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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

CXF-6

This Assessment has been compiled in accordance with the provisions of *the Industrial Chemicals (Notification and Assessment) Act 1989*, 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 Human Services and Health.

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**CXF-6****1. APPLICANT**

Lexmark International (Australia) Pty Ltd of 12A Rodborough Rd, Frenchs Forest, NSW 2086 has submitted a limited notification statement for an assessment certificate for CXF-6.

2. IDENTITY OF THE CHEMICAL

Based on the nature of the chemical and the data provided, CXF-6, is considered to be non-hazardous. Therefore the chemical identity, spectral data and composition have been exempted from publication in the Full Public Report and the Summary Report.

**Chemical Abstracts Service
(CAS) Registry No.:**

Not available

Trade name:

CXF-6

Method of detection and determination:

The notified polymer is detected by gel permeation chromatography and identified by Infrared spectroscopy

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa: pale yellow powder

Odour: slight, characteristic

Melting Point: 85 - 103°C

Density: 1176.4 kg/m³ at 21°C

Water Solubility: < 1.5 X 10⁻⁴ g/L at 20°C
(column elution method)

**Partition Co-efficient
(n-octanol/water) log P_{ow}:** > 2.13 at 21.5°C
(shake flask method)

Flammability Limits: not highly flammable

Autoignition Temperature: none below melting temperature

Explosive Properties: non-explosive

Reactivity/Stability: non-oxidising

Particle size distribution: range - 10 - 850 µm

mean - ~ 250µm

Comments on the physico-chemical properties:

No information was supplied regarding boiling points. It is unlikely that the substance will boil under ambient conditions and therefore the omission of such data is acceptable.

No information was given on vapour pressure on the grounds that as the notified substance is a polymeric powder, this test is not applicable. This is acceptable.

No data was supplied for hydrolysis, on the grounds that low water solubility prevented testing of this characteristic. The presence of ester linkages in the structure of the polymer indicate that hydrolysis is possible, but this is unlikely under typical environmental conditions.

Adsorption/desorption and dissociation constants were not supplied, as the low solubility of the substance prevented testing of these characteristics. This is acceptable. The polymer may contain a small proportion of free carboxylic acid groups.

4. PURITY OF THE CHEMICAL

Degree of purity : > 99%

**Non-toxic impurities
(> 1% by weight):** None

Maximum content of residual monomers: 0.5%
Additives/Adjuvants: None

5. INDUSTRIAL USE

The chemical is a polyester resin that will be used as a binder resin in toners used in electrophoto-copying or electrophoto-graphic machines.

The notified substance will be imported in the range of 1 to 10 tonnes per annum over the next five years.

6. OCCUPATIONAL EXPOSURE

The notified polymer makes up 85 -95% of a toner to be imported sealed in toner cartridges at a rate of 1 - 10 tonnes per year.

Office workers may be exposed to the toner when replacing spent toner cartridges. The toner cartridges are designed so that no toner escapes until the seal tape is removed after the cartridge is placed in the photocopier or printer. A low level of exposure is possible from toner adhering to the seal tape when a new cartridge is inserted. The release of toner into the atmosphere during this operation is very unlikely.

Exposure during routine maintenance of photocopiers and printers is possible. However, this is expected to occur infrequently and the level of exposure is expected to be minimal.

During copying or printing operations the toner will be transferred to the paper and firmly fixed by heat.

Exposure to toner in the atmosphere when photocopiers or printers are in use is expected to be low.

7. PUBLIC EXPOSURE

The toner cartridges are imported and transported enclosed in individual plastic bags and packaged in a corrugated cardboard box, fixed with side packings. The box is sealed with adhesive tape, and three boxes each containing cartridges are wrapped in film. Twenty of these units are then put on palettes and fixed with film. No information was provided on the specific mode of transport.

Release of toner to the atmosphere during operation of photocopiers and printers is expected to be low.

The notified polymer and the toner containing the notified polymer are to be treated as plastic waste. Incineration or landfill disposal will be in accordance with local laws.

8. ENVIRONMENTAL EXPOSURE

Release

The polyester resin will be fully imported as a component of toner cartridges, and will not be manufactured, formulated or packaged in Australia. The toner cartridges are sealed with tape which is only opened when the cartridge is placed into the copier.

The notified substance is to be used as a binder resin for toner in electrophotocopying or printing machines, and will form 85 - 95% of the toner weight. The toner cartridge is supplied as part of a set of components, including a development unit and other components. When the toner has been consumed in the copying or printing process the whole cartridge is replaced. The cartridge has been designed to limit spills when they are being replaced in copying machines.

The toner is heat fixed to the paper following application. The notifier has given no indication whether the toner will remain fixed to paper during paper recycling processes, but has stated that polymer is soluble in organic solvents, such as toluene and acetone.

It is claimed there will be no environmental release of the toner, and thus the notified polymer, as the toner cartridges are fully sealed prior to insertion into copier machines. Accidental spills, if they do occur, are to be collected and disposed of to landfill, or incinerated. These routes also recommended for disposal of spent toner cartridges.

Fate

The most likely route of release of the notified polymer is from landfill sites when spills are disposed of, or when waste paper is dumped. Leaching of the toner/polymer mix is unlikely from these sites, given the low solubility of the substance. Hydrolysis, although theoretically possible, is unlikely.

No data were provided on the likely behaviour of the polymer during 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. 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. During these processes there is the potential for hydrolysis of the polymer to occur, with the possibility of more soluble products being formed. Should the polymer be removed from the paper by such processes, then it will most likely be incorporated with the sludge remaining from recycling, with sludge being placed in landfill, or incinerated. Should importation levels rise above 10 tonnes per annum the company should clarify both the likely behaviour of the polymer, and hydrolytic potential of the polymer during paper recycling.

The only other potential release of this polymer will occur in the event of transport accidents. Collection of spilt material would again be disposed of to either landfill or incineration.

If the polymer was spilt to waterways, it would not be expected to disperse into the water column, but should settle out onto sediments. The polymer is not expected to cross biological membranes, due to the low solubility and high molecular weight. Therefore, the notified substance should not bioaccumulate.

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicological data was supplied and this is acceptable according to the *Industrial Chemicals Notification and Assessment Act, 1989* for polymers of number-average molecular weight (NAMW) > 1000.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided, which is acceptable for polymers of NAMW > 1000, according to the Act. The polymer would not be expected to cross biological membranes, due to its low solubility, the partition co-efficient and high molecular weight.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The low environmental exposure of the polymer as a result of normal use indicates that the overall environmental hazard should be negligible.

Accidental spillage of the polymer, either during replacement of cartridges or during transport should result in powder wastes being sent to either landfill or incineration facilities. Movement of the polymer by leaching from landfill sites is not expected.

Environmental exposure to the notified substance could occur when paper containing the polymer is recycled or disposed of. The polymer would be either bound to waste paper, or bound to the sludge that results from recycling processes.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified polymer is not expected to be a health hazard as the high number-average molecular weight (> 1000) should preclude transmission of molecules across biological membranes. Levels of residual monomers are very low and should not render the polymer a health hazard. There is one notable hazardous impurity.

However, the level (< 0.2%) is not sufficient to render the polymer hazardous (2). The level of low molecular weight (< 1000) species (5.0%) is also unlikely to render the polymer hazardous.

Occupational exposure to the notified polymer is expected to be minimal since it is imported in robust photocopier and printer toner cartridges and no repackaging occurs. The only significant occupational or public exposure expected is when the plastic seal is removed after the cartridge is inserted into the machine. However, as this occurs infrequently, is of short duration and the toner will not be released into the atmosphere, exposure is expected to be minimal. Exposure during routine machine maintenance is also expected to be minimal as a result of containment of the toner within the cartridge.

In the case of accidental spillage during transport, the public may be exposed to the notified polymer. This is minimised by the recommended practices for storage and transportation. Emergency procedures for the containment and clean up of accidental spills are available.

The risk of adverse occupational or public health or safety effects resulting from transport, storage, disposal or use of the notified polymer is expected to be minimal.

13. RECOMMENDATIONS

To minimise occupational exposure to CXF-6 the following guidelines and precautions should be observed:

- . when changing toner cartridges containing the notified polymer, care should be taken to avoid exposure to the toner adhering to the plastic tape which seals the cartridge. Should exposure occur, the toner should be removed immediately by washing.
- . a copy of the Material Safety Data Sheet (MSDS) should be easily accessible to employees.

14. MATERIAL SAFETY DATA SHEET

The attached MSDS for CXF-6 and toner were provided in a suitable format (3).

These MSDS were provided by Lexmark International (Australia) Pty Ltd as part of their notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of Lexmark International (Australia) Pty Ltd.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of CXF-6 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. Dangerous Properties of Industrial Materials, 7th Ed., Sax N. I. and Lewis R. J. Sr Eds, Van Nostrand Reinhold, 1989.

2. National Occupational Health and Safety Commission, *Approved Criteria for Classifying Hazardous Substances*, AGPS, Canberra, 1994.
3. National Occupational Health and Safety Commission, *Guidance Note for the Completion of a Material Safety Data Sheet*, 2nd. edition, AGPS, Canberra, 1990.