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

FULL PUBLIC REPORT

Lexmark Polymers 823B/209A/1329A

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**

TABLE OF CONTENTS

FULL PUBLIC REPORT.....	3
1. APPLICANT AND NOTIFICATION DETAILS	3
2. IDENTITY OF CHEMICAL	3
3. PLC CRITERIA JUSTIFICATION	3
4. PHYSICAL AND CHEMICAL PROPERTIES	4
5. INTRODUCTION AND USE INFORMATION.....	4
6. HUMAN HEALTH IMPLICATIONS.....	4
Hazard Characterisation.....	4
7. ENVIRONMENTAL IMPLICATIONS	5
Hazard Characterisation.....	5
8. CONCLUSIONS AND RECOMMENDATIONS.....	6
Human health risk assessment	6
Recommendations.....	6
Regulatory Obligations.....	6

FULL PUBLIC REPORT**Lexmark Polymers 823B/209A/1329A****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

Lexmark International (Australia) Pty Limited (ABN 86 050 148 466)
13b Narabang Way
Belrose NSW 2085

NOTIFICATION CATEGORY

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, Residual Monomers/Impurities and Import Volume.

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

Korea 2007

USA Polymer exemption

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Lexmark 823B Polymer
Lexmark 209A Polymer
Lexmark 1329A Polymer

MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn) >1000 Daltons

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:	Pale Yellow solid
Melting Point	> 360°C (using DSC)
Density	1860 kg/m ³ at 20.2°C
Water Solubility	350 to 399 g/L at 20±0.5°C as determined visually using the flask method, OECD TG 105.
Dissociation Constant	pKa = 4.32±0.50 (Estimated). It is not possible to experimentally determine the dissociation constants due to the structure of the notified polymer.
Particle Size	<0.1% under 100 µm notified polymer (Present in solution)
Reactivity	Stable under normal environmental conditions. The results of hydrolysis testing at pH 1.2, 4, 7 and 9 indicate that the notified polymer is most unstable at pH 4 and below.
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	<0.1	<0.1	<0.1	<0.1	<0.1

Use

The notified polymer is a component of the ink in printer ink cartridges at concentrations up to 5%. Both the public and businesses will use the printer cartridges containing the notified polymer.

Mode of Introduction and Disposal

There will be no manufacture or reformulation of the notified polymer within Australia.

The notified polymer is imported in the finished printer cartridges ready for final end use through the port of Sydney.

6. HUMAN HEALTH IMPLICATIONS

Hazard Characterisation

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard. This is supported by toxicological endpoints observed in testing conducted on the notified polymer.

<i>Endpoint</i>	<i>Result</i>	<i>Effects Observed?</i>	<i>Test Guideline</i>
1. Rat, acute oral	LD50 >2000 mg/kg bw	yes	OECD TG 401
2. Genotoxicity - bacterial reverse mutation	non mutagenic to <i>Salmonella typhimurium</i> TA98	no	Non-GLP Testing

All results were indicative of low hazard.

One death, which was caused by an inadvertent gavage accident, was seen in the rat acute oral toxicity test.

Occupational Health and Safety Risk Assessment

Dermal and inhalation exposure of workers to the notified polymer may occur when refilling/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. Once the ink dries, the chemical would be trapped in the printed paper, and therefore dermal exposure to the notified chemical from contact with the dried ink is not expected.

Overall, the OHS risk presented by the notified polymer is expected to be low, based on low exposure to workers and the low intrinsic hazard of the polymer.

Public Health Risk Assessment

The scenarios by which the public may be exposed to the notified chemical would involve home use of printers, and are similar to those for office workers. However, it is expected that the public will be using the printer less often than workers.

Although the public will be exposed to the notified polymer during use of printer cartridges containing the notified polymer, the risk to public health is considered to be low due to low exposure and the predicted low hazard of the notified polymer.

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 could apply to the notified polymer. However, any 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

Printer ink will be imported in ready-to-use cartridges. No release is expected as manufacturing and reformulation of the ink containing the notified polymer will not take place in Australia. Environmental release of the notified polymer is unlikely during importation, storage and transportation, and spillage during a transport accident is the most likely reason for environmental release. Individual container capacity, container and packaging specifications would limit the extent of release.

The ink cartridges are designed to prevent leakage and will not open during transport, use, installation or replacement. Therefore, release of ink containing the notified polymer to the environment is not expected under normal conditions of use. Spills during installation and replacement will be contained with absorbent and disposed of in landfill.

Most of the notified polymer (>98%) will be bound to the printed 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 chemical treatments, which result in fibre separation and ink detachment from the fibres. The waste is expected to go to trade waste sewers. Approximately 50% of the ink printed on paper will enter paper recycling of which a proportion of the ink is expected to be recovered during recycling. While most may partition to water, due to the low import levels and percentage of the notified polymer in these inks and the widespread use, release to the aquatic compartment from any given recycling plant will still be low based on worst case assumptions. Any chemical absorbed to sludge during recycling process will be disposed of to landfill.

The total import volume of the notified polymer will ultimately be disposed as normal office/domestic waste that will end up in either landfill or be incinerated. Some waste paper printed with the ink may be disposed of directly to landfill with the notified polymer bound to the paper. Some will enter the paper recycling process. Used cartridges may be sent to recycling and disposal centres. The cartridges will be broken down into component parts for recycling. Residual ink (< 2% of the notified polymer) left in the empty cartridges will be separated from the cartridges and incinerated during the recycling of the cartridges. If the used cartridges are not recycled, they are expected to be disposed of to landfill.

Notified polymer that is incinerated is expected to thermally decompose to form predominantly simple organic compounds and various salts. Similarly, notified polymer that is disposed of to landfill should eventually degrade to similar products.

The notified polymer disposed of to landfill may be mobile, however, the low proposed annual import volume, and diffuse release throughout Australia will mitigate any potential exposure while the notified polymer slowly degrades.

In Australia, approximately 50% of printed paper is recycled. Given the low volume and diffuse release pattern, 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 notified chemical is not expected to pose an unacceptable risk to workers.

When used in the proposed manner the notified chemical is not expected to pose an unacceptable risk to the public.

Environmental risk assessment

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

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 *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 chemical has changed from a component of the ink in printer ink cartridges at concentrations up to 5%, or is likely to change significantly;
 - the amount of chemical being introduced has increased from 0.1 tonnes, or is likely to increase, significantly;
 - if the chemical has begun to be manufactured in Australia;
 - additional information has become available to the person as to an adverse effect of the chemical 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.

No additional secondary notification conditions are stipulated.

Material Safety Data Sheet

The MSDS of products containing the notified chemical provided by the notifier were reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.