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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Almatex XPA5236R

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**Almatex XPA5236R****1. APPLICANT**

Mita Copiers Australia Pty Ltd of 25 Sirius Road LANE COVE NSW 2066 has submitted a notification statement accompanying their application for assessment of a synthetic polymer of low concern, Almatex XPA5236R.

2. IDENTITY OF THE CHEMICAL

Almatex XPA5236R meets the definition of a Polymer of Low Concern under the Act, and is not considered to be hazardous according to NOHSC Criteria, based on the nature of the polymer and the data provided. Therefore the chemical name, molecular formula, structural formula, molecular weight, spectral data, monomer identity and formulation details have been exempted from publication in the full public report.

Other Name(s): Almatex XPA5236R

Trade Name(s): Black Developer for DC-5090 Copy Machine
(containing 1-5% of the notified polymer)

3. PHYSICAL AND CHEMICAL PROPERTIES**Appearance at 20°C and 101.3**

kPa: no data provided

Melting Point: 150 -195°C

Density: 1.18 (25°C)

Water Solubility: 0.45 mg.L⁻¹ (see comments below)

**Partition Co-efficient
(n-octanol/water):** not available (see comments below)

Hydrolysis as a Function of pH: not available (see comments below)

Flammability Limits: not available

Autoignition Temperature: not available

Explosive Properties: not available

Reactivity: not available

Particle Size Distribution: not available

Comments on Physico-Chemical Properties

No test reports on the melting point or specific gravity determinations accompanied the notification.

The water solubility is reported as low at 0.45 mg.L^{-1} , and this is in accord with the high content of hydrophobic groups and high NAMW of the notified polymer. The water solubility was estimated from TOC (total organic carbon) measurements of solutions prepared by stirring an excess of the polymer in distilled water for 24 hours at $25 \pm 2^\circ\text{C}$, and filtered through a 0.3 micron filter. The TOC of the solutions were measured using a TOC analyser, and gave a mean result of 0.3 mg.L^{-1} . The water solubility was then calculated on the basis of 66% carbon content in the polymer, as determined from elemental analysis.

The polymer contains a hydrocarbon (ie acrylic) backbone which is stable under the usual environmental conditions. Although the material contains pendant ester functionalities which are potentially hydrolysable, this reaction occurs only under extreme pH conditions, and is unlikely in the usual pH region where the pH lies between 4 and 9. The low water solubility will hinder intimate contact between the polymer and an aqueous environment, further hindering any potential hydrolysis. It is expected that overall the new material will be stable to chemical degradation in the environment.

No dissociation constant data was provided, which is acceptable since the polymer contains no inherently acidic or basic functionalities.

5. USE, VOLUME AND FORMULATION

According to the notifier, the new polymer is used as a "carrier" for toner. Its function in the toner product is to assist the pigmented toner in migrating to, and adhering to the electrically charged drums of the photocopying equipment, prior to transfer and subsequent curing of the toner to the paper. The new polymer may function as a dispersant, ensuring even distribution of pigment within the final print. It is expected that the new polymer will become intimately encapsulated within the plastic film of the print itself, and consequently bound firmly to the paper.

The notified polymer will not be manufactured in Australia, but will be imported as a minor component of toner product (developer) intended for use in photocopiers. It is anticipated that less than 100 kg of the new polymer will be imported in toner products per annum, and this import level is not expected to change over the next five years.

6. OCCUPATIONAL EXPOSURE

The notified polymer is a minor component (1 to 5%) of a product, Black Developer for DC-5090 Copy Machine. The developer is sealed in a plastic bottle (1.4 kg capacity) and the contents will not be released until the cap is removed. The bottles are packed in paper boxes.

The developers containing the notified polymer will be imported. No reformulation or repackaging needs to be carried out in Australia.

Transport and storage workers are unlikely to be exposed to the notified polymer except in the event of spillage or breakage.

The end users are service engineers from the photocopier companies. They will clean the developing unit, collect waste developer and install new units. Dermal contact would be the main route of exposure. During the service, there could be some dust formed. The notifier did not provide the particle size distribution of the product containing the notified polymer. Inhalation exposure to dust would be possible. Service engineers may be frequently exposed to the notified chemical, although the duration of exposure episodes may be short. Service engineers and other workplace employees could become contaminated from spills of toner.

7. PUBLIC EXPOSURE

No public exposure to the notified polymer is expected to occur during distribution of product containing the notified polymer. Disposal of any waste containing the notified polymer will be by landfill in accordance with relevant local regulations. No public exposure is expected to occur.

The plastic bottles containing the notified polymer are sealed with a cap which is removed prior to transfer of toner to the toner reservoirs of photocopiers. Accidental spills are possible during transfer, or from residual material left in empty toner bottles. Any such spills would be disposed of as normal office waste, and thus either incinerated or disposed of by landfill.

8. ENVIRONMENTAL EXPOSURE

. Release

Very little release of the notified polymer is anticipated during normal use of the toner in photocopying equipment, although some release could be expected as a consequence of accidental spills, particularly during the transfer of toner from the plastic bottles to the toner reservoirs in the machines, and also with the residue left in empty toner bottles. If it is assumed (no data provided by the notifier) that 5% of the toner is lost in this manner, then an annual release of around 1 500 grams of the notified polymer could be anticipated. This material would normally be disposed of as office waste, and this could be expected to be either incinerated or placed into

landfill. In any case the release is expected to be very diffuse since photocopying equipment is widely used.

As mentioned above, it is expected that most of the notified polymer will become incorporated into the print media, and firmly bound to the paper substrate in a thermoplastic matrix which offers little potential for release.

The major avenue for release to the environment will be through disposal of the old and waste paper. The anticipated fate of the material would be associated with that of the paper which is described below.

. Fate

The majority of the notified material will be associated with the print and as a component of the pigment binding medium will be bound strongly to paper within a plastic film. Waste paper disposal is effected either through high temperature incineration, recycling or deposition into landfill.

High temperature incineration would destroy the compound with production of water vapour and evolution of oxides of carbon. Similarly, it is expected that during the extensive repulping and bleaching procedures implied by paper recycling, the material would be either destroyed chemically or be incorporated into waste sludge. The material is not appreciably soluble in water and it is likely that the polymer will be either destroyed through chemical action or become associated with the recycling plant waste sludge.

Waste sludge from the recycling plants would be either incinerated or disposed of to landfill, while aqueous waste would be comprehensively treated prior to discharge.

No partition coefficient or adsorption data were provided by the notifier as these are not required for PLC. However, the essentially hydrophobic nature of the majority of the side groups indicates that the material is unlikely to be mobile, and would partition into oil phases and would also adsorb to and become associated with the organic component of soils and sediments.

Some waste paper and/or office waste containing the new polymer may be disposed of directly to landfill. It is anticipated that leaching of the polymer would be very slow, but in this event it is likely that it would rapidly adsorb to and become assimilated into the soils and sediments. Prolonged residence in an active landfill environment or in natural sediments would eventually degrade the notified substance through the agency of slow biological and abiotic processes. The same considerations will apply to waste sludge from paper recycling if disposed of to landfill.

9. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided. This is acceptable for polymers of low concern with a NAMW of greater than 1 000 according to the Act.

10. ASSESSMENT OF ENVIRONMENTAL HAZARD

The environmental hazard from the notified polymer appears to be minimal, and in the event of accidental spillage or release of the toner, the clean up operation would probably entail disposal to landfill. Environmental releases from normal use and in the disposal of empty toner bottles are low.

Most of the notified polymer will be released to the environment as a result of disposal of waste paper. The “long term” fate of the majority of the notified polymer will be associated with that of the paper and is expected to be either paper recycling, landfill disposal or incineration. In all three cases it is anticipated that the material would be destroyed either through the agency of a vigorous chemical environment or through slow biological or abiotic processes. Even in the absence of substantial degradation, the diffuse nature of disposal patterns would indicate slow release into the wider environment, and this at low concentrations.

At concentrations likely to arise as a consequence of normal disposal procedures for the residual toner product and waste paper, the notified compound appears to offer little cause for concern in respect of the aquatic environment.

11. ASSESSMENT OF OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY EFFECTS

11.1 Almatex XPA5236R

Almatex XPA5236R has been notified as a synthetic polymer of low concern under section 23 for the purposes of section 24A of the Act. The polymer meets the criteria for a synthetic polymer of low concern as specified in regulation 4A of the Act and can be considered of low hazard to human health. No toxicological data were required for notification as a polymer of low concern.

One of the monomers has irritancy effects and is on the *NOHSC List of Designed Hazardous Substances* (1). However, the maximum residual concentration of the monomer in the notified polymer is below the cutoff concentration.

Dermal contact would be the main route for the occupational exposure. If dust is generated, inhalation exposure is also possible during photocopier servicing.

The occupational exposure and adverse health risk for transport and warehouse worker handling the notified polymer are considered to be negligible except in the event of accident.

The notifier claimed that service engineers are expected to be experienced in handling other Mita developers. They will clean the developing unit, collect waste

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developer and install new units. Dermal exposure may occur if developer is spilt during services. However, the concentration of the notified polymer in the product is low. If eye contact occurs, the notified polymer or other components may cause mild irritation. Inhalation exposure to the notified polymer may occur but is expected to be negligible. Therefore, a low health risk could be expected during cleaning and installing the developing units for service engineers.

Although there is some potential for more general workplace and public exposure to the notified polymer to occur during the addition of dry developer to photocopy machines, the high NAMW for the polymer suggests that if contact were to occur, absorption is unlikely, and therefore there is negligible risk to general workplace and public safety.

11.2 Black Developer for DC-5059 Copy Machine

The Material Safety Data Sheet (MSDS) for Black Developer for DC-5090 Copy Machine indicates that it is not acutely toxic by ingestion, not irritating to the skin and eyes, and may cause minimal respiratory tract irritation if inhaled.

Three ingredients in the product Black Developer for DC-5059 Copy Machine are on the NOHSC *List of Designated Hazardous Substances* (1) and have NOHSC exposure standards (2). They are magnesium oxide (CAS No 1309-48-4, TWA=10 mg.m⁻³), calcium oxide (CAS No 1305-78-8, TWA=2 mg.m⁻³) and iron oxide (CAS No 1309-37-1, TWA=5 mg.m⁻³). Accordingly, Black Developer for DC-5059 Copy Machine should be treated as a hazardous substance. Employers should ensure that the exposure standards for magnesium oxide, calcium oxide or iron oxide are not exceeded.

12. RECOMMENDATIONS

To minimise occupational exposure to Almatex XPA5236R the following guidelines and precautions should be observed:

- Spillage of the notified polymer should be avoided. Spillages should be cleaned up promptly and put into containers for disposal;
- Good personal hygiene should be adopted;
- A copy of the MSDS should be easily accessible to employees.

To minimise occupational exposure to Black Developer for DC-5090 Copy Machine the following guidelines and precautions should be observed:

- Work areas should well ventilated and service personnel should implement good work practices to avoid the spills and generation of dust. The NOHSC exposure standards for magnesium oxide, calcium oxide or iron oxide should not be exceeded when using the products containing the notified polymer.

13. MATERIAL SAFETY DATA SHEET

The MSDS for the notified polymer 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 notifier 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 notifier.

14. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act secondary notification of Almatex XPA5236R shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

15. REFERENCES

1. National Occupational Health and Safety Commission 1994, *List of Designated Hazardous Substances [NOHSC:10005(1994)]*, Australian Government Publishing Service, Canberra.
2. National Occupational Health and Safety Commission 1995, 'Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment, [NOHSC:1003(1995)]', in *Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards*, Australian 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)]*, Australian Government Publishing Service, Canberra.