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

FULL PUBLIC REPORT

NT-22

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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 9577 8888.
Website:	www.nicnas.gov.au

**Director
Chemicals Notification and Assessment**

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FULL PUBLIC REPORT**NT-22****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

Canon Australia Pty Ltd
1 Thomas Holt Drive
North Ryde NSW 2113

NOTIFICATION CATEGORY

Limited: Polymer with NAMW ≥ 1000 (greater than 1 tonne per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Identity of chemical
Composition

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed as follows:

Hydrolysis as a function of pH
Partition coefficient
Dissociation constant
Flash point

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

US-EPA (1994)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

NT-22

3. COMPOSITION

DEGREE OF PURITY

High

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 a photocopier toner in sealed cartridges or bottles. The notifier does not intend to manufacture the new polymer in Australia in the foreseeable future.

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	1-10	10-100	10-100	10-100

USE The notified polymer will be used as an ingredient of toner for electrophoto-copying machines or electrophotographic printers. The notified polymer improves pigmentation and fixation of the toner.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, Transport and Storage

PORT OF ENTRY
Not stated

IDENTITY OF MANUFACTURER/RECIPIENTS
Canon Australia Pty Ltd
1 Thomas Holt Drive
North Ryde NSW 2113

TRANSPORTATION AND PACKAGING
The notified polymer will be imported, distributed and supplied to consumers in 2 to 4 L sealed cartridges or plastic bottles containing between 300 – 1500 g of toner. The toner contains 0.5 – 3% notified polymer.

5.2. Operation Description

The toner containing the notified polymer is installed inside of an electrophoto-copying machines or electrophotographic printers. The plastic bottle and cartridge are designed so that release of toner is not expected unless the seal tape is removed (cartridge) or shutter open (bottle). The toner is replaced either by exchanging cartridges or fitting the plastic bottle to copying machine/printer and opening the shutter to transfer toner.

5.3. Occupational exposure

Office workers and printer maintenance workers may be intermittently exposed to the notified polymer when replacing the spent cartridge or bottle, and during maintenance and cleaning of printers or photocopiers. Maintenance workers may potentially come in contact with the notified polymer more often than office workers. Exposure would be principally by skin contamination, however, inhalation exposure could also occur, particularly if spillage occurs. The toner containing the notified polymer consists of a small proportion of respirable particles (0.4% less than 10µm). However, exposure is expected to be controlled through the design of the developer cartridge or bottles and the printing and photocopier machines. Printer and photocopier maintenance personnel often wear cotton disposable gloves. Toner cartridges and bottles are sealed and worker exposure to the toner is minimised by the use of the replacement procedures recommended by the manufacturer.

Waterside, warehouse and transport workers are unlikely to be exposed to the notified polymer unless the packaging is breached.

Contact with paper printed with toners containing the notified polymer is unlikely to result in dermal exposure, as it will be bound in the structure of the paper.

5.4. Release

RELEASE OF CHEMICAL FROM USE

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 (up to 2 tonnes per annum) 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.

5.5. Disposal

The total import volume of the notified polymer will ultimately be disposed of in either landfill or be incinerated or recycled with paper.

5.6. Public exposure

Public exposure during transport is unlikely. In the event of an accidental spill, the material should not be cleaned up using a vacuum cleaner unless it rates as a dust explosion-proof type, since fine powder can form explosive dust-air mixtures. The spilled powder should be lightly sprayed with water to prevent formation of dust, then swept up and carefully transferred to a waste container for disposal. Disposal should be in accordance with federal, state or local laws. In case of a large spill, all sources of ignition including sparks and static electricity should be eliminated. The spill should be slowly swept on to paper, the remainder wiped with wet paper, cloth or mop, and then carefully transfer into a waste container.

The potential for public exposure to the notified polymer is expected to be very low when replacing the toner bottle or cartridge. During copying or printing operations, the toner will be transferred onto the paper and firmly fixed by heat. The potential for public exposure thereafter is negligible. The empty cartridges remain closed and are either recycled or reused or sent to landfill in accordance with relevant local regulations.

6. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa Light yellow granule

Melting Range 100°C-200°C

METHOD OECD TG 102 Melting Point/Melting Range.
EC Directive 92/69/EEC A.1 Melting/Freezing Temperature.
Remarks The notified polymer was found to decompose at >130 °C.
TEST FACILITY Huntingdon Life Sciences Ltd, UK (2001)

Boiling Point Not determined

Remarks The notified polymer decomposes at >130 °C without boiling.

Density 1.05 x 10³ kg/m³ at 22°C

METHOD OECD TG 109 Density of Liquids and Solids.
EC Directive 92/69/EEC A.3 Relative Density.
Remarks The density was determined relative to pure water at 4 °C.
TEST FACILITY Huntingdon Life Sciences Ltd, UK (2001)

Vapour Pressure 1.7 x 10⁻⁹ kPa at 25°C

METHOD OECD TG 104 Vapour Pressure.
EC Directive 92/69/EEC A.4 Vapour Pressure.
Remarks A vapour pressure balance and linear regression analysis were used to calculate vapour pressure at 25°C. The low value determined indicates that the notified polymer is classified as being very slightly volatile.
TEST FACILITY Huntingdon Life Sciences Ltd, UK (2001)

Water Extractivity 3.41 and 31.9 mgC/L at 20°C
(at low and high test concentrations respectively)

METHOD OECD TG 120 Water Solubility.
EC Directive 92/69/EEC A.20 Water Extractivity.
Remarks Analytical Method: TOC analyser
The increase in extractivity with test concentration and the preliminary check of

water solubility (<1mg/L) suggest that the observed soluble components are impurities rather the polymer itself. The polymer is likely to have a low water solubility.

TEST FACILITY Huntingdon Life Sciences Ltd, UK (2001)

Hydrolysis as a Function of pH Not determined

Remarks The test was not conducted due to the low water solubility of the polymer. The polymer does not contain any polymer groups which are generally considered to be hydrolysable.

Partition Coefficient (n-octanol/water) Not determined

Remarks The test was not conducted due to the low water solubility of the polymer.

Adsorption/Desorption $\log K_{oc} > 3.6$

METHOD OECD TG 121 Adsorption/Desorption – QSAR Calculation.

Remarks The K_{oc} was estimated using $\log K_{oc} = -0.55 \log S + 3.64$ where S is the water solubility in mg/L, which is <1 mg/L taken from the preliminary water solubility test.

TEST FACILITY Huntingdon Life Sciences Ltd, UK (2001)

Dissociation Constant Not determined

Remarks The test was not conducted due to the low water solubility of the polymer. The polymer contains polymer groups which are likely to display typical acidity.

Particle Size 0.4% by mass <10 μm

METHOD OECD TG 110 Particle Size Distribution/Fibre Length and Diameter Distributions.

<i>Range (μm)</i>	<i>Mass (%)</i>
>125	59.8
<105	39.8
<10	0.4

Remarks Sieve and image analyses were used.

TEST FACILITY Huntingdon Life Sciences Ltd, UK (2001)

Flash Point Not applicable

Remarks The polymer is a solid.

Flammability Limits Not highly flammable

METHOD EC Directive 92/69/EEC A.10 Flammability (Solids).

Remarks The polymer was charred and melted but failed to ignite.

TEST FACILITY Huntingdon Life Sciences Ltd, UK (2001)

Autoignition Temperature >400°C

METHOD 92/69/EEC A.16 Relative Self-Ignition Temperature for Solids.

Remarks Small exotherms observed at 150-200 °C were consistent with decomposition of the polymer.

TEST FACILITY Huntingdon Life Sciences Ltd, UK (2001)

Explosive Properties Not explosive

METHOD EC Directive 92/69/EEC A.14 Explosive Properties.

Remarks	Sensitivity to heat (flame), shock and friction was tested.
TEST FACILITY	Huntingdon Life Sciences Ltd, UK (2001)

Oxidizing Properties

Non-oxidising

METHOD	EC Directive 92/69/EEC A.17 Oxidizing Properties (Solids).
Remarks	The maximum burning rate of the polymer is determined using cellulose and barium nitrate as references.
TEST FACILITY	Huntingdon Life Sciences Ltd, UK (2001)

7. TOXICOLOGICAL INVESTIGATIONS

A bacterial reverse mutation assay was submitted for the notified polymer. No other toxicity data for the notified polymer were submitted.

7.1. Genotoxicity - bacteria

TEST SUBSTANCE	Notified polymer
METHOD	Japanese Occupational Safety and Health Law - Standards for Mutagenicity Test using Microorganisms
Species/Strain	<i>S. typhimurium</i> : TA1535, TA1537, TA98, TA100, <i>E. coli</i> : WP2 uvrA
Metabolic Activation System	Rat liver S9 fraction from animals pretreated with Phenobarbital and 5,6-benzoflavon
Concentration Range in Main Test	a) Test 1, without metabolic activation: 0.019 to 5000 µg/plate Test 1, with metabolic activation: 4.8 to 5000 µg/plate b) Test 2, without metabolic activation: 312.5 to 5000 µg/plate Test 2, with metabolic activation: 312.5 to 5000 µg/plate
Vehicle	Dimethylsulfoxide
RESULTS	
Remarks - Results	The number of revertant colonies for all strains was less than twice that of the negative controls with and without metabolic activation.
CONCLUSION	The notified polymer was not mutagenic to bacteria under the conditions of the test.
TEST FACILITY	Chemicals Safety Division, Canon Inc. (2001)

8. ENVIRONMENT**8.1. Environmental fate**

No data were submitted.

9. RISK ASSESSMENT**9.1. Environment****9.1.1. Environment – exposure assessment**

Release to the environment of the toner containing the notified polymer is not expected under normal use as the cartridges and bottles are 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 containers (cartridges and

bottles). In addition, environmental exposure may occur as a result of accidental leakage of the containers during use.

Toner residues contained in the empty cartridges and bottles are expected to be in the range 1-5% of the import volume and to remain within these containers, although release could occur from deterioration of the cartridges or bottles. The total import volume of the notified polymer will ultimately be disposed of in either landfill or be incinerated or recycled with paper.

Some 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 notified polymer. Incineration of waste paper will destroy the compound with the generation of water vapour and oxides of carbon.

In addition to landfill, some of the toner 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 toner and therefore at least 30% of the notified polymer in the recycled paper will be disposed of with sludge in landfill. The substance is not expected to bioaccumulate due to its high molecular weight and limited release to water (Connell, 1990).

9.1.2. Environment – effects assessment

No ecotoxicity data were submitted for the notified polymer. There will be limited release to the aquatic compartment.

9.1.3. Environment – risk characterisation

The notified polymer will enter environmental compartments indirectly by disposal of waste paper (for recycling, to landfill or for incineration) and by direct release from discarded cartridges, bottles and plastic bags at landfill sites. Based on the import volume, method of packaging and low concentration of the notified polymer in the toner, release of the notified polymer to the environment is expected to be low but widespread. Waste from the recycling process includes sludge which is dried and disposed of to landfill, and very little of the notified polymer will partition to the supernatant water which is released to the sewer.

Abiotic or slow biotic processes are expected to be largely responsible for the degradation of the notified polymer as it is unlikely to be readily biodegradable. As a consequence of its low water solubility, the notified polymer is likely to be immobilised through adsorption onto soil particles and sediments.

Releases to the sewer will be low because very little of the notified polymer is expected to reach water and partition to supernatant water. Furthermore, the substance is not expected to bioaccumulate due to its high molecular weight and limited release to water.

9.2. Human health

9.2.1. Human health - effects assessment

The notified polymer gave a negative result in the bacterial mutagenicity test. No other toxicity data have been provided for the notified polymer.

The notified polymer has low water solubility and a low vapour pressure, and hence has low bioavailability. It contains low residual monomers and 2-propanol, which is present as an impurity at a concentration below the cut-off level for classification as a hazardous substance in accordance with the *NOHSC List of Designated Hazardous Substances* (NOHSC, 1999a). Therefore, the notified polymer is unlikely to be a hazardous substance according to the *NOHSC Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b).

9.2.2. Occupational health and safety – risk characterisation

Exposure to printing toners containing the notified polymer during transport of pre-packed cartridges or bottles should not occur except in the event of accidental spillage.

The notified polymer will be imported in pre-packed cartridges or bottles at up to 3%. Dermal and inhalation exposure of office workers to the notified polymer may occur when replacing spent cartridges and clearing paper jams from the printer or photocopier. However, the design of the cartridges is such that exposure to the notified polymer should be low.

Dermal and inhalation exposure of maintenance workers to the notified polymer is possible during routine maintenance and toner replenishment but is expected to be low due to the low concentration of the notified polymer in the toner. Due to their frequent exposure to toners, maintenance personnel should wear cotton or disposable gloves.

Overall, the risk of adverse health effects arising from exposure to the notified polymer is low due to its expected low toxicity, low concentration in toner and low potential for exposure. Nevertheless, due to the particulate nature of the toner, skin, eye and respiratory exposure should be avoided. Photocopies and printers should be located in well-ventilated areas. The NOHSC exposure standard for nuisance dusts of 10 mg/m³ TWA (NOHSC, 1995) must be maintained in the workplace. Australia has no exposure standard for respirable dust, however, the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) of 3 mg/m³ TWA is recommended [ACGIH, 2001].

The low concentration of the notified polymer in the toner, the limited contact to the toner when in use, the presence of adequate ventilation in the workplace and the use of disposable gloves by maintenance personnel would ensure that the occupational risk posed by the notified polymer is low when used as specified in the notification.

9.2.3. Public health – risk characterisation

There is low potential for public exposure to the notified polymer during transportation, handling and usage of the toner unless accidental spillage occurs. In view of its physical and chemical properties, its low proportion in the toner, and the pattern of package and usage of the toner, the notified polymer is unlikely to pose a significant hazard to public health.

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, 1999b).

10.2. Environmental risk assessment

On the basis of the available information, the overall environmental hazard of the notified polymer is expected to be low.

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

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS for the toner the containing the notified polymer 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 toner the containing the notified polymer 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 special precautions are required for the notified polymer when used at low quantities as a toner in pre-packed bottles or cartridges for electrophoto-copying machines or electrophotographic printers. However, in the interests of good occupational health and safety, the following guidelines and precautions should be observed for use of toners containing the notified polymer:

- Avoid contact with skin and eyes.
- Avoid generation of dust. Photocopiers and printers should be located in well ventilated areas. The NOHSC Exposure Standard of 10 mg/m³ TWA should be maintained in the workplace.
- Service personnel should wear cotton or disposable gloves when replenishing toner and servicing copying machines and printers.

Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- 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.

Emergency procedures

- Spills/release of the notified polymer should be contained as described in the MSDS (ie. sweep onto paper and transfer to a sealable waste container) and the resulting waste disposed of in landfill.

12.1. Secondary notification

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

Under Section 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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