Standards Association of Australia Publ., Sydney, Australia.
5. 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.
6. Standards Australia 1978, *Australian Standard 2161-1978, Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ., Sydney, Australia.
7. Standards Australia, 1987, *Australian Standard 2919 - 1987 Industrial Clothing*, Standards Association of 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. National Occupational Health and Safety Commission 1994, *National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]*, AGPS, Canberra, Australia.