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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

AKM-72F in Ricoh Printer Ink

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

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 and structural formulae, molecular weight, use details and import volume,

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed as follows: several physicochemical properties.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None

NOTIFICATION IN OTHER COUNTRIES
USA, Canada, China, Korea and Philippines

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
AKM-72F in Ricoh Printer Ink

OTHER NAME(S)
Sucrose Fatty Acid Ester

3. COMPOSITION

DEGREE OF PURITY >99%

IMPURITIES/RESIDUAL MONOMERS None identified

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20°C AND 101.3 kPa: White waxy solid

Property	Value	Data Source/Justification
Melting Point	55°C	MSDS
Boiling Point	Not determined	The notified chemical is expected to decompose before boiling.
Relative Density	0.95 at 16°C	MSDS
Vapour Pressure	Not determined	The notified chemical is a relatively high molecular weight inert solid and is expected to have low vapour pressure.
Water Solubility	<0.1 g/L at pH 6.5	Company Technical Data Sheet. No test details provided.
Hydrolysis as a Function of pH	Not determined	The notified chemical has surface active properties and is, at most, moderately soluble in water, therefore, the rate of hydrolysis as a function of pH could not be determined.
Partition Coefficient (n-octanol/water)	Not determined	The notified chemical has surface active properties. Therefore, the water-octanol partition coefficient could not be determined.
Adsorption/Desorption	Not determined	The notified chemical has surface active properties. Therefore, the adsorption/desorption coefficient could not be determined.
Dissociation Constant	Not determined	The notified chemical is not expected to dissociate in the environmental pH range (4-9).
Particle Size	Not applicable	Notified chemical is a waxy solid. Supplied in sheet form.
Flash Point	277°C	MSDS
Autoignition Temperature	Not determined	Expected to be very high based on Flash point.
Explosive Properties	Not determined	The notified chemical does not contain any structural alerts for explosivity. The notified chemical in the form of dust may present an explosive hazard if in sufficient concentration in air (50-60 g/m^3) and in the presence of an ignition source or static discharge.

DISCUSSION OF PROPERTIES

Reactivity
The notified chemical is stable under normal conditions of use.

Dangerous Goods classification
Based on the submitted physical-chemical data in the above table the notified chemical is not classified as a Dangerous Goods according to the Australian Dangerous Goods Code (NTC, 2007). However the data above does 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 chemical/polymer.

5. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified chemical will not be manufactured or reformulated in Australia. It will be imported at a concentration of <0.01% in sealed ink-jet cartridges with an ink capacity of 40 g, which are ready to use in ink-jet printing machines.

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

Year	*1*	*2*	*3*	*4*	*5*
Kg	< 200	< 200	< 200	< 200	< 200

PORT OF ENTRY
SYDNEY

IDENTITY OF MANUFACTURER/RECIPIENTS
Ricoh Australia Pty Ltd (notifier)

TRANSPORTATION AND PACKAGING
The notified chemical will be imported at a concentration of <0.01% in sealed ready-to-use printer cartridges (40 g capacity). Printer cartridges in four colours will be imported packed in sturdy cardboard boxes and will be transported by road from the dock to the notifiers' warehouse facilities and then distributed to end-users.

USE
The notified chemical will be used as a component of printer ink in sealed cartridges at <0.01% for ink-jet printing machines.

OPERATION DESCRIPTION
The notified chemical will be imported as a component of an ink formulation in sealed printer cartridges. Cartridges are purpose built for direct insertion into inkjet printing machine equipment. Cartridges will be supplied to commercial and retail outlets for sale to businesses and to the public.

6. HUMAN HEALTH IMPLICATIONS

6.1 Exposure assessment

6.1.1 Occupational exposure

NUMBER AND CATEGORY OF WORKERS

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

EXPOSURE DETAILS
Dermal, ocular or inhalation exposure of transport/storage workers and wholesale printer supplies workers to the notified chemical is possible only in the event of an accident where the cartridges are damaged.

Dermal and ocular exposure of printer operators, office workers and service technicians to the notified chemical may occur during replacement of cartridges or during normal use of printer machines. Service technicians may also be exposed during all these operations and during servicing the printer machines.

Inhalation exposure to the notified chemical during printing and servicing of machines is likely to be very low due to its expected low vapour pressure, the enclosed nature of the printing machine and the use of mechanical ventilation in print rooms.

For printer operators and office workers, dermal exposure while changing cartridges is expected to be minimal due to the sealed nature of the cartridges and the very low concentrations (<0.01%) incorporated in ink.

Once the ink dries, dermal exposure to the notified chemical on printed papers is likely to be negligible since the notified chemical would be trapped in the printed paper.

Overall, as the notified chemical is present at very low concentration in the ink and has a very low vapour pressure and being in sealed ink cartridges, the worker exposure is expected to be very low.

6.1.2. Public exposure

The ink-jet cartridges containing the notified chemical at < 0.01% will be used by the public. The public may intermittently be exposed to the notified chemical during the use of printer machines and replacing the spent ink cartridges and printed papers. However, the exposure to the public from the use of the notified chemical will be very low as the notified chemical is only present at < 0.01% in ink-jet sealed cartridges, and is expected to remain bound to the paper or to the cured print matrix.

6.2. Human health effects assessment

No toxicity data for the notified chemical were submitted.

Health hazard classification

Due to lack of toxicity data the notified chemical cannot be classified according to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004).

6.3. Human health risk characterisation

6.3.1. Occupational health and safety

The risk of adverse health effects from exposure to the notified chemical will be low due to very low potential for exposure.

Therefore, the risk to workers is not considered to be unacceptable.

6.3.2. Public health

The potential exposure of the public to the notified chemical is expected to be similar to that of workers, or lower.

The risk to the health of the public during the use of sealed cartridges containing the notified chemical at less than 0.01% is not expected to be unacceptable.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1 Environmental Exposure

RELEASE OF CHEMICAL AT SITE

The notified chemical will be imported into Australia as a component of a final product in ready-to-use cartridges. No manufacturing and reformulation of the notified chemical will take place in Australia. Environmental release of the notified chemical is unlikely to occur during importation, storage and transportation.

RELEASE OF CHEMICAL FROM USE

The toner cartridges will be designed to prevent leakage and will not be opened during transport, use, installation or replacement. Therefore, release of toner containing the notified chemical to the environment is not expected under normal conditions of use. If leakage or spillage does occur, the toner will be physically contained with absorbent material and disposed of to landfill. Cartridges will be contained

within the printer until the contents are consumed and then they will be removed and sent for recycling or disposed of to landfill. Approximately 0.1% of the toner containing the notified chemical will remain in spent cartridges.

RELEASE OF CHEMICAL FROM DISPOSAL

Most of the notified chemical will be bound to printed paper, which will be either disposed of to landfill or recycled. It is assumed that 50% of the waste paper will end up in landfill and the rest will undergo paper recycling processes. During recycling processes, waste paper is repulped using a variety of chemical agents which, amongst other things, enhance detachment of toner from the fibres. A minor amount of the notified chemical (a non-ionic surfactant) is expected to partition to the supernatant water, due to its slight to moderate water solubility and surface activity, which is released to the sewer. Sludge generated during the washing process will be sent to landfill for disposal.

7.1.2 Environmental fate

Based on results of the biodegradation study of an analogue of the notified chemical, provided with this notification, the notified chemical is expected to be readily biodegradable ($t_{1/2}$ < 10 h) and therefore not expected to persist in the environment. The notified chemical is not anticipated to bioaccumulate since it is expected to be readily biodegradable.

7.1.3 Predicted Environmental Concentration (PEC)

A PEC has been calculated assuming 50% recycling of the waste paper, and a worst case continental model in which none of the notified chemical entering waste water treatment plants (either on-site or municipal) is removed from the effluents.

Predicted Environmental Concentration (PEC) for the Aquatic Compartment		
Total Annual Import/Manufactured Volume	150	kg/year
Proportion expected to be released to sewer	50%	
Annual quantity of chemical released to sewer	75	kg/year
Days per year where release occurs	260	days/year
Daily chemical release:	0.29	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:	0.0682	µg/L
PEC - Ocean:	0.0068	µg/L

7.2. Environmental effects assessment

No ecotoxicity data were submitted.

7.2.1 Predicted No-Effect Concentration

Since no ecotoxicity data were submitted and the notified chemical is expected to rapidly biodegrade in the aquatic compartment, the PNEC was not calculated.

7.3. Environmental risk assessment

The Risk Quotient (Q = PEC/PNEC) value has not been calculated since a PNEC was not calculated for the notified chemical. The concentration of the notified chemical in surface waters is expected to be very low based on the reported use pattern and the maximum import volume. Moreover, the notified chemical is expected to completely biodegrade on a timescale of days and not persist in the environment. Therefore, the notified chemical is not expected to pose an unacceptable risk to the environment.

8. CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification
Due to lack of toxicity data the notified chemical cannot be classified 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 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 expected to pose a risk to the environment.

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 chemical in print cartridges at <0.01%.
- 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 of to landfill.

Emergency procedures

- Spills or accidental release of the notified chemical should be handled by physical containment, collection and subsequent safe disposal.

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

(2) Under Section 64(2) of the Act; if
- the function or use of the chemical has changed from a component of printing ink in sealed cartridges;
- 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 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 C: ENVIRONMENTAL FATE AND ECOTOXICOLOGICAL INVESTIGATIONS

C.1. Environmental Fate

C.1.1. Ready biodegradability

TEST SUBSTANCE	Analogue of notified chemical
METHOD	International Standards Organisation method 7827 "Water Quality-Evaluation in an Aqueous Medium of the Aerobic Biodegradability of Organic Compounds, Method by Dissolved Organic Carbon" (1984)
Inoculum	Aerobically growing activated sludge from pilot scale sewage treatment plant
Exposure Period	Not stated
Auxiliary Solvent	None
Analytical Monitoring	Dissolved organic carbon determination
Remarks - Method	The culture medium was an aqueous solution containing several minerals and micronutrients and set to a pH of ~7. The test substance was added to the culture medium to give a DOC of 30 ppm. The medium was inoculated with 7 mL fresh aerobic activated sludge to give a suspended solids content of 30 mg/L. The culture was shaken continuously at 140-150 rpm for the duration of the test. The temperature was maintained at 27 ± 2ºC which is outside the range specified in the method (20 to 25ºC). The biodegradation test included duplicate cultures of the test substance, a blank culture (containing only test medium and activated sludge inoculum), an inhibition test culture and an abiotic test culture. The inhibition test culture contained the test substance and sodium acetate both at levels of 30 ppm DOC. The abiotic blank culture contained the test substance in an inoculated culture that was sterilised by addition of 4 mL/L hypochlorite solution. Samples for DOC analysis (~35 mL) were withdrawn at the required intervals and centrifuged at 2,275 × g for 15 min.

RESULTS

Test substance		*Sodium Acetate*	
Day	*% Degradation**	*Day*	*% Degradation*
2	~95%	3	>94%
7	~98%		

*Information taken from a graph (DOC vs time)

Remarks - Results	The duration of the test was not stated, however graphical information in the paper indicates the test substance was analysed over 9 days which is adequate considering it has a measured biodegradability half life of <9.84 h.
CONCLUSION	The test substance and hence the notified chemical is readily biodegradable
TEST FACILITY	Exempt information

BIBLIOGRAPHY

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.

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