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

FULL PUBLIC REPORT

DP 5003

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (Cwlth) (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 Department of Health and Ageing, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Department of the Environment and Heritage.

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**Director
Chemicals Notification and Assessment**

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FULL PUBLIC REPORT**DP 5003****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANTS

1. DuPont (Australia) Ltd
49-53 Newton Rd
Wetherill Park NSW 2164
ABN 59 000 716 469
2. Epson Australia Pty Ltd
3 Talavera Road
North Ryde NSW 2113
ABN 91 002 625 783

NOTIFICATION CATEGORY

Synthetic Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical identification

Import volume

Details of use

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

No variation to the schedule of data requirements is claimed.

NOTIFICATION IN OTHER COUNTRIES

USA 1992, Canada 1996.

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

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3. COMPOSITION

PLC CRITERIA JUSTIFICATION

Functional Group	Category	Equivalent Weight (FGEW)
All functional groups	Low Concern	-

*Criterion**Criterion met*

Meets Molecular Weight Requirements	Yes
Meets Functional Group Equivalent Weight (FGEW) Requirements	N/A
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.

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>	1-3	3-10	3-10	10-30	10-30

USE

Ink component for office and consumer printing. The notified polymer will not be manufactured or reformulated in Australia. It will be imported as a component of printing inks.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

Polymer is imported as component of ink, already packed in cartridges for printing. The notified polymer will not be manufactured or reformulated in Australia.

6. EXPOSURE INFORMATION

6.1. Summary of Environmental Exposure

Environmental Exposure

- The notified polymer will not be manufactured or reformulated in Australia.
- Due to the packaging, environmental release of the notified polymer from cartridges during importation, transportation, storage, handling and use is unlikely. In the event of an accidental leakage, clean-up procedures are expected to efficiently remove the majority of the released notified polymer.
- It is estimated that annually a maximum of < 5 tonnes of the notified polymer will remain in empty cartridges, most of which will be disposed of to landfill. Currently up to a third of waste paper is recycled, thus < 15 tonnes of the notified polymer will enter the paper recycling process annually. The remaining < 25 tonnes will be disposed to landfill, or possibly incinerated, bound to printed paper.

Exposure Assessment

- Due to its expected moderate water solubility, the notified polymer is likely to be mobile in soils. However, it is unlikely to move from the landfilled printed waste material into leachate or groundwater since the majority it will be bound on the paper in an inert matrix. If the polymer does enter the leachate it will be present at very low concentrations and will be released in a diffuse manner across Australia. The notified polymer will degrade through abiotic and biotic processes to water vapour and oxides of carbon and potassium salts.
- Incineration of waste paper will destroy the notified polymer and will generate water vapour and oxides of potassium, carbon and nitrogen.
- During the paper recycling process, the paper will be repulped in water, decontaminated, deinked with alkali, washed, cooked, bleached, screened and then used in the normal process as in other pulp materials. The alkali mixture resulting from the deinking stage is most likely recycled or neutralised and disposed of to a wastewater treatment plants (WWTP) by a licensed waste contractor. It is expected that all of the ink (including the bound notified polymer) removed from the paper/pulp during deinking will mostly move to sludge, though some may remain in the water compartment due to its expected moderate water solubility.

The notified polymer is not expected to bioaccumulate due to its high molecular weight.

6.2. Summary of Occupational Exposure

- Potential areas for exposure are distribution and end use.
- The notified polymer will be imported into Australia as a component in finished ink cartridges at up to 10% of the finished ink product.
- Exposure would be low due to the small quantities involved and the modular design of the cartridges.
- The ink is fully and irreversibly deposited to the paper immediately on application.
- During importation the storemen or importer will only handle single totally sealed sales units. Due to the multiple layering of packaging and the design of the cartridge, contact is extremely unlikely if not impossible.
- Office support and maintenance personnel may become exposed to the product containing the notified chemical due to breaches of the cartridges, however exposure will be minimal due to the small quantities of chemicals involved and the cartridge design.
- The notified polymer is applied in a precise and accurate manner without creating a mist or atomisation and hence there is no possibility of it being available to be inhaled by any person with respiratory problems.

During transport and storage, workers are unlikely to be exposed to the notified polymer except when packaging is accidentally breached.

The notified polymer will be imported in pre-packed cartridges. Dermal and inhalation exposure to the notified polymer may occur when replacing spent cartridges. However, the concentration of the notified polymer in the ink is low, and the design of the cartridges is such that exposure to the notified polymer should be low.

6.3. Summary of Public Exposure

- The ink polymer may attract a wide use within the community.
- The notified polymer is contained within specially designed sealed cartridges and thus accidental spills or exposure during normal use are unlikely. Public exposure would only occur through accidental breaches of the cartridges holding the ink that contains the notified polymer.
- As the ink is fully and irreversibly bound to the paper on application, no public exposure is likely once the product containing the notified polymer has been used.

Members of the public may come into contact with ink cartridges containing the notified polymer at up to 10% of the ink. Exposure is likely to be very low.

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	Clear to slightly yellow solution polymer
Melting Point/Glass Transition Temp	Not measured
Density	50% w/w solution in THF is 1140 kg/m ³ (temperature not supplied) Estimated density of solid 1100 –1200 kg/m ³ .
Water Solubility	The notifier has indicated that it's water solubility is expected to be approximately 10% by weight The polymer contains a functionality expected to have typical acidity, therefore would be expected to be water soluble to some degree.
Particle Size	Is in solution.
Reactivity	Stable under normal environmental conditions
Degradation Products	Combustible. Information on degradation products not supplied.

Stability in Water

Polymer contains groups which are unlikely to hydrolyse under ambient environmental conditions (pH 4-9). A stability test has indicated that a closely related polymer is stable at pH 2, 7 and 9. Initially, the molecular weight of the test material was determined and then samples were crushed and dissolved or dispersed in pure water to give a concentration of 1000 mg/L at pH 1.2, 2, 7 and 9. After 4 hours of agitation at 40°C in natural light the Dissolved Organic Carbon (DOC) was measured in all samples. The pH 2, 7 and 9 samples were then agitated for a further 14 days while the pH 1.2 sample was agitated for 15 days. The DOC was again measured and the samples were filtered and dried. The molecular weight of the dried material was then determined by GPC. Comparison of the DOC levels and the molecular weights did not show any significant changes, thus indicating the polymer was stable in the pH levels tested.

8. HUMAN HEALTH IMPLICATIONS

8.1 Toxicology

Toxicological Investigations

The following toxicological studies were submitted on ink containing up to 10% of the notified polymer:

<i>Endpoint and Result</i>	<i>Assessment Conclusion</i>
Local lymph node assay in mice	no evidence of sensitisation.
Genotoxicity - bacterial reverse mutation	non mutagenic

All results were indicative of low hazard.

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

10. RISK ASSESSMENT

10.1. Environment

The notified polymer will be imported into Australia as a component in an ink formulation in finished cartridges. Release of the polymer to the environment is not anticipated because the ink is housed in sealed cartridges, designed to prevent release until the cartridges are inserted into the printer. Ultimately most of the notified polymer in the ink will be bound to printed paper (in stable polymer matrix formed by reaction with other ink components), which at the end of its useful life will be either buried in landfill, incinerated, or recycled.

The notified polymer in ruptured landfilled cartridges will be mobile in soil thus entering the leachate or groundwater, but this will be at very low concentrations. The polymer is expected to undergo slow degradation by biotic and abiotic processes. Incineration is expected to destroy the notified polymer resulting in the release of combustion products such as water and oxides of carbon and metal salts.

Given these considerations, the potential risk to the environment posed by the use of the polymer is low.

10.2. Occupational health and safety

The OHS risk presented by the notified polymer is expected to be low, based on low hazard and low exposure.

10.3. Public health

The risk to the public from the notified polymer is considered low. Members of the public may use ink cartridges containing the notified polymer as an ingredient of ink. During normal use, dermal or inhalational contact with the polymer is expected to be very low. Dermal contact could occur if the cartridges were breached. However, the risk to public health will be low because the notified polymer is present at low volumes and concentrations and is unlikely to be bioavailable.

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

11.2. Environmental risk assessment

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

11.3. Human health risk assessment

11.3.1. Occupational health and safety

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

11.3.2. Public health

There is Low Concern when used by the public as a component of printing ink for home applications.

12. MATERIAL SAFETY DATA SHEET

12.1. Material Safety Data Sheet

The notifier has provided MSDS for the final ink product containing the notified polymer. 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.
- Service personnel should wear cotton or disposable gloves and ensure adequate ventilation is present when removing spent printer cartridges containing the notified polymer and during routine maintenance and repairs.
- 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

- The following control measures should be implemented by distributor to minimise environmental exposure during use of the notified polymer:
 - Clear instructions on installation of cartridge and disposal of any spilt material or empty cartridges.

Disposal

- The cartridges which hold the product containing the notified polymer should be disposed of to domestic landfill. The pages on which the notified polymer has been applied should either be landfilled, incinerated or recycled.

Emergency procedures

- Spills/release of the notified polymer should be contained and not allowed to enter any water body or course, then should be manually collected.

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.or
- (2) Under subsection 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.

No additional secondary notification conditions are stipulated.