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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME
(NICNAS)**

FULL PUBLIC REPORT

Polymer in Aqua Urethane AU240A

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**Director
Chemicals Notification and Assessment**

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FULL PUBLIC REPORT**Polymer in Aqua Urethane AU240A****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

Toyo Ink Australia Pty Ltd of 29 Garden Street, Kilsyth Victoria 3137

NOTIFICATION CATEGORY

Synthetic Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical Name, CAS Number, Molecular and Structural Formulae, Molecular Weight, Polymer Constituents, Purity, Use Details, Manufacture/Import Volume, Site of Manufacture/Reformulation and Charge Density.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

No variation to the schedule of data requirements is claimed.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

No

NOTIFICATION IN OTHER COUNTRIES

No

2. IDENTITY OF CHEMICAL

OTHER NAME(S)

Polymer in Aqua Urethane AU240A

3. COMPOSITION

PLC CRITERIA JUSTIFICATION

<i>Criterion</i>	<i>Criterion met (yes/no/not applicable)</i>
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	Yes
Low Charge Density	Yes
Approved Elements Only	Yes
No Substantial Degradability	Yes
Not Water Absorbing	Yes
Low Concentrations of Residual Monomers	Yes
Not a Hazard Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria. Although the notified polymer contains potentially cationic groups, consideration of the structure activity of the polymer across the environmental pH range (4 - 9) indicates it is unlikely to be cationic except in very acidic conditions, e.g. pH < 4 to 4.5.

4. INTRODUCTION AND USE INFORMATION

MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Tonnes</i>	10-30	30-100	30-100	30-100	30-100

USE

Component of aqueous gravure inks.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

The product Aqua Urethane AU240A containing the notified polymer in an aqueous dispersion will be imported in liquid form in 20 litres containers and will be stored in the notifier's warehouse. At the manufacturing site, the product containing the notified polymer will be mixed with other ingredients in a 1000 L open top vessel and is blended using a high speed dispenser.

The dispersed product is then placed through a sand mill which places the product under sheer, effectively creating the final dispersion required for the product to be utilised in the printing process.

The final step is to blend into the product a number of components to achieve the correct acidity and viscosity levels. This is also done in a 1000 L open top vessel utilising a high-speed dispersion mixer.

The process involves 2 key operators and 1 quality control chemist.

One operator is involved in the movement of the resin in a packaged state to the premix vessel and measuring via a set of scales a specified volume. This is done using a mechanical lifting device and the product is poured into the pre-mix vessel.

The second operator will be involved in the post-mix blending operation and will add additional items to the vessel in a similar manner to the pre-mix operator.

A quality control chemist will be involved in the measuring of specific characteristics of the manufactured product.

6. EXPOSURE INFORMATION

6.1. Summary of Environmental Exposure

Release of Polymer During, Transportation, Storage And Reformulation

The notified polymer will not be manufactured in Australia. Environmental release during importation, storage and transportation is unlikely except in the event of accidental spillage. Spilt material will be contained and collected and reused in the process. During the production of the ink, there will be minimal release of the polymer as most of the equipment cleaning streams are reused in the process. Part of the equipment under goes annual cleaning with release to sewer. This accounts for a release of less than 1% of imported polymer. Expired product is also reprocessed and accounts for a loss of approximately 3%. Import containers are rinsed with the rinsate being used in the production process. The rinsed containers will contain less than 1% of the notified polymer when disposed of to licensed drum recyclers. Therefore during ink production a maximum of 5% (up to 5 tonnes) of the imported notified polymer may be released.

Release of Polymer From Ink Use

The user containers are rinsed with water, with the rinsate then used to prepare the ink. The rinsed containers are then disposed of by a licensed waste contractor. Before a different ink is used the printing press is cleaned and the cleaning effluent stored until it is disposed either to sewer under a

trade waste agreement or via a licensed liquid waste contractor. It is likely that less than 1% of the notified polymer would be in this effluent.

At the printer's site, there is the possibility that some waste printed material will be generated. This will be collected and disposed of via a licensed waste contractor generally to landfill, recycling or incineration. Once applied and dried the polymer will be bound to the article and will be inert. Therefore any printed article disposed of to landfill will release the notified polymer very slowly and it will not be mobile. In landfill the article and ink, including the notified polymer, will undergo slow abiotic and biotic decomposition over time.

6.2. Summary of Occupational Exposure

Transport and warehousing

Workers are not expected to be exposed to the imported notified polymer, as it will be handled in closed containers. The notified polymer will be supplied in 20 litres containers and will be stored in the notifier's warehouse. Exposure is possible in the event of an accidental spillage where the packaging is breached.

Ink Formulation

The notified polymer is an aqueous dispersion and formulation is undertaken in open top vessel. Dermal, inhalation and ocular exposure are expected to be the main routes of exposure. Exposure may occur during opening and closing of the imported container, weighing and transfer of the polymer dispersant into the sand mill and high speed mixer, and when filling the ink containers. Workers will wear chemical resistant gloves, coveralls and safety goggles when handling the notified polymer. The blending and filling operations are also conducted under local exhaust ventilation.

End Use

Dermal exposure to the notified polymer could occur during printing press. Exposure to the notified polymer could occur from intermittent contact with printing rollers. Suitable gloves are expected to be worn by workers.

6.3. Summary of Public Exposure

The notified polymer is intended only for use in industry.

The public is unlikely to be exposed to the notified polymer during transport, storage, and manufacture except in the accident of an accidental spillage.

When the notified polymer is used in laminating inks, it will enter the public domain in laminated film for packaging for various general items. Consequently, public contact to the packaging is likely to be high, but exposure to the notified polymer which is in the dried adhesive layer sandwiched between two layers of film is likely to be non significant.

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	Nearly transparent with pale brown colour
Autoignition Temperature	Not autoignitive in nature
Density	1.02 kg/m ³
Water Solubility	500 mg/L (max)
Reactivity	Stable toward oxidation, photodegradation, and hydrolysis
Stability	Stable and does not break down readily under normal condition
Explosive Properties	No

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

8.2. Human Health Hazard Assessment

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard.

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology

No toxicological data were submitted.

9.2. Environmental Hazard Assessment

The notified polymer may become cationic only under strongly acidic conditions while under normal environmental pH conditions it is expected to be largely anionic. Anionic polymers can have either direct or indirect impact on aquatic organisms. Polyaliphatic acid polymers have a moderate indirect impact on green algae at pH 7, while toxicity to fish and invertebrates is generally low ($LC_{50} > 100$ mg/L).

Algae toxicity is dependent on the structure of the anionic polymer, with 96 h EC_{50} ranging from 3.13 to 500 mg/L depending on the distance between acid groups. Since there is a relatively low amount of carboxylic acid grouping, it is likely that the acid groups will be greater than 1 carbon apart and therefore the 96 h EC_{50} would be between 57 and 150 mg/L. As an estimate of the PNEC the using the lowest algal 96 h EC_{50} of 57 mg/L and a safety factor of 1000, because toxicity data is not for the notified polymer, the estimated PNEC is 0.057 mg/L.

10. RISK ASSESSMENT

10.1. Environment

Ink Manufacture

During ink manufacture up to 5 tonnes of notified polymer may be disposed of via a licensed waste contractor. The contractor is likely to treat the effluent via pH adjustment and flocculation. It will be negatively (anionic) charged and based on its NAMW approximately 75% will be removed through partitioning to the sludge. If 75% is removed then 1250 kg of the notified polymer may be released to sewer in the contractor's effluent. Assuming release into a sewage system which handles approximately 35% of a city's sewage, the following PEC can therefore be estimated:

Amount of notified polymer entering sewer	1250 kg
Melbourne population	approximately 4 million
Amount of water used per person	200 L
Percentage handled by eastern system	35%
Volume handled by eastern system	$\frac{4 \text{ million} \times 200 \text{ L} \times 35}{100}$
	= 280 ML
Number of days	365
Concentration in STP	$\frac{1250 \text{ 000}}{365 \times 280 \text{ 000 000}}$
	= 0.012 mg/L

An estimate risk quotient (RQ) can be calculated by dividing the estimated PEC by the estimated PNEC, $0.012 \text{ mg/L} \div 0.057 \text{ mg/L} = 0.21$. Since RQ is less than 1, and given the conservative assumptions used, the hazard posed by ink production is acceptable.

Ink Use

Ultimately the majority of the notified polymer will be disposed of to landfill on the surface of the printed article. Once applied to the article and dried it will be in an inert form bound to the surface so that in landfill it will remain on the article and decompose by abiotic and biotic pathways over time. Incineration of the notified chemical will result in the formation of water vapour and oxides of carbon and nitrogen.

Due to its high molecular weight the polymer is not expected to bioaccumulate.

The above considerations indicate that the hazard posed to the environment by the proposed use of the notified polymer is low.

10.2. Occupational Health and Safety

The notified polymer is present in formulations containing hazardous ingredients. If these formulations are classified as hazardous to health in accordance with the NOHSC Approved Criteria for Classifying Hazardous Substances, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Exposure to the notified polymer during formulation and end use is expected to be low by the use of engineering controls and PPE. Also, the notified polymer is of high molecular weight and therefore dermal absorption is unlikely. Overall, the OHS risk presented by the notified polymer is expected to be low.

10.3. Public Health

The notified polymer will not be available to the public. Members of the public may make dermal contact with products containing the notified polymer. However, the risk to public health will be negligible because the notified polymer is bound within a matrix once the paint is cured and unlikely to be bioavailable. Therefore, the risk to public from exposure to the notified polymer is considered low.

11. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS

11.1. Environmental Risk Assessment

The polymer is not considered to pose a risk to the environment based on its reported use pattern.

11.2. Human Health Risk Assessment

11.2.1. Occupational health and safety

There is Low Concern to occupational health and safety under the conditions of the occupational settings described.

11.2.2. Public health

There is Low Concern to public health when used in the manner proposed by the notifier.

12. MATERIAL SAFETY DATA SHEET

12.1. Material Safety Data Sheet

The notifier has provided MSDS as part of the notification statement. The accuracy of the information on the MSDS remains the responsibility of the applicant.

13. RECOMMENDATIONS

CONTROL MEASURES

Occupational Health and Safety

- No specific engineering controls, work practices or personal protective equipment are required for the safe use of the notified polymer itself, however, these should be selected on the basis of all ingredients in the formulation.
- 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 the notified polymer are classified as hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Environment

Disposal

- The notified polymer should be disposed of via a licensed waste contractor, while printed articles using the ink containing the polymer should be disposed of to landfill or by incineration.

Emergency procedures

- Spills/release of the notified polymer should be handled by containment, collected and stored in a labelled container until recycled, if possible, or until disposal under the state authority's guidelines.

13.1. 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 subsection 64(1) of the Act; if
- the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

The Director will then decide whether secondary notification is required.

No additional secondary notification conditions are stipulated.