File No PLC/519

21 January 2005

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

2-Propenoic acid, butyl ester, polymer with diethenylbenzene and ethenylbenzene

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

2-Propenoic acid, butyl ester, polymer with diethenylbenzene and ethenylbenzene

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Kodak (Australasia) Pty Ltd (ABN 49 004 057 621) of 173 Elizabeth Street Coburg VIC 3058; and
IBM Australia Ltd (ABN 79 000 024 733) of Level 13, IBM Centre, 601 Pacific Highway St Leonards NSW 2065.

NOTIFICATION CATEGORY
Synthetic Polymer of Low Concern – Self Assessment

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
No details are claimed exempt from publication.

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
None.

2. IDENTITY OF CHEMICAL

CHEMICAL NAME
2-Propenoic acid, butyl ester, polymer with diethenylbenzene and ethenylbenzene

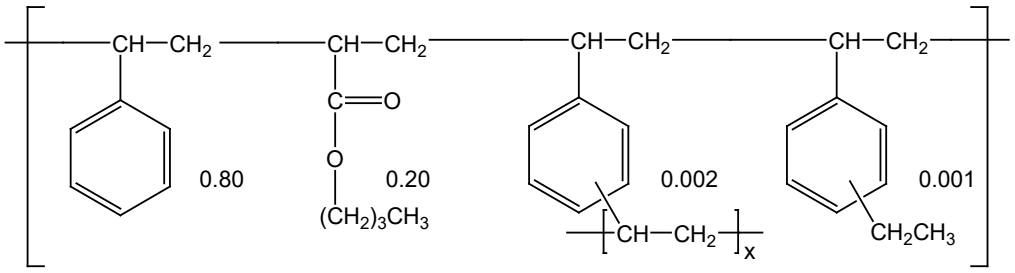
OTHER NAME(S)
Butyl acrylate-divinylbenzene-styrene block copolymer
Butyl acrylate-divinylbenzene-styrene copolymer
n-Butyl acrylate-divinylbenzene-styrene copolymer

MARKETING NAME(S)
KODAK Digimaster D1 Toner, KODAK Digimaster M1 Toner and IP2000 TonerV2 (50-80% w/w notified polymer)

CAS NUMBER
60806-47-5

MOLECULAR FORMULA
$(C_{10}H_{10}.C_8H_8.C_7H_{12}O_2)x$

STRUCTURAL FORMULA



MOLECULAR WEIGHT

Number Average Molecular Weight (Mn)	35000
Weight Average Molecular Weight (Mw)	288000
Polydispersity Index (Mw/Mn)	8.2
% of Low MW Species < 1000	<1%
% of Low MW Species < 500	<1%

3. COMPOSITION

POLYMER CONSTITUENTS

Chemical Name	*CAS No.*	*Weight % starting*	*Weight % residual*
Benzene, ethenyl-	100-42-5	80	<0.01
2-Propenoic acid, butyl ester	141-32-2	20	<0.01
Benzene, diethenyl-	1321-74-0	0.2	<0.01

PLC CRITERIA JUSTIFICATION
Not Applicable

Criterion	*Criterion met (yes/no/not applicable)*
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	Not applicable
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. FGEW requirements do not apply due to high molecular weight, but the notified polymer does not contain reactive functional groups with FGEW <5000.

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
Imported, as a component of finished toner products.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	30-50	30-50	30-50	30-50	30-50

USE
As a component (50-80%) of copier and printer toners supplied in ready-to-use sealed bottles.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

No manufacturing, reformulation, filling or refilling of toner bottles will occur in Australia. Toners containing the notified polymer will be import in pre-packed plastic bottles that are purchased and generally stored by the end user. When needed, the user will follow replacement procedures recommended by the manufacturer. This involves sliding the empty bottle out of the copier and sliding a new bottle in place with a seal released to allow the toner to be available for copying. The empty bottle is either disposed of with normal office/domestic waste or saved for recycling through the supplier.

6. EXPOSURE INFORMATION

6.1. Summary of Occupational Exposure

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

Office staff and service engineers may be intermittently exposed to the notified polymer contained in the bottles via skin contact when replacing the spent cartridges, cleaning paper jams or during maintenance and servicing. Exposure by inhalation may also occur, although the amount of dust around the copiers is expected to be minimal. The service engineers will wear gloves and receive appropriate training in servicing techniques. Toner bottles are sealed and worker exposure to the toner is minimised by following instructions on opening the copier and replacing the toner recommended by the manufacturer.

Contact with paper printed with the ink containing the notified polymer is unlikely to result in dermal exposure as the polymer will be bound within the matrix of the paper and become inert, except if the paper or other substrate is handled before the ink has dried.

6.2. Summary of Public Exposure

Public exposure may potentially occur from contact with printed media containing the notified polymer, residues in the copier, and during the toner replacement. However, the toner is contained within sealed bottles which are not expected to leak during normal use, while the ink deposited on the printed pages is bound to the paper and hence not biologically available once dried.

6.3. Summary of Environmental Exposure

6.3.1. Environmental Release

Residual material in toner bottles may be disposed of in a landfill.

6.3.2. Environmental Fate

The notified polymer has the potential to hydrolyse but this is unlikely to occur under the environmental pH range of 4-9 due to its low water solubility. The notified polymer is not expected to biodegrade in the environment. It is also not expected to bioaccumulate in the food chain based on its high molecular weight.

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	White bead
Melting Point/Glass Transition Temp	Not available
Density	Not available
Water Solubility	Expected to be low due to its large hydrocarbon constituents with no dissociable groups
Particle Size	Not available
Reactivity	Stable under normal environmental conditions
Degradation Products	CO, CO_2, acrylate monomers, and hydrocarbons

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

The following toxicological end-points were available for a toner product containing >90% notified polymer.

Endpoint	*Result*	*Classified?*	*Effects Observed?*
Rat, acute oral LD50 >5000 mg/kg bw	low toxicity	no	no
Rabbit, skin irritation	non-irritating	no	no
Rabbit, eye irritation	non-irritating	no	no
Guinea pig, skin sensitisation	no evidence of sensitisation	no	no

All results were indicative of low hazard.

8.2. Human Health Hazard Assessment

The notified polymer meets the PLC criteria and the available toxicological data supports the conclusion of low hazard.

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology

No toxicological data were submitted.

9.2. Environmental Hazard Assessment

The literature indicates non-water soluble, non-ionic polymers with MW>1000 are of low hazard to the environment.

10. RISK ASSESSMENT

10.1. Environment

While environmental exposure is limited during toner use, the total import volume of the notified polymer will ultimately be disposed of in either landfill or be incinerated. The widespread use pattern indicates that landfills throughout Australia would receive the notified polymer bound into the toner matrix within containers and on paper products. The used toner would be expected to remain within the container unless breached. On paper the notified polymer will interact with other components to form a stable polymer matrix and, once dry, is expected to be immobile and pose little risk to the environment. During recycling processes, waste paper is repulped using a variety of alkaline, dispersing and wetting agents, water emulsifiable organic solvents and bleaches. These agents enhance fibre separation, toner detachment from the fibres, pulp brightness and the whiteness of paper. These aqueous wastes are expected to go to sewer. Little of the notified polymer is expected to partition to the supernatant water which is released to the sewer. Sludge generated during the washing process is dried and incinerated or sent to landfill for disposal.

The notified polymer is not likely to present a risk to the environment when it is stored, transported, used, recycled and disposed of in the proposed manner.

10.2. Occupational Health and Safety

The OHS risk presented by the notified polymer is expected to be low. The notified polymer may be 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.

10.3. Public Health

The risk to public health will not be a significant concern given the design of the pre-packed

toner bottle and the expected bio-unavailability of the notified polymer once bound to the paper on copying.

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 No Significant Concern to public health when used in the proposed manner.

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.
- In the interest of occupational health and safety, the following guidelines and precautions should be observed for use of the notified polymer as introduced as a component of toner products:
  - Wearing cotton or disposable gloves and ensuring adequate ventilation during replacement of toner bottles, machine maintenance and repair services;
  - Adequate induction and training programs for service personnel.
- 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.

Disposal

- The notified polymer should be disposed of in landfill or incineration.

Emergency procedures

- Spills/release of the notified polymer should be handled by sweeping onto suitable material and transfer to a sealable waste container for appropriate disposal in accord with government regulations.

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.