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14 March 2002

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

AROPLAZ 6421-X-75

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 the National Occupational Health and Safety Commission which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment and the assessment of public health is conducted by the Department of Health and Ageing.

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Copies of this full public report may also be requested, free of charge, by contacting the Administration Coordinator on the fax number below.

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Director
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FULL PUBLIC REPORT

AROPLAZ 6421-X-75

1. APPLICANT

DIC International (Australia) Pty Ltd of 18-20 Pickering Road, Mulgrave, Victoria 3170 has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC).

2. IDENTITY OF THE CHEMICAL

The chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data and details of the polymer composition have been exempted from publication in the Full Public Report.

Marketing names: AROPLAZ 6421-X-75
Polymer in AROPLAZ 6421
Alkyd Resin

3. POLYMER COMPOSITION AND PURITY

Details of the polymer composition have been exempted from publication in the Full Public Report.

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

The polymer has a molecular weight >1000, and %MW <500 and < 1000 within the prescribed limits. It contains reactive functional groups of low concern.

5. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is manufactured in xylene solution and is never isolated.

Property	Result	Comments
Appearance		The polymer solution is a viscous liquid
Boiling point	Not determined	135-142 °C xylene
Specific gravity	1.066-1.078 g/cm ³ at 25 °C	
Water solubility	Not provided	The polymer is insoluble in water
Particle size	Not applicable	The notified polymer is not isolated from solution
Flammability limits	1-7% in air (xylene)	<38°C (flash point)
Autoignition temperature	500°C	(for Xylene)
Explosive properties	Not provided	
Stability/reactivity		The notified polymer does not contain any groups that are likely to be reactive and therefore is likely to be stable in the environment.
Hydrolysis as function of pH	Not provided	The notified polymer contains ester groups that have the potential to hydrolyse but are not likely to do so under environmental conditions, pH 4-9.
Partition coefficient	Not provided	The partition coefficient was not determined. Given its low water solubility, the polymer is expected to partition into the octanol phase
Adsorption/desorption	Not provided	No adsorption data were provided in the notification dossier. The polymer is not expected to be mobile in soils due to its low water solubility.
Dissociation	Not provided	The dissociation constant was not

constant

determined. The polymer is not ionic and is therefore not expected to dissociate.

6. USE, VOLUME AND FORMULATION

Use:

The notified polymer will be imported at a concentration of 75% in xylene to be reformulated into paint (containing 30% notified polymer) for the spray application of machinery in Queensland. Electrostatic spray guns will be used for the application of the polymer containing coatings.

Manufacture/Import volume:

The notified polymer will not be manufactured in Australia. It will be imported as a 75% solution in xylene contained in 200 L steel drums. The polymer will be imported at less than 100 tonnes per year over the first 5 years.

Formulation details:

The notifier will supply the imported polymer for reformulation into paint. At the reformulation site the notified polymer will be decanted into a closed mixing vessel along with other components of the paint to a final concentration of 30%. The blended paints will be decanted into 200 L steel drums for sale to customers. They will be supplied to customers in this form for application to machinery using electrostatic spray guns.

7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
<i>Polymer Re-formulation (Paint manufacture)</i>		
<i>Warehousing and distribution of raw materials: 4 forklift drivers</i>		
Dermal	Only possible in case of accidental packaging breach	Standard sturdy containers and use of correct equipment and machinery for internal and external transport At the reformulation site, the drums will be placed in drum cradles for decanting into the mixing vessel
<i>Mixing/blending and decanting into bulk containers: 2 workers, 4 hours/day/30 days/year</i>		
Dermal	Possible skin contact if spills occur while mixing /blending the ingredients in the mixing vessel	Mixing takes place in a closed 200 kg mixer

and decanting into bulk containers (30% notified chemical)

reaction vessel enclosed, exhaust ventilation and personal protective equipment are used (safety glasses or goggles, chemically impermeable clothing and gloves, boots and air respirator with organic vapour cartridge or canister)

Quality control- batch adjustments and testing: 2 workers, 4 hours/day, 30 days/year

Dermal	Possible skin contamination when preparing small scale formulations (75% notified chemical) or testing of small samples (30% notified chemical) prior to filling	Enclosed systems, local exhaust ventilation and personal protective equipment (safety glasses, gloves, laboratory coat)
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Decanting and filling into drums: 3 workers, 8 hours/day, 30 days/year

Dermal	Spillage during filtration and filling procedures	Enclosed systems and personal protective equipment is employed
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End use

Thinning and spraying: 4 workers, 8 hours/day, 220 days/year

Sanding and clean up: 2 workers, 8 hours/day, 220 days/year

Inhalation and/or dermal	Spilling during activation and thinning of paint, cleaning of spray equipment (30% notified chemical). Some ocular contamination from splashes may occur. Exposure to vapour/spray mist during application of paint (spraying).	Paint is sprayed in a well ventilated, down draft spray booth, protective eyewear, respiratory protection, chemically permeable clothing, impermeable gloves and occupational footwear are used.
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Transport and storage

Paint is transported in sealed drums, so contact is unlikely to occur except in the event of a spill.

Drums are sealed, however, if spillage occurs, proper personal protective equipment is worn, ie safety glasses or goggles, chemical resistant gloves and clothing, footwear, respiratory protection: air respirator with vapour cartridge or canister, impervious clothing

Disposal

Waste disposal contractors

Dermal	Paint residue dries to a solid, so	Personal protective equipment worn
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exposure/contact is unlikely.

includes: coverall, footwear, goggles and gloves.

8. PUBLIC EXPOSURE

The public may be exposed to the notified polymer in its imported form as a 75% concentrate in xylene or as a 30% component of formulated paint, following transport accidents *en-route* from the port of importation or from the site of reformulation to end users respectively. The 200L drums used for the carriage of these products are sturdy and not likely to rupture. In spills that do occur, contact with the notified polymer is likely to be dermal and of a transient nature. It is also possible that it will be inhaled as a component of solvent vapour. Members of the public are also unlikely to contact the notified chemical as an environmental contaminant. During the reformulation of the imported product into paint there is no escape of the notified chemical into the environment. Waste residues from the reformulation plant and end users of the paint are likely to be consigned to land fill and will be immobile in soil.

The formulated paint will not be sold to the public. Once the paint layers have hardened the notified polymer will be inaccessible to human contact. The potential for exposure of the public to the notified polymer is therefore minimal.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

Release of the notified polymer to the environment could occur in the form of waste generation at the reformulation site during blending of the paint products, or at customer sites during application of the paint to machinery. Only minimal release of the polymer is expected to occur during the reformulation processes mainly through accidental spills. No atmospheric release is anticipated because the substance is not volatile, although, the paint contains some solvents, which evaporate in the ventilation systems.

Up to 1% of the notified polymer may be released as waste generated each year as a result of spills during paint manufacture. This equates to less than 1 tonne per annum notified polymer waste. All accidental spills will be contained by bunding and collected for disposal by landfill.

At customer sites, waste polymer may be generated in three main ways: by overspray during the application process, cleaning of the spray guns and mixing equipment, and in unused paint and residues in empty containers. Most of the waste is generated by overspray during the application process.

The amount of waste generated from cleaning of spray guns and mixing equipment and from residues in containers will be small compared to overspray. No estimates are provided for wastes generated through equipment cleaning and unused paint, however, the notifier estimates that polymer residues in containers will account for about 0.05% per annum. A further 17.5% per annum, may be lost as overspray. The paint containing the polymer will dry to form a solid that will be disposed of in landfill. Wastes generated through overspray

and equipment washing will be collected and disposed of through licensed waste disposal contractors.

No release of the polymer is expected once the paint dries on the surface of the machinery. The notified polymer will dry as a durable, inert paint matrix.

9.2. Fate

Usage patterns indicate that most of the new polymer will be incorporated into the coating formulation and reside on machinery where it will be inert. The paint coating would not be readily degradable, however, paint film left exposed to sunlight for long periods may slowly deteriorate to an inert chalky powder under the action of UV light. The polymer, being incorporated into the machinery surface coating, will share the fate of the machinery bodies, potentially being recycled for steel reclamation. When recycled the polymer would be destroyed in furnaces and converted to water vapour and oxides of carbon.

Less than 10 tonnes per annum of the notified polymer may be released as wastes generated during paint manufacture, formulation and spray application. Waste generated during manufacturing is recovered as an insoluble solid from the wastewater used for cleaning and is disposed to landfill. The containers and their residue will also be disposed in this manner. Wastes generated from overspray onto masking material are likely to be incinerated, while wastes collected on filters are likely to be landfilled or incinerated. Incineration would destroy the new polymer releasing combustion products comprising mainly of water and oxides of carbon.

In landfill, the notified polymer is expected to persist for some time, degrading very slowly through abiotic and biotic processes. Leaching of the polymer from landfill sites is not expected given the low water solubility.

The polymer is not expected to cross biological membranes, due to the high molecular weight, and as such should not bioaccumulate (Connell, 1989).

10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological data were submitted.

The health hazards of the ingredients contained in the polymer solution are tabulated below.

Chemical	Health hazards (NOHSC, 1999a)	Regulatory controls (NOHSC, 1995)
Hazardous impurities- none		
Additives/adjuvants: Xylene	Flammable Harmful by inhalation and contact with skin- cut-off-level $\geq 12.5\%$ Irritating to skin- cut-off level is <20%	TWA: 80 ppm STEL: 150 ppm
Toluene	Harmful by inhalation	TWA: 100 ppm

	Conc. Cut-off level is $\geq 12.5\%$	STEL: 150 ppm
Ethyl benzene	Harmful by inhalation	TWA: 100 ppm
	Conc. Cut-off level is $\geq 25\%$	STEL: 125 ppm

TWA-Time weighted average
STEL-Short Term Exposure Limit

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were provided.

12. ENVIRONMENTAL RISK ASSESSMENT

No release to the aquatic environment is expected during paint manufacture and application. Waste polymer, the majority from captured overspray during use, is ultimately expected to be disposed to landfill or incinerated. If disposed to landfill, the polymer is unlikely to be mobile in the soil environment and would be expected to slowly degrade through abiotic and biotic processes. The environmental hazard of the notified polymer in landfill is expected to be low. If incinerated, the polymer would be rapidly destroyed and converted to water vapour and oxides of carbon. The remainder of the polymer will be incorporated into paint applied to machinery. On drying the polymer will form part of an inert, durable coating and pose no risk to the environment.

In the event of accidental spillage of the polymer into waterways it is not expected to disperse in the water, but settle out onto sediments. If the polymer is spilt on land, either during usage or transport, it is expected that the polymer would become immobilised in the soil layer. Contaminated soil can then be collected and disposed to landfill.

The polymer's high molecular weight should prevent bioaccumulation. Given the above, the overall environmental hazard is expected to be low.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

No toxicological information has been provided for AROPLAZ 6421-X-75. However, the notified polymer has a high molecular weight and is unlikely to penetrate biological membranes. Its chemical structure also suggests that the polymer has a low toxicity viz; a lack of reactive functional groups, lack of charged groups, lack of solubility in water, non-cationic in the pH range 4-9 and high stability. It contains no reactive functional groups and no residual monomers. The polymer meets the PLC criteria and is unlikely to be a hazardous substance according to the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b).

The hazardous nature of AROPLAZ 6421-X-75 derives from the solvents used in the product. The imported polymer solution is classified as hazardous according to NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b).

The following risk phrases were listed on the material safety data sheet (MSDS) for AROPLAZ 6421-X-75:

R11 Highly flammable

R20/21 Harmful by inhalation and in contact with skin

R38 Irritating to skin

The polymer solution Alkyd Resin (AROPLAZ 6421-X-75) is classed as a Class 3 dangerous good (flammable liquid) because of the solvent content.

The MSDS states that inhalation of the vapour or spray mists can result in headaches, dizziness and nausea. Repeated and prolonged occupational over-exposure to solvents can produce central nervous system damage.

13.2. Occupational health and safety

The polymer solution is imported in steel drums, then transported to a manufacturing plant for further processing into paint. Skin contamination may occur during paint formulation, QC testing, packaging and cleaning up of spills and maintenance and cleaning up of equipment. QC testing provides the possibility of exposure to small quantities of the notified polymer when collecting samples. The formulation process is largely enclosed, with local exhaust ventilation provided, and workers handling the polymer will wear personal protective equipment consisting of safety glasses or goggles, protective gloves, overalls, boots and respirator with vapour cartridge or canister. These controls will also provide protection against exposure to other constituents of the formulated coating. These controls and the low toxicological impact render the health risk from the notified polymer for these formulation workers as low.

During spray application of the paint, inhalation exposure to the notified polymer may occur, in addition to dermal and ocular exposure during spray application and cleaning of equipment.

The final paint mix including the pre-prepared paint component containing the notified polymer could contain a wide variety of additional ingredients. This is likely to introduce human health hazards due to the presence of potentially toxic solvents. It is also probable that professionals involved in the spray painting industry will use a number of different paint formulations. For these reasons, the notified polymer must be assessed for the contribution it makes to the hazards associated with spray application of the paint. The presence of many potential and actual hazardous substances in the formulations requires the use of stringent engineering controls, such as a correctly constructed and maintained spray booth, and of a high level of personal protective equipment, such as impermeable overalls and gloves, safety glasses or goggles and respirator. The use of the paint containing the polymer should be in accordance with the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999c). The level of protection from exposure afforded by the standard protective measures will provide adequate protection from the polymer, which is likely to be less intrinsically toxic than most of the solvents and pigments and also some other paint resins.

Once the final paint mix has hardened, the notified polymer is bound within the matrix and unavailable for exposure or absorption.

There is no occupational exposure expected for transport and storage workers except in case of an accident.

There are NOHSC exposure standards for xylene, toluene and ethyl benzene, identified as ingredients in the paint solution. The employer is responsible for ensuring that these exposure standards, and exposure standards pertaining to other final paint mix additives, are not exceeded in the workplace.

The solutions containing the polymer are flammable due to their solvent content. Precautions must be taken to avoid sources of ignition, e.g. use of earthing leads. Operators should wear antistatic overalls and footwear.

Similar considerations apply in the cleaning of spray equipment and disposal of the polymer. The wastes containing the polymer may be hazardous materials on the basis of the solvent and other resin content, and the precautions used for the additional materials should be adequate for protection from the polymer. In addition, much of the polymer will be crosslinked and hardened, and therefore immobile, by the time of disposal.

Conclusion

The polymer itself is of low hazard, and apart from the controls already in place to prevent exposure to other paint components, and to the polymer in particulate form during spraying, no additional controls are required.

13.3. Public health

Public exposure to the notified polymer is expected to be limited to unlikely transport accidents involving damage to the packaging carrying the imported product or to the packaging containing the reformulated paint. Such exposure is likely to be dermal and transient. The notified polymer has a high molecular weight and is not likely therefore to penetrate any biological membranes in contact with it. In the hardened paint coverings the notified polymer is present as an integral part of the matrix of the paint and is not accessible to human contact. The low likelihood of exposure to the notified chemical and its low toxicity suggest that it will not pose a significant hazard to public health when used in the proposed manner.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS of AROPLAZ 6421-X-75 provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). It is published here as part of the assessment report. The accuracy of the information on the MSDS remains the responsibility of the applicant.

14.2. Label

The label for AROPLAZ 6421-X-75 provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994b). The accuracy of the information on the label remains the responsibility of the applicant.

15. RECOMMENDATIONS

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Control Measures

Occupational Health and Safety

No specific measures are required for the notified polymer. However, in the interest of good occupational health and safety, the following controls are recommended:

- Employers should implement the following engineering controls:
 - exhaust ventilation during formulation and filling processes
 - enclosed and automated formulation process
- Employers should implement the following safe work practices:
 - Use of the paint containing the notified polymer should be in accordance with the NOHSC *National Guidance Material for Spray Painting*;
 - Employers should ensure that NOHSC exposure standards for all of the components of the final paint mix are not exceeded in the workplace.
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the solvent solution containing the notified polymer:
 - Chemical resistant gloves, protective clothing which protects the body, arms and legs, respirator with vapour cartridge or canister and goggles or safety glasses.

Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- A copy of the MSDS should be easily accessible to employees.
- If products and mixtures containing AROPLAZ 6421-X-75 are classified as hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (1999b), workplace practices and control procedures

consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Emergency procedures

In the event of a spill, the notified polymer should be contained, absorbed onto soil, sand or other inert material, and the resulting waste disposed of in landfill or by incineration.

Secondary notification

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

- (1) Under Section 64(1) of the Act; if
 - the notified polymer is introduced in a chemical form that does not meet the PLC criteria.
 - If the conditions of use are varied from its proposed use as a component of paint for machinery, then greater exposure of the public may occur. In such circumstances, further information may be required to assess the hazards to public health.

or

- (2) Under Section 64(2) of the Act:
 - if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

16. REFERENCES

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