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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in Apollon C-3 Developer

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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FULL PUBLIC REPORT

Polymer in Apollon C-3 Developer

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, CAS Number, Molecular Formula, Structural Formula, Molecular Weight, Spectral Data, Purity, Identity and % weight of toxic or hazardous impurities, Non hazardous impurities, and Import volumes.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed for several physico-chemical properties of the polymer:
Boiling Point, Vapour Pressure, Water Solubility, Hydrolysis as a function of pH, Partition Coefficient (n-octanol/water), Adsorption/Desorption, Dissociation Constant, Flash Point, Autoignition and Explosive Properties, .

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None

NOTIFICATION IN OTHER COUNTRIES
None

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
Apollon C-3 Developer (product containing the notified polymer)

ANALYTICAL DATA
Reference IR and GPC spectra were provided.

3. COMPOSITION

DEGREE OF PURITY >98%

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20°C AND 101.3 kPa: Colourless to pale yellow powder

Property	Value	Data Source/Justification
Glass Transition Temperature	41°C	Measured.
Boiling Point	Not determined	The notified polymer is expected to crosslinking with heating.
Density	900kg/m^3 at 20°C (for the notified polymer in solvent)	MSDS.
Vapour Pressure	Not determined	The notified polymer has a relatively high molecular weight (Mn > 10,000) and is not expected to have appreciable vapour pressure.
Water Solubility	Not determined	The notified polymer is expected to react with water to form insoluble crosslinked solids.
Hydrolysis as a Function of pH	Not determined	The notified polymer contains functional groups that will readily hydrolyse in water. This process will promote the formation of crosslinked, insoluble solids.
Partition Coefficient(n-octanol/water)	Not determined	The notified polymer is expected to react with water to form insoluble, crosslinked solids.
Adsorption/Desorption	Not determined	Based on the relatively high molecular weight of crosslinked reaction products formed in water the notified polymer is expected to be relatively immobile in soil or sediment.
Dissociation Constant	Not determined	The notified polymer does not contain any groups which can undergo dissociation in water.
Particle Size	Respirable fraction (<10 μm): 46% Mean Particle Size=26 μm	Measured on product (developer).
Flash Point	Not determined	
Autoignition	Not determined	
Explosive Properties	Not determined	The notified polymer is not expected to be explosive. It dos not contain any structural alerts with explosive properties.

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

Reactivity
Stable under normal conditions of storage. However the notified polymer reacts with water due to the presence of alkoxysilyl groups in the polymer resulting in crosslinking of the polymer and release of flammable and toxic gas. Heating is also expected to result from polymer crosslinking.

The developer in the form of dust may present an explosive hazard if in sufficient concentration in air and in the presence of an ignition source or static discharge.

Dangerous Goods classification
Based on the submitted physical-chemical data in the above table the notified polymer is not classified as a Dangerous Good according to the Australian Dangerous Goods Code (NTC, 2007). However the data above do not address all Dangerous Goods endpoints. Therefore consideration of all endpoints should be undertaken before a final decision on the Dangerous Goods classification is made by the introducer of the polymer.

5. INTRODUCTION AND USE INFORMATION

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

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

Year	*1*	*2*	*3*	*4*	*5*
Kilograms	< 50 kg	< 60 kg	< 80 kg	< 100 kg	< 200 kg

The notified polymer will be imported at <1% in printing and photocopying developer in sealed ready to use cartridges (capacity 215g of developer product) and sealed refill sachets (capacity 215g of developer product).

PORT OF ENTRY
Sydney

IDENTITY OF MANUFACTURER/RECIPIENTS
Ricoh Australia Pty Ltd.
ABN 30000593171
8 Rodborough Road, Frenchs Forest NSW 2086

And

Lanier Australia Pty Ltd.
ABN 39001568958
854 Lorimer Street, Port Melbourne Victoria 3207

TRANSPORTATION AND PACKAGING
The notified polymer will be imported as a component of printing and photocopying developer at a concentration of <1%, in sealed ready-to-use printer cartridges (215 g capacity) or sealed refill sachets (215 g capacity), packed in cardboard boxes and will be transported in containers from the dock to the notifier warehouse facilities.

The notified chemical will not be manufactured or reformulated in Australia.

USE
The notified chemical will be used as a component of printer cartridges for industrial printing machines and photocopiers

OPERATION DESCRIPTION
The notified polymer will be imported as a component of developer in sealed cartridges or packaged in aluminium sachets (containing 215 g developer) which will be inserted inside the printing or photocopying equipment by trained service engineers / technicians.

The trained engineers / technicians would also refill the developer compartment of the cartridge in a purpose built area supplied with local fume extraction. The technicians will wear a dust mask during the filling operation. The aluminium foil sachets are opened with scissors. The contents are manually poured into the opening in the cartridge using a funnel and the cartridges are sealed. Each sachet contains enough for one refill operation. This is expected to be conducted once per annum at most premises.

6. HUMAN HEALTH IMPLICATIONS

6.1 Exposure assessment

6.1.1 Occupational exposure

NUMBER AND CATEGORY OF WORKERS

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

EXPOSURE DETAILS
Worker exposure to the notified polymer during transportation, storage and distribution will be negligible as the developers and cartridges are sealed. Exposure would only occur in the event of an accident where the packaging is breached.

Dermal or inhalation exposure of workers to the notified polymer may occur during replacement and refilling of cartridges in the printing equipment and during the normal use of the equipment. Service technicians may be exposed during all these operations. Printer operators would only be exposed during normal printing operations.

Printing and copying equipment are expected to be in well ventilated rooms and service technicians will wear protective gloves during servicing. Moreover refill operation will be carried out in a purpose built area supplied with local fume extraction. Service engineers / technicians will wear dust mask, gloves and protective clothing during refilling of developers or cartridges. The refilling operation is expected to take place infrequently (once a year). Therefore, the exposure of service engineers / technicians to the notified polymer would be low.

Dermal exposure to notified polymer on printed material will be very low since the notified polymer is expected to be chemically bound in the print matrix and will not be bioavailable.

6.1.2. Public exposure
The printer or photocopier components containing the notified polymer will not be sold to the general public or used by the public. Thus, the public exposure the notified polymer will be negligible.

The general public may be exposed to the printed papers containing the notified polymer. However, once released onto the paper, the notified polymer is expected to be chemically bound to the cured print matrix and will not be bioavailable.

6.2. Human health effects assessment

No toxicity data were submitted. The notified polymer contains a functional group which has a structural alert for skin irritation and concern for lung toxicity if inhaled (USEPA Part II, January 22, 1998).

The developer has 46% of its contents as particles <10 μm) and may be inhaled into the lower respiratory system. Therefore the notified polymer may be in this particle size range, however, only <1% of the notified polymer is in the developer.

Health hazard classification
Based on the data provided, the notified chemical can not be classified as hazardous according to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004).

6.3. Human health risk characterisation

6.3.1. Occupational health and safety
Based on its structure, the notified polymer may be irritating to skin and have adverse effects on the lung. During normal use it may react with water releasing a hazardous vapour.

Dermal or inhalation exposure of printer operators to the notified polymer may occur during the normal use of the equipment and during clearing paper jams from the printer or photocopier. However, the design of the cartridges is such that exposure to the notified chemical should be very low.

Dermal and inhalation exposure of maintenance workers to the notified polymer is also possible during routine maintenance and developer refilling but is expected to be low due to the controls expected to be used in place, low frequency of maintenance/refilling and the low concentration of the notified polymer in the final developer.

Maintenance personnel generally wear cotton or disposable gloves, which will reduce dermal exposure to the developer during refilling and routine maintenance. Inhalation exposure during the transfer of developer from the sachet to the spent cartridge will be limited by the small size of the packages, the low concentration of the notified polymer in the developer, and local exhaust ventilation in the filling area.

During normal printing/photocopying, the notified polymer will react to release a flammable, hazardous volatile material. However, due to the small size of the packages and the low concentration of the notified polymer in the developer, only very small quantities would be released. Worker exposure is expected to be low, and would be further reduced by ensuring good ventilation.

The developer in the form of dust may present an explosive hazard if in sufficient concentration in air and in the presence of an ignition source or static discharge. This is not expected to occur due to the small size of the developer packages and the risk would also be reduced by ensuring good ventilation.

Overall, the risk to workers from the use of the notified polymer is not expected to be unacceptable due to low potential for exposure.

6.3.2. Public health
Printing and photocopying developer containing the notified polymer would not be sold to general public.

The public may be exposed to the printed papers. However, once released onto the paper, the notified polymer will be chemically bound to the cured print matrix and will not be bioavailable.

Overall, the risk to general public from the use of the notified polymer is very low and not considered to be unacceptable.

7. ENVIRONMENTAL IMPLICATIONS

7.1 Environmental Exposure & Fate Assessment

7.1.1 Environmental Exposure

RELEASE OF POLYMER AT SITE

The notified polymer will be manufactured overseas and imported in end-use packaging. Therefore, the only release that may occur at this stage will be from accidents during transport and handling. Any release will be limited due to the small individual packaging, and spilled material is expected to be disposed to landfill.

RELEASE OF POLYMER FROM USE

Release of the contents of the cartridge to the environment is not expected under normal use. The cartridge is installed inside of the machine or printer and designed to prevent leakage. Therefore, no environmental release is expected when the cartridge is replaced. Some release may occur during refilling from sachets. However, if leakage or spill of the developer does occurs, it is expected that it will be collected with a vacuum cleaner and will be disposed to landfill as solid waste.

Once the notified polymer is fused onto the paper during the printing process, most of the polymer is expected to remain bound to the media and be trapped within the print matrix on the paper.

Paper to which the notified polymer will be bound will eventually be buried in landfill or be incinerated, or the polymer may be removed from paper by de-inking processes during paper recycling. Residues left in empty cartridges or sachets (estimated as <1%) will most likely be disposed of to landfill. Spent cartridges collected by the recovery system will either be recycled or reused. Spent cartridges that are not recycled are likely to be sent to landfill.

Paper recycling may take place in a number of centres throughout Australia. During the paper recycling process, waste paper is repulped using a variety of alkaline, dispersing and wetting agents, water emulsifiable organic solvents and bleaches. It is expected that the print matrix will be released from the paper and be physically removed from the water with subsequent disposal to landfill with sludge recovered from the recycling process.

RELEASE OF POLYMER FROM DISPOSAL

The notified polymer in unused or spent developer will be disposed of to landfill.

7.1.2 Environmental fate

No environmental fate data were submitted. Notified polymer that is disposed of to landfill is expected to react with water resulting in the formation of inert and immobile, crosslinked solids. Over time, the notified polymer is expected to degrade to form water and various simple carbon and silicon based compounds.

7.1.3 Predicted Environmental Concentration (PEC)

As the notified polymer is expected to be physically removed from process water within on-site water treatment works at paper recycling facilities, a PEC has therefore not been calculated.

7.2 Environmental effects assessment

No ecotoxicity data were submitted. The notified polymer is a high molecular weight non-ionic polymer that is not expected to be hazardous to aquatic organisms.

7.3 Environmental risk assessment

The Risk Quotient (Q = PEC/PNEC) value has not been calculated since neither a PEC or PNEC were calculated. As release to surface water is not anticipated, the notified polymer is not expected to pose an unacceptable risk to the environment.

8. CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification
Based on the data provided, the notified chemical can not be classified as hazardous according to the *Approved Criteria for Classifying Hazardous Substances* [NOHSC: 1008(2004)].

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

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

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

Recommendations

CONTROL MEASURES
Occupational Health and Safety

- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer as introduced for use in the product Apollon C-3 Developer:
  - Local Exhaust/Ventilation during refill of cartridges
  - Good general ventilation during printing/photocopying

- Employers should ensure that the following personal protective equipment is used by workers to minimise exposure to the notified chemical in the product Apollon C-3 Developer:
  - Dust mask, clothing and gloves when refilling cartridges.
  - Gloves during servicing.

  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 *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 following state or local regulation for the disposal of the waste.
- Material or contaminated packaging from the notified polymer should not enter drains, sewers or water courses

Emergency procedures

- Spills or accidental release of the notified polymer should be handled by collecting the cartridges intact and disposing them to landfill.
- Powder spill should be contained in a suitable sealed container and follow state or local regulation for the disposal of the waste.

Regulatory Obligations

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:

Under Section 64(2) of the Act; if

- the function or use of the chemical has changed from a polymer at <1% in printing and photocopying developer, or is likely to change significantly;
- the amount of chemical being introduced has increased or is likely to increase, significantly;
- 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 the notified chemical (and 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.

APPENDIX A: PHYSICAL AND CHEMICAL PROPERTIES

Glass Transition Temperature 41°C

Method DSC.
Remarks Report not provided
Test Facility Toray, Japan

Boiling Point The notified chemical is a solid and has no boiling point

Method
Remarks The notified polymer is expected to crosslinking with heating
Test Facility

Density 900 kg/m^3 at 20°C (Notified polymer in solvent)
Approximately 5000 kg/m3 at 25 °C (developer)

Method
Remarks Value used from the manufacturer MSDS
Test Facility

Vapour Pressure Not determined

Method
Remarks The notified chemical has a relatively high molecular weight (Mn > 10,000) and is expected to have no significant vapour pressure.

Test Facility

Water Solubility Not determined

Method
Remarks The notified polymer contains alkoxysilyl groups which react with water and result in crosslinking of the polymer. Therefore, the water solubility could not be determined.
Test Facility

Hydrolysis as a Function of pH Not determined

Method
Remarks The notified polymer contains alkoxysilyl groups which react with water and result in crosslinking of the polymer. Therefore, the rate of hydrolysis at different pH could not be determined.
Test Facility

Partition Coefficient (n-octanol/water) Not determined

Method
Remarks The notified polymer contains alkoxysilyl groups which react with water and result in crosslinking of the polymer. Therefore, the water-octanol partition coefficient could not be determined.
Test Facility

Adsorption/Desorption – screening test Not determined.

Method
Remarks The notified polymer contains alkoxysilyl groups which react with water and result in crosslinking of the polymer. Therefore, the adsorption/desorption coefficient could not

be determined.

Test Facility

Dissociation Constant Not determined.

Method

Remarks The notified polymer does not contain any groups which can undergo dissociation in water.

Test Facility

Particle Size 46% by volume of sample was seen to be 10.00µm or less. Mean particle size is approximately 26 µm.

Method Malvern Instrument, - Sysmex FPIA-3000 Particle Characterization

Remarks These data are provided for the developer containing the notified polymer at <1%.

Test Facility Ricoh Japan

Flash Point Not determined

Method

Remarks The notified chemical is imported on a solid inorganic support

Test Facility

Autoignition Temperature Not determined

Method

Remarks The notified chemical is imported on a solid inorganic support

Test Facility

Explosive Properties Not expected to be explosive

Method

Remarks The notified polymer does not contain any structural alerts for explosive risk. The dust of the developer containing the notified polymer at <1% may present an explosive hazard if in sufficient concentration in air and in the presence of an ignition source or static discharge.

Test Facility

BIBLIOGRAPHY

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