

File No: NA/419

Date: August 1996

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**N-3100**

This Assessment has been compiled in accordance with the provisions of *the Industrial Chemicals (Notification and Assessment) Act* 1989 (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 Worksafe Australia which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment, Sport, and Territories and the assessment of public health is conducted by the Department of Health and Family Services.

For the purposes of subsection 78(1) of the Act, copies of this full public report may be inspected by the public at the Library, Worksafe Australia, 92-94 Parramatta Road, Camperdown NSW 2050, between the hours of 10.00 a.m. and 12.00 noon and 2.00 p.m. and 4.00 p.m. each week day except on public holidays.

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Director  
Chemicals Notification and Assessment

**FULL PUBLIC REPORT****N-3100****1. APPLICANT**

Konica Australia Pty Ltd of 22 Giffnock Avenue NORTH RYDE NSW 2113 has submitted a limited notification statement in support of their application for an assessment certificate for N-3100.

**2. IDENTITY OF THE CHEMICAL**

N-3100 is not considered to be hazardous based on the nature of the chemical and the data provided. Therefore the chemical name, CAS number, molecular and structural formulae, exact molecular weight, spectral data, details of the polymer composition and details of exact import volume have been exempted from publication in the Full Public Report and the Summary Report.

**Other names:** N-3100, KC 9502

**Trade name:** N-3100

**Number-average molecular weight:** > 1 000

**Maximum percentage of low molecular weight species**  
**molecular weight < 1000:** 0.42%  
**molecular weight < 500:** 0.30%

**Method of detection and determination:** ultraviolet/visible and infrared spectroscopy

**3. PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance at 20°C and 101.3 kPa:** white powder

**Softening Point:** 120-130°C

**Density:** 1100 kg/m<sup>3</sup> at 20°C

**Vapour Pressure:** < 6 X 10<sup>-15</sup> kPa at 25°C

**Water Solubility:** saturation concentration = 260 mg/L at 20°C;  
 content of water extractable parts = 12.8 g/kg  
 (1280 ppm)

<b>Partition co-efficient (n-octanol/water):</b>	$\log P_{ow} > 6$
<b>Hydrolysis as a function of pH:</b>	not determined
<b>Adsorption/Desorption:</b>	estimated $K_{oc} > 1 \times 10^6$ (by estimation from $\log P_{ow}$ )
<b>Dissociation constant:</b>	not determined
<b>Flash point:</b>	not determined
<b>Flammability limits:</b>	highly flammable: fastest burning time over a distance of 100 mm was 31 seconds
<b>Autoignition temperature:</b>	$> 400^\circ\text{C}$
<b>Explosive properties:</b>	non-explosive
<b>Particle Size:</b>	median mass diameter: $1.8 \mu\text{m}$ $84.8\% < 10 \mu\text{m}$
<b>Reactivity/Stability:</b>	predicted to be non-oxidising; sunlight and temperatures above $50^\circ\text{C}$ will contribute to instability

### Comments on Physico-Chemical Properties

The notified polymer exhibits surprising solubility at room temperature. Water solubility measured was determined using the new draft solubility/extractability OECD test (1), which gives a measure of solubility for the test material by the amount extracted into double-distilled water. The solubility for this substance seems high given the lack of functionality that might confer such properties to this chemical and the calculated  $\log P_{ow}$ .

While it contains ester functionalities the notified substance is not expected to hydrolyse under the expected environmental pH range.

The estimated partition coefficient data and high molecular weight for this polymer suggests that it is not expected to cross biological membranes or to bioaccumulate. The estimation of the ability for adsorption/desorption indicates the notified substance is expected to sorb strongly to soils. There are no dissociable hydrogens in the notified polymer.

## 4. PURITY OF THE CHEMICAL

<b>Degree of purity:</b>	99.9%
<b>Toxic or hazardous impurities:</b>	the monomers making up the notified polymer are estimated to be present at less than 0.3% from the GPC; one of these is moderately toxic by inhalation and intraperitoneal routes, is an experimental tumourigen and teratogen, exhibits human systemic effects by inhalation,

experimental reproductive effects, mutagenic data and skin and eye irritancy; there are no data for the other monomers but some similarities to the above are expected

**Non-hazardous impurities  
(> 1% by weight):**

none

**Maximum content  
of residual monomers:**

0.3%

**Additives/Adjuvants:**

none

## **5. USE, VOLUME AND FORMULATION**

The notified polymer is the carrier resin for formulated photocopy developers. It is to be imported at a rate of less than 1 tonne per year for the first five years. It is present in photocopy developer at < 3%, the remainder comprising ferrite carrier (> 60%), carbon black (< 1%) and polyester resin (< 5%).

## **6. OCCUPATIONAL EXPOSURE**

The notified chemical is to be imported as a component of photocopy developer in 0.8 kg polythene bags, 2 bags to a cardboard box. There is a low probability of exposure during transport and handling in the event of an accident.

Company service engineers replace developer in photocopiers once in 1-3 months per machine. The developing unit (cartridge) in the photocopier is recharged by removal of the unit, discarding about 5 g of spent developer onto a plastic sheet and loading the entire contents of a bag (0.8 kg) into the cartridge prior to its replacement in the photocopier. Exposure is expected to be low given that each recharge takes about 10 minutes and that a service engineer would spend a total of about 15 hours per year performing these operations.

## **7. PUBLIC EXPOSURE**

No public exposure to the notified polymer is expected to occur during distribution, use in photocopiers or in disposal.

## **8. ENVIRONMENTAL EXPOSURE**

### **Release**

The notifier indicated that the yearly loss from recharging photocopier cartridges will be negligible. Only trained technicians will recharge photocopier cartridges, which should help reduce spillages. Less than 0.15 g of the spent notified substance is expected to remain in the cartridge after emptying and only 30 mg of notified substance is left in the plastic bags after cartridge refilling. Possible release to the environment will be through spillages upon use of this developer and disposal of the plastic bags used for transport of the notified chemical. Given recharging of cartridges is needed every 1-3 months and that 1000 of these printers are estimated to be in use over the next five years, wastes from the plastic storage bags will be a maximum of 432 g of notified polymer. Treatment and disposal of any spillages and wastes is adequately dealt with in the Material Safety Data Sheet (MSDS).

Loss of notified substance will also occur via cleaning of the photocopiers using the developer. Photocopiers will be cleaned using water-based solvents and the wastes disposed of according to Local government regulations. Environmental exposure during the use of these developers from dry process printers is unlikely. As the notified substance has a relatively high molecular weight and low water solubility it is not expected to cross biological membranes nor to be bioavailable.

### **Fate**

The fate of most of the notified substance is identical to that of the paper to which it is bound. This paper may be recycled but eventually be disposed of to landfill. Here they would very slowly break down.

Recycling is a growing industry in Australia. Waste paper is repulped using a variety of alkalis, dispersing agents, wetting agents, water emulsifiable organic solvents and bleaching agents. These chemicals enhance the fibre separation, ink detachment from the fibres, pulp brightness and the whiteness of the paper. After pulping, the contaminants and the ink are separated from the fibres by pumping the stock through various heat washing, screening, cleaning, flotation and dispersion stages.

The notifier has provided no data on the likely behaviour of the polymer during recycling processes. The hydrolysis of ester linkages under alkaline conditions will be minimal due to the low solubility of the polymer. The polymer therefore is likely to survive recycling conditions, either remaining bound to the pulp or becoming associated with the sludge. In the latter case, the polymer will arrive in landfill where it can be expected to remain intact, or be destroyed through incineration.

### *Bioaccumulation*

The waste generated by use of the notified substance will, in the general case, be spills or by refilling of developer cartridges. These wastes will be treated as landfill. Given the water solubility of N-3100, its  $\log_{10}P_{ow}$  value ( $> 6$ ) and low aquatic exposure, the potential for bioaccumulation seems negligible.

## **9. EVALUATION OF TOXICOLOGICAL DATA**

Toxicological data are not required for polymers of number-average molecular weight (NAMW)  $> 1000$  according to the Act and no data were submitted for the notified polymer.

## **10. ASSESSMENT OF ENVIRONMENTAL EFFECTS**

No ecotoxicological data were provided, which is acceptable for polymers with an annual import rate of  $< 1$  tonne and a NAMW  $> 1000$ , according to the Act.

## **11. ASSESSMENT OF ENVIRONMENTAL HAZARD**

The notified substance is unlikely to present a hazard to the environment at any stage of its use. Of the original quantity of N-3100 to be imported (between 1.5 and 2.1 tonnes over the next 5 years) it is expected that negligible amounts will be released during recharging of photocopier cartridges or cleaning of the photocopying machines. The ultimate fate of the waste developer is treatment by landfill at an approved industrial facility. Leaching of such treated wastes into the soil is not expected.

## **12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS**

The notified polymer has a NAMW greater than 1000 and should not be able to be absorbed across biological membranes to cause systemic effects. The levels of low molecular weight species (0.42%) and residual monomers (maximum of 0.3%) would not render the polymer hazardous according to the criteria of Worksafe Australia (2). In addition, the concentration of notified polymer in the formulation to be imported is low (< 3%).

Exposure of workers to the notified polymer during importation, warehousing and handling of containers is likely to occur only in the event of an accident.

Exposure of service engineers to photocopier developer containing the notified polymer is expected to be low given the time taken to recharge the developer cartridge (10 minutes). Accidental spills during this operation are expected to be infrequent. There may be some exposure to developer during cleaning of the machine and machine maintenance but this can be easily avoided by the use of disposable plastic gloves.

Health risks to service engineers involved in developer replenishment and machine maintenance are considered to be negligible given the limited and infrequent exposure coupled with the predicted low hazard of the notified chemical.

## **13. RECOMMENDATIONS**

To minimise occupational exposure to the notified chemical the following guidelines and precautions should be observed:

- Spillage of the notified chemical should be avoided, spillages should be cleaned up and put into containers for disposal;
- Good personal hygiene should be practised to minimise the potential for ingestion;
- A copy of the relevant MSDS should be easily accessible to employees.

## **14. MATERIAL SAFETY DATA SHEET**

The MSDS for the notified chemical was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (3).

This MSDS was provided by the applicant as part of the notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of the applicant.

## **15. REQUIREMENTS FOR SECONDARY NOTIFICATION**

Under the Act, secondary notification of the notified chemical shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

## 16. REFERENCES

1. OECD ENV/MC/CHEM(96)2. Proposal for the Endorsement of Three New Test Guidelines and One Updated Guideline, Submitted to the 24th Joint Meeting, 1996.
2. National Occupational Health and Safety Commission 1994, *Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]*, Australia Government Publishing Service, Canberra.
3. National Occupational Health and Safety Commission 1994, *National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]*, AGPS, Canberra.