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

FULL PUBLIC REPORT

ZSR-20Be4

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Street Address:	334 - 336 Illawarra Road MARRICKVILLE NSW 2204, AUSTRALIA.
Postal Address:	GPO Box 58, SYDNEY NSW 2001, AUSTRALIA.
TEL:	+ 61 2 8577 8800
FAX	+ 61 2 8577 8888.
Website:	www.nicnas.gov.au

Director

Chemicals Notification and Assessment

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FULL PUBLIC REPORT

ZSR-20Be4

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

Ricoh Australia Pty Ltd
8 Rodborough Rd
FRENCHS FOREST NSW 2086

Lanier Australia Pty Ltd
854 Lorimar St
PORT MELBOURNE VIC 3207

NOTIFICATION CATEGORY

[Limited: Polymer with NAMW \geq 1000 (greater than 1 tonne per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

- Chemical identity
- CAS Number
- Molecular Weight
- Molecular and Structural Formulae
- IR Spectrum
- Import Volumes
- Concentration of the notified polymer in the toner

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

MARKETING NAME(S)

ZSR-20Be4

METHODS OF DETECTION AND DETERMINATION

ANALYTICAL METHOD FTIR

METHOD

Remarks KBr disk

TEST FACILITY

3. COMPOSITION

DEGRADATION PRODUCTS

The notified polymer is considered stable under normal circumstances of use and storage. Hazardous decomposition or polymerisation will not occur at room temperature.

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES

Once bound to paper, all constituents of the toner will be fixed and leaching is not expected to occur.

4. INTRODUCTION AND USE INFORMATION

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

The notified polymer will be imported as a component of pre-packed photocopier toner.

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	<1	1-3	1-3	1-3

USE

The notified polymer is a component of photocopier toner imported in ready-to-use cartridges containing 550 g of toner.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, Transport and Storage

TRANSPORTATION AND PACKAGING

The notified polymer is imported as a component in a photocopier toner preparation contained within a closed cartridge.

5.2. Operation Description

The notified polymer is imported from overseas as a component of printer ink. The toner is contained in a sealed cartridge which itself is packaged in cardboard.

The cartridges will be transported from the port of entry to the local notifier's warehouses where they will be stored until distribution to customer outlets around Australia. The cartridges will be installed/replaced primarily by copier service engineers..

5.3. Occupational exposure

Number and Category of Workers

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration</i>	<i>Exposure Frequency</i>
Storage & Transport	6-8	2-3 hours/day	10-15 days/year
Customer Service Engineers	200	5-20 minutes	200 days/year

Exposure Details

Exposure to the notified polymer during the importation transport and storage of the printer cartridges is not expected except in the unlikely event of an accident where the sealed cartridge and its packaging may be breached.

Office workers and service technicians may be exposed to the notified polymer when changing printer cartridges with service technicians also potentially exposed during printer maintenance.

Users of the printers may be exposed to the notified polymer during handling of printed paper, however, in this state the notified polymer is bound to the paper matrix and not expected to be readily bioavailable.

5.4. Release

RELEASE OF CHEMICAL AT SITE

The notified polymer is not manufactured or reformulated in Australia.

RELEASE OF CHEMICAL FROM USE

Due to packaging specifications, 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 up to 200 kg will remain in empty cartridges, most of which will be disposed of to land fill. Up to an additional 1,000 kg of the notified polymer bound to printed paper may also be disposed of to landfill. In addition, up to 500 kg is expected to enter the paper recycling process.

5.5. Disposal

The majority of the notified polymer will either be disposed of to landfill or incinerated. Small amount may also be released to sewer as a result of paper recycling processes.

5.6. Public exposure

Members of the public may be exposed to the notified polymer through handling of the printed paper. However, once printed onto paper the notified polymer is bound and unavailable for release.

6. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	Pale yellow powder granule
Melting Point/Glass Transition Temp	Not available
Density	1200 kg/m ³ at 20°C
Water Solubility	0.5 mg/L at 20°C
Particle Size	1.0-9.6 mm
Degradation Products	No degradation expected
Loss of monomers, other reactants, additives impurities	Not expected

The solubility of the polymer was determined by frequently mixing samples of the polymer in water by hand for 1 h at 40°C, followed by shaking for 24 h at 25°C. After shaking samples were collected by filtration, dried and weighed. Solubility was determined from the difference in mass initially and after drying.

The polymer contains ester, carbamate and urethane linkages which should not hydrolyse under ambient environmental conditions. The low solubility suggests partitioning into the organic phase and to soils and sediments. The polymer contains amino groups which would be expected to display typical basicity.

7. TOXICOLOGICAL INVESTIGATIONS

No toxicological data were submitted.

8. ENVIRONMENT

8.1. Environmental fate

No environmental fate data were submitted.

Due to its low water solubility, the notified polymer is likely to be immobilised through adsorption to organic components of soils and landfilled waste material and unlikely to move into landfill leachate or groundwater. The long residence time in landfill would allow abiotic and slow biotic processes to degrade the notified polymer.

Incineration of waste paper will destroy the notified polymer and will generate water vapour and oxides of carbon and nitrogen.

During the paper recycling process, the paper will be repulped in water, cleansed of contaminants, 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 plant (WWTP) by a licensed waste contractor. It is expected that all of the developer removed from the paper/pulp during de-inking will mostly move to sludge due to its low solubility.

The notified polymer is not expected to cross biological membranes, due to the expected low solubility, high molecular weight and strong adsorption to soil, and as such should not bioaccumulate (Connell 1989).

8.2. Ecotoxicological investigations

No ecotoxicity data were submitted. The notified polymer contains amino functional groups which are potentially toxic to aquatic organisms. However, due to the low environmental exposure as a result of the proposed use pattern, the polymer is not expected to be toxic to aquatic organisms.

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

Release of the toner containing the notified polymer to the environment is not expected under normal use as the cartridge is designed to prevent leakage. However, if leakage does occur, the toner will be contained and presumably disposed of in landfill. Environmental exposure will result from the disposal of printed paper and discarded cartridges as well as the possibility of accidental leakage of the cartridges during use. Toner residues contained in the empty cartridges are expected to be about 2% of the import volume and to remain within these containers, although release could occur from deterioration of the cartridge. The total import volume of the notified polymer will ultimately be disposed of in either landfill or be incinerated or recycled with paper.

Waste paper may be disposed of directly to landfill with the notified polymer strongly bound to the paper. It is anticipated that prolonged residence in an active landfill environment would eventually degrade the compound. Incineration of waste paper will destroy the compound with the generation of water vapour and oxides of carbon, sulphur and nitrogen.

In addition to landfill, some of the ink printed on paper will enter the paper recycling process. During such 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, ink detachment from the fibres, pulp brightness and the whiteness of paper. De-inking wastes are expected to go to trade waste sewers. Trade sources estimate the washing process will recover 30-60% of the total amount of ink and therefore at least 30% of the notified polymer in the recycled paper will be disposed of with sludge in landfill.

Assuming a worst-case situation in which the entire import volume is released to sewer and not removed during sewage treatment processes, the daily release on a nationwide basis to receiving waters is estimated to be 8.2 kg/day. Assuming a national population of 19,500,000 and that each person contributes an average 200 L/day to overall sewage flows, the predicted concentration in sewage effluent on a nationwide basis is estimated as 2.1 µg/L.

Amount entering sewer annually	≈3000 kg
Population of Australia	19.5 million
Amount of water used per person per day	200 L
Number of days in a year	365
Estimated PEC	≈ 2.1 µg/L (2.1ppb)

9.1.2. Environment – effects assessment

No ecotoxicity data were submitted. However, the notified polymer contains free amine groups that are a high concern reactive functional group due to their cationic nature. Cationic polymers are potentially toxic to aquatic organisms as they interfere with sensitive external tissues such as gills (Connell, 1997)

9.1.3. Environment – risk characterisation

The notified polymer will be imported into Australia as a component in a toner formulation in finished toner cartridges. Release of the polymer to the environment is not anticipated because the toner 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 toner will be bound to printed paper, which at the end of its useful life will be either buried in landfill, incinerated, or recycled.

Owing to its low water solubility, polymer entering soils via landfill, either fixed to paper, residing in sludge, or released from ruptured cartridges, is not expected to be mobile and enter the aquatic compartment in surface runoff or percolating groundwater. In soil environments, 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 carbon monoxide, carbon dioxide, and low molecular weight organics.

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

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

The notified polymer will be imported in pre-packed sealed cartridges. During transport and storage, workers are unlikely to be exposed to the notified polymer except when cartridges are accidentally breached.

Printer technicians and office staff replacing cartridges may come into small quantities of the notified polymer as a component of free toner of which small quantities may accumulate in the printer over time.

Exposure to the notified polymer on printed paper is low as the dye is bound to the paper matrix.

9.2.2. Public health – exposure assessment

Public exposure through importation, transportation or storage is assessed as negligible. There is little potential for exposure during cartridge changes. Ink containing the notified polymer on the printed page is bound to the paper and is not biologically available. Public exposure is assessed as low.

9.2.3. Human health - effects assessment

The notified polymer has a high molecular weight (NAMW >1000) and a low water solubility indicating low potential to cross biological membranes. The notified polymer is not considered to be hazardous.

The fine particles of the imported toner may cause mechanical irritation to the eyes, and to the respiratory tract if inhaled. Repeated or prolonged skin contact may result in mild irritation.

9.2.4. Occupational health and safety – risk characterisation

The notified polymer will be imported in pre-packed toner cartridges. Dermal and inhalation exposure of office workers to the notified polymer will potentially occur when replacing spent cartridges and clearing paper jams from the photocopier.

The toner is contained within cartridges which are not normally opened and which release toner only in very small doses. The OHS risk presented by the notified polymer is therefore expected to be low.

9.2.5. Public health – risk characterisation

Members of the public are not likely to make contact with the notified polymer during cartridge changes unless the cartridge is ruptured or otherwise tampered with. Additionally the notified polymer is present at low concentrations in a formulation which is not classified as hazardous. Ink containing the notified polymer on the printed pages is bound to the paper and is not bioavailable.

Therefore, the risk to public health from exposure to the notified polymer is considered low.

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

10.1. Hazard classification

Based on the available data the notified polymer is not classified as hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999).

10.2. Environmental risk assessment

On the basis of the PEC/PNEC ratio:

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

10.3. Human health risk assessment

10.3.1. Occupational health and safety

There is low concern to occupational health and safety under the conditions of the occupational settings described.

10.3.2. Public health

There is negligible concern to public health when used in the intended manner.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of the product containing the chemical provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). It is published here as a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

11.2. Label

The label for the product containing the chemical provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994b). The accuracy of the information on the label remains the responsibility of the applicant.

12. 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 and office staff should wear cotton or disposable gloves and ensure adequate ventilation is present when removing spent 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

Disposal

- The notified polymer should be disposed of to landfill.

Emergency procedures

- Spills/release of the notified polymer should be handled by collecting and removing to a

disposal container using a suitable vacuum cleaner.

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(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.

13. BIBLIOGRAPHY

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