

File No PLC/750

January 2008

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

FULL PUBLIC REPORT

NEJI-9 polymer in Epson Ink Cartridge

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 Water Resources.

For the purposes of subsection 78(1) of the Act, this Full Public Report may be inspected at our NICNAS office by appointment only at 334-336 Illawarra Road, Marrickville NSW 2204.

This Full Public Report is also available for viewing and downloading from the NICNAS website or available on request, free of charge, by contacting NICNAS. For requests and enquiries please contact the NICNAS Administration Coordinator at:

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**Director
NICNAS**

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FULL PUBLIC REPORT**NEJI-9 polymer in Epson Ink Cartridge****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

EPSON Australia Pty. Ltd. (ABN 91 002 625 783)
3 Talavera Road, North Ryde, NSW 2113

NOTIFICATION CATEGORY

Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical Name, Other Names, CAS Number, Molecular and Structural Formulae, Molecular Weight, Polymer Constituents, Residual Monomers/Impurities, Use Details

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)

None

NOTIFICATION IN OTHER COUNTRIES

USA

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

NEJI-9

MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn) >10000 Da

Reactive Functional Groups

The notified polymer contains only low concern functional groups.

3. PLC CRITERIA JUSTIFICATION

Criterion	Criterion met
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	Yes
Low Charge Density	Yes
Approved Elements Only	Yes
Stable Under Normal Conditions of Use	Yes
Not Water Absorbing	Yes
Not a Hazard Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

4. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	Powder dispersed in liquid (product)
Melting Point	Not determined
Density	1040 kg/m ³ at 20°C
Water Solubility	< 1 × 10 ⁻³ g/L (dissolved organic carbon value, temperature unspecified). No supporting data submitted. The presence of anionic functionality could facilitate relative water solubility.
Dissociation Constant	The notified polymer contains anionic functionality with typical acidity of pKa ≈ 5.
Particle Size	106 nm
Reactivity	While the notified polymer contains hydrolysable functionality, it is expected to be stable under normal environmental conditions
Degradation Products	None under normal conditions of use

5. INTRODUCTION AND USE INFORMATION

Maximum Introduction Volume of Notified Chemical (100%) Over Next 5 Years

Year	1	2	3	4	5
Tonnes	< 1	< 1	< 1	< 1	< 1

Use

Component of ink for use in inkjet printer.

Mode of Introduction and Disposal

The notified polymer will be imported as a component of inkjet printing inks in pre-packed cartridges. The inks will contain < 3% notified polymer.

6. HUMAN HEALTH IMPLICATIONS

Hazard Characterisation

No toxicological data were submitted. The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard.

Occupational Health and Safety Risk Assessment

The primary route of exposure of workers to the notified polymer is likely to be dermal, during the use or maintenance of inkjet printers and/or handling of inkjet cartridges. Skin contact is likely to be avoided by workers to avoid staining of skin. The notified polymer is imported as a component of inkjet ink at low levels (< 3%) in inkjet cartridges, and is therefore unlikely to cause significant levels of exposure by any route.

The notified polymer is therefore considered to present a low risk to the health of workers, based on its low toxicity, low concentration in inkjet inks and low potential for exposure.

The notified polymer is of high molecular weight and has the potential to cause lung overloading. However, the notified polymer is imported in pre-packed cartridges and inhalation exposure to the ink is unlikely. Therefore it is not expected to pose an unreasonable risk.

Public Health Risk Assessment

The public's potential for exposure to the notified polymer during the handling of inkjet ink cartridges is similar to that of workers. Therefore, the notified polymer is likely to present a low risk to public health, based on its low toxicity, low concentration in inkjet inks and low potential for exposure.

7. ENVIRONMENTAL IMPLICATIONS

Hazard Characterisation

No ecotoxicological data were submitted. Anionic polymers are known to be moderately toxic to algae. The mode of toxic action is overchelation of nutrient elements needed by algae for growth. The highest toxicity is when the acid is on alternating carbons of the polymer backbone. This possibly applies to the notified polymer. Further, the toxicity to algae is likely to be reduced due to the presence of calcium ions, which will bind to the functional groups.

Environmental Risk Assessment

The notified polymer will be imported in sealed cartridges. There will be no release to the environment due to reformulation or repackaging. The ink cartridges are designed to prevent leakage and will not be opened during transport, use, installation or replacement. Therefore, release of ink containing the notified polymer to the environment is not expected under normal conditions. Cartridges will be changed by office workers and the public. However, if leakage or spillage does occur, the ink will be contained with absorbent material, which will presumably be disposed of in landfill in the normal office garbage along with the empty cartridges and print heads.

The sealed cartridges are contained within the printer until they are removed for disposal. Residual ink (< 5%) left in empty cartridges will most likely be disposed of to landfill.

Most of the notified polymer will be bound to printer paper, which will be disposed of to landfill, recycled or incinerated. Recycling of treated paper may result in the release of a proportion of the notified polymer to the aquatic compartment. Waste paper is repulped using a variety of polymer treatments, which result in fibre separation and ink detachment from the fibres. The wastes are expected to go to trade waste sewers. Due to the low percentage of notified polymer in the ink and the widespread use, release to the aquatic compartment will be highly diluted. The notified polymer adsorbed to sludge during the recycling process will be disposed of to landfill.

Empty cartridges which contained the ink preparation will be disposed of by landfill.

Notified polymer disposed of to landfill is expected to associate with soil and organic material and should be relatively immobile within the landfill environment. Over time, the notified polymer is expected to degrade by biotic and abiotic means to form simple organic compounds.

Notified polymer on printed paper sent for recycling, which is not removed during recycling is expected to be released via the trade sewer where a major proportion may be absorbed to sludge due to low solubility. Any remaining polymer that enters the aquatic environment is expected to eventually associate with soil and sediments, and over time degrade via biotic and abiotic processes to form simple organic compounds.

As no ecotoxicity data are available, a PNEC and resultant Risk Quotient (Q) are unable to be calculated. However, given the likely low ecotoxicity together with the low volume and diffuse release pattern, there should be an adequate safety margin and the overall environmental risk is expected to be acceptable.

8. CONCLUSIONS AND RECOMMENDATIONS

Human health risk assessment

Under the conditions of the occupational settings described, the risk to workers is considered to be acceptable.

When used in the proposed manner the risk to the public is considered to be acceptable.

Environmental risk assessment

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

Recommendations

CONTROL MEASURES

Occupational Health and Safety

- Specific engineering controls, work practices or personal protective equipment 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 *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)], workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Disposal

- The notified polymer should be disposed of to landfill.

Emergency procedures

- Spills and/or accidental release of the notified polymer should be handled by physical containment, collection and subsequent safe disposal.

Regulatory Obligations

Secondary Notification

This risk assessment is based on the information available at the time of notification. The Director may call for the reassessment of the chemical under secondary notification provisions based on changes in certain circumstances. Under Section 64 of the *Industrial Chemicals (Notification and Assessment) Act (1989)* the notifier, as well as any other importer or manufacturer of the notified chemical, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified chemical is listed on the Australian Inventory of Chemical Substances (AICS).

Therefore, the Director of NICNAS 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.

or

- (2) Under Section 64(2) of the Act; if
 - the function or use of the polymer has changed from component of printer ink for use in inkjet printer, or is likely to change significantly;
 - the amount of polymer being introduced has increased from **1 tonne per annum**, or is likely to increase, significantly;
 - **if the polymer has begun to be manufactured in Australia;**
 - additional information has become available to the person as to an adverse effect of the polymer on occupational health and safety, public health, or the environment.

The Director will then decide whether a reassessment (i.e. a secondary notification and assessment) is required.

Material Safety Data Sheet

The MSDS of the **products containing the notified polymer** provided by the notifier was reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.