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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Chemical in Ricoh Toner Type 320E

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, Water, Heritage and the Arts.

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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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Ricoh Australia Pty Ltd (ABN: 30 000 593 171)
8 Rodborough Rd
Frenchs Forest
NSW 2086

and

Lanier Australia Pty Ltd (ABN: 39 001 568 958)
854 Lorimar Street
Port Melbourne
VIC 3207

NOTIFICATION CATEGORY
Limited-small volume: Chemical other than polymer (1 tonne or less per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication:
Chemical Name, Other names, Molecular Formula, Structural Formula, CAS Number, Details of use, Import Volume, Molecular Weight, Composition details (degree of purity and % impurities)

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)
Ricoh Toner Type 320E

MOLECULAR WEIGHT
< 500 Da

ANALYTICAL DATA
Reference X-ray diffraction and IR spectra were provided.

3. COMPOSITION

DEGREE OF PURITY 70 - 90%

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20°C AND 101.3 kPa: White powder

Property	Value	Data Source/Justification
Melting Point/Boiling Point	No melting or boiling temperature	Measured
Density	6210 kg/m^3 at 20ºC	Measured
Vapour Pressure	Not determined	The notified chemical is an inorganic salt and is expected to have no significant vapour pressure.
Water Solubility	< 5 × 10^{-6} g/L at 20ºC	Measured.
Hydrolysis as a Function of pH	Not determined	Not expected to undergo hydrolysis.
Partition Coefficient (n-octanol/water)	Not determined	The notified chemical is an inorganic salt.
Adsorption/Desorption	Not determined	Based on low water solubility the notified chemical is expected to be relatively immobile in soil or sediments.
Dissociation Constant	Not determined	Very low water solubility. Degree of expected dissociation of salt is unclear.
Particle Size	Respirable fraction (< 10 μm): 60.37 % MMAD* = 18.958 μm	Measured
Flash Point	Not determined	Expected to be high (inorganic solid).
Flammability	Not determined	Not expected to be flammable (inorganic solid).
Autoignition Temperature	Not determined	Not expected to autoignite at ambient temperature and pressure (inorganic solid).
Explosive Properties	Not determined	Not expected to be explosive (inorganic solid).

* MMAD = Mass Median Aerodynamic Diameter

DISCUSSION OF PROPERTIES

For full details of tests on physical and chemical properties, please refer to Appendix A.

Reactivity

Stable under normal conditions of use.

5. INTRODUCTION AND USE INFORMATION

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

The notified chemical will be imported as toner with concentrations of < 0.1% in sealed toner cartridges, which are ready to use in printers.

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

Year	*1*	*2*	*3*	*4*	*5*
Kg	< 10	< 10	< 10	< 10	< 10

PORT OF ENTRY

Sydney

IDENTITY OF MANUFACTURER/RECIPIENTS

The toner cartridges containing the notified chemical will be supplied to offices and retailers nationwide.

TRANSPORTATION AND PACKAGING

Transportation will be by ship in containers. Individual toner cartridges will be packed in sturdy cardboard boxes and would normally be transported by road. The notified chemical will be imported as toner at a concentration of < 0.1% in sealed toner cartridges (320 g capacity), which are ready to use in printers.

USE

The notified chemical will be used as a component of toner cartridges.

OPERATION DESCRIPTION

The notified chemical will not be manufactured or reformulated in Australia. It will be imported as a component of sealed toner cartridges. The toner will be imported and supplied in purpose built, sealed toner cartridges, which are inserted inside the printers.

6. HUMAN HEALTH IMPLICATIONS

6.1 Exposure assessment

6.1.1 Occupational exposure

NUMBER AND CATEGORY OF WORKERS

Category of Worker	*Number*	*Exposure Duration*	*Exposure Frequency*
Transport and storage	10-20	4-8 hours/day	200 days/year
Wholesale printer supplies	> 1000	8 hours/day	200 days/year
Service technicians	200	8 hours/day	200 days/year
Printer users	> 1000	0.5 hour/day	5 days/year

EXPOSURE DETAILS

Transport and warehousing

Workers are not expected to be exposed to the imported notified chemical, as they will be handling closed containers. Exposure is possible in the event of an accident where the packaging is breached.

Wholesale Workers

These workers will be involved in opening cardboard cartons, removing the toner cartridges (the toner cartridges are contained within an outer cardboard box) and stacking the individual boxes onto shelves. These workers will have minimum contact with the toner cartridge and minimum exposure to the notified chemical.

Service technicians

Service technicians will come in contact with the sealed toner cartridges during printer maintenance. Any empty or defective cartridges will be replaced with new ones. No attempt will be made to repair or refill the cartridges. The most likely route of exposure is dermal. Inhalation exposure is unlikely and the formation of dust is unlikely due to the sealed nature of the cartridges. Similarly accidental oral exposure is not expected to be significant. Printer maintenance personnel often wear cotton disposable gloves. Worker exposure to the toner is minimised further by the use of the replacement procedures recommended by the manufacturer.

Printer users

Printer users are not expected to be exposed to the notified chemical. Exposure will also be limited because of the good general ventilation in areas of printers.

After application to paper substrate and once dried, the toner containing the notified chemical is expected to be bound to the paper or the cured print matrix.

6.1.2. Public exposure

The exposure of the public to the notified chemical through the use of printer toner is expected to be identical to that experienced by office workers during the changing of cartridges, printing onto paper and other media, and handling dried, printed pages. Members of the public may be expected to change printer cartridges less frequently than would office workers, as domestic applications are often smaller.

Public exposure through importation, transportation or storage is expected to be negligible. Such exposure could only occur in the extremely unlikely event of an accident where crates, boxes, packaging and cartridges were ruptured, liberating toner containing the notified chemical.

6.2. Human health effects assessment

No toxicity data were submitted for the notified chemical. A related chemical may be harmful by inhalation, with effects on the lungs and nervous system. Some MSDS show some related chemicals may have irritating properties.

Toxicokinetics, metabolism and distribution.
The notified chemical may be absorbed through the skin, gastrointestinal wall and lungs due to its low molecular weight (< 500 Da). Its particle size is in the respirable range. As the notified chemical is an inorganic salt, dermal absorption is expected to be reduced.

Classification
Based on the available data the notified chemical cannot be classified as hazardous under the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004).

6.3. Human health risk characterisation

6.3.1. Occupational health and safety
Based on the available data the notified chemical cannot be classified as hazardous. A related chemical has adverse effects when inhaled. Some related chemicals may have irritating properties.

The particle size of the notified chemical is in the respirable range and low molecular weight may allow absorption. However, exposure and risk to workers during changing cartridges and during printing is expected to be low because of the enclosed nature of the cartridge and the very low (<0.1%) concentration in the product. Once bound to the printed paper the notified chemical would not be bioavailable.

Overall the risk to workers is expected to be low, based on the low exposure.

6.3.2. Public health
Use and exposure of the notified chemical by the public during printing is similar to that of office workers. Therefore the risk to the public is expected to be low based on low exposure. Once incorporated into printed paper the notified chemical is expected to be bound and will not be bioavailable.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1 Environmental Exposure

RELEASE OF CHEMICAL AT SITE
No release is expected as reformulation of the notified chemical will not take place in Australia.

RELEASE OF CHEMICAL FROM USE
The notified chemical or the printing components containing it will not be manufactured in Australia. The notified chemical will only be imported in sealed purpose built 320 g toner cartridges. The release of the notified chemical will be low and diffuse. The environmental safety controls and use pattern for the notified chemical would indicate a limited potential for its release into the environment. Aquatic release of the formulation containing the notified chemical is considered unlikely and after drying the notified chemical is likely to be stable within an inert matrix on printed-paper products.

Emptied toner cartridges containing a residue of notified chemical will be sent to landfill for disposal. In a landfill, the notified chemical is expected to be immobile, and eventually it will degrade through biotic and abiotic processes, and consequently, should not pose a significant exposure hazard to the environment.

A portion of the paper products containing the notified chemical may be released to the environment via printed water paper, however, the expected small quantity and stable form is unlikely to pose an unacceptable risk to the environment.

RELEASE OF CHEMICAL FROM DISPOSAL
The total import volume of the notified chemical will ultimately be disposed of to landfill.

7.1.2 Environmental fate

No environmental fate data were submitted.

The notified chemical is expected to be stable under normal environmental conditions. Due to its low water solubility, the notified chemical in solid wastes is expected to remain bound within the soils and sediments of landfills and will speciate. If spilt on land, the notified chemical is expected to bind to soil and become immobilised in the soil layer. If spilt to water, it is not expected to dissolve but rather disperse or settle to sediment

7.1.3 Predicted Environmental Concentration (PEC)

Recycling of treated paper may result in the release of a proportion of the notified chemical to the aquatic compartment. Waste paper is repulped using a variety of chemical treatments, which result in fibre separation and toner detachment from the fibres. The wastes are expected to go to trade waste sewers. Due to the low percentage of notified chemical in the toner and the widespread use, release to the aquatic compartment will be highly diluted. As a worst case, assuming 50% of paper is recycled in Australia, and that all notified chemical is removed during the recycling process, the following Predicted Environmental Concentration (PEC) has been calculated.

Predicted Environmental Concentration (PEC) for the Aquatic Compartment	
Total Annual Import/Manufactured Volume	10 kg/year
Proportion expected to be released to sewer	50%
Annual quantity of chemical released to sewer	5 kg/year
Days per year where release occurs	365 days/year
Daily chemical release:	0.0137 kg/day
Water use	200.0 L/person/day
Population of Australia (Millions)	21.161 million
Removal within STP	0%
Daily effluent production:	4,232 ML
Dilution Factor - River	1.0
Dilution Factor - Ocean	10.0
PEC - River:	0.0032 µg/L
PEC - Ocean:	0.0003 µg/L

7.2. Environmental effects assessment

No ecotoxicity data were submitted as is appropriate for a LTD notification.

7.3. Environmental risk assessment

The notified chemical will be used as a component of a conventional toner. Once these printing toner have been cured the notified chemical is expected to remain within the product matrices. Hence, the majority of the notified chemical will share the fate of the articles into which it is incorporated. It is anticipated that these will be disposed of to landfill, recycled or incinerated at the end of their useful lifetime. In landfill it is expected that the notified chemical will remain immobile within the soil.

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

8. CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification

Based on the available data the notified chemical cannot be classified as hazardous under the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)].

and

Similarly, it is not possible to categorise the notified chemical according to the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS) (United Nations 2003) for either health or environmental effects.

Human health risk assessment
Under the conditions of the occupational settings described, the notified chemical is not considered to pose an unacceptable risk to the health of workers.

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

Environmental risk assessment
On the basis of the reported use pattern, the notified chemical is not considered to pose a risk to the environment.

Recommendations

CONTROL MEASURES
Occupational Health and Safety

- Specific engineering controls, work practices or personal protective equipment required for safe use 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 chemical and during routine maintenance and repairs.

- A copy of the MSDS should be easily accessible to employees.

- If products and mixtures containing the notified chemical 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 chemical should be disposed to landfill.

Emergency procedures

- Keep the notified chemical away from sewers and waterways. If spilled, sweep up or pick up by vacuum cleaner (rated for toner extraction).

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 importation volume exceeds one tonne per annum notified chemical; or
- the use of the notified chemical is other than in sealed toner cartridges;

or

(2) Under Section 64(2) of the Act; if

- the function or use of the chemical has changed from a component of toner cartridges, or is likely to change significantly;
- the amount of chemical being introduced has increased from 10 kg per annum, 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.

Material Safety Data Sheet

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

APPENDIX A: PHYSICAL AND CHEMICAL PROPERTIES

Melting Point/Boiling Point No melting or boiling temperature

Method	OECD TG 102 Melting Point/Melting Range. EC Directive 92/69/EEC A.1 Melting/Freezing Temperature. OECD TG 103 Boiling Point. EC Directive 92/69/EEC A.2 Boiling Temperature.
Remarks	A broad endothermic effect was observed between 25°C and 400°C or between 50°C and 400°C.
Test Facility	NOTOX B.V. (2007)

Density 6210 kg/m^3 at 20°C

Method	OECD TG 109 Density of Liquids and Solids. EC Directive 92/69/EEC A.3 Relative Density.
Remarks	Pycnometer
Test Facility	NOTOX B.V. (2007)

Water Solubility $< 5 \times 10^{-6}$ g/L at 20°C

Method	OECD TG 105 Water Solubility. EC Directive 92/69/EEC A.6 Water Solubility.
Remarks	The column elution method was chosen for the determination of the water solubility. Stock solution of the analytical standard was prepared by dissolving the notified chemical in 2% HNO_3 (v/v) in distilled water at concentrations of 100 mg/L. The eluates were checked for the presence of undissolved particles by examination for the Tyndall effect (light scattering). This was performed by recording a UV-Vis absorption spectrum between 190 nm and 900 nm.
Test Facility	NOTOX B.V. (2007)

Adsorption/Desorption Not determined

Remarks	The notified chemical is an inorganic substance with low water solubility. For inorganic substances, the HPLC method is not applicable for estimation of the adsorption coefficient. A QSAR calculation can neither be performed because there are no QSAR's available for inorganic compounds.

Particle Size MMAD = 18.958 µm

Method CTL SOP No. 417

Range (µm)	*Mass (%)*
< 10	60.37%
< 100	Approximately 92%

Remarks	Laser diffraction test
Test Facility	Chilworth Technology Limited (2007)

BIBLIOGRAPHY

Chilworth Technology (2007) Notified chemical: Particle Size Analysis, Final Report October 2007, Study 300586 for Ricoh Company Ltd. SHIZUOKA-KEN 410-0007, Japan. Chilworth Technology Limited, Southampton SO16 7NS, United Kingdom (Unpublished report provided by notifier).

FORS (Federal Office of Road Safety) (1998) Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG code), 6th Edition, Canberra, Australian Government Publishing Service

NOHSC (1994) National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

NOHSC (2003) National Code of Practice for the Preparation of Material Safety Data Sheets, 2nd edition [NOHSC:2011(2003)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

NOHSC (2004) Approved Criteria for Classifying Hazardous Substances, 3rd edition [NOHSC:1008(2004)]. National Occupational Health and Safety Commission, Canberra, AusInfo.

NOTOX B.V. (2007) Notified chemical: Determination of Physico-chemical Properties, Final Report November 2007, Study 486111 for Ricoh Company Ltd. SHIZUOKA-KEN 410-0007, Japan. NOTOX B.V. 5231 DD's-Hertogenbosch, The Netherlands (Unpublished report provided by notifier).

United Nations (2003) Globally Harmonised System of Classification and Labelling of Chemicals (GHS). United Nations Economic Commission for Europe (UN/ECE), New York and Geneva.