

File No: NA/781

23 April 2020

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

POLYMER SPF-3

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 the National Occupational Health and Safety Commission which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment and the assessment of public health is conducted by the Department of Health and Aged Care.

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Director
Chemicals Notification and Assessment

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FULL PUBLIC REPORT**POLYMER SPF-3****1. APPLICANT**

FUJI XEROX AUSTRALIA PTY LTD of 546 Gardeners Road MASCOT NSW 2020 has submitted a limited notification statement in support of their application for an assessment certificate for Polymer SPF-3.

2. IDENTITY OF THE CHEMICAL

The chemical name, molecular and structural formulae, molecular weight, spectral data and details of the polymer composition have been exempted from publication in the Full Public Report and the Summary Report.

3. PHYSICAL AND CHEMICAL PROPERTIES

Unless stated otherwise, physico-chemical properties cited are for the end-product containing the polymer and not for the isolated notified polymer.

Appearance at 20°C and 101.3 kPa:	White solid with no discernible odour.
Marketing Name:	Polymer SPF-3 Contained in imported products: AColour 620/635/935/4040 DocuColor Cyan Developer
Boiling Point/ Melting Point	Not determined.
Specific Gravity:	~5 (see comments below).
Vapour Pressure:	Not determined.
Particle Size:	Mean 50 µm.
Water Solubility:	Less than 0.017 g/L at 20°C (see comments below).
Partition Co-efficient (n-octanol/water):	Not determined as the final product is insoluble in water and therefore is not expected to have a partition coefficient (see comments below).
Hydrolysis as a Function	The notified chemical contains acidic carboxyl and

of pH:	amine groups which may undergo hydrolysis under certain temperature and pH conditions. Tests conducted reported up to 1.03% change in weight due to changes in pH .
Adsorption/Desorption:	Not determined as the final product is insoluble in water (see comments below).
Dissociation Constant:	Not determined (see comments below).
Flash Point:	Not applicable.
Flammability Limits:	Not flammable under normal conditions.
Autoignition Temperature:	Not determined.
Explosive Properties:	generation of airborne toner dust may be potentially explosive in a confined space.
Reactivity/Stability:	The final product is stable.

Comments on Physico-Chemical Properties

The notifier has stated that the specific gravity is *ca.* 5. No test report was presented to substantiate this claim which is surprisingly high.

A water solubility test was performed by the flask method (OECD TG 105) but only produced a very synoptic test report. The presence of the carboxylic acid group has the potential to increase the water solubility of the polymer. However, the monomer containing this group represents less than 1% of the polymer and therefore should not significantly increase water solubility.

The notified chemical contains ester, amide and epoxide groups which may undergo hydrolysis under extreme conditions but is not expected to occur within the environmental pH range.

The partition coefficient and adsorption/desorption were not determined due to the low water solubility of the notified chemical. However, the high hydrocarbon content of the notified chemical suggests that it would have an affinity for oil, soil and sediments.

The notified polymer contains dissociable carboxyl groups. The pKa of these groups are estimated to be approximately 4.0-4.5.

4. PURITY OF THE CHEMICAL

Degree of Purity:	99 %.
Hazardous Impurities:	(within the notified chemical)

Chemical name: Toluene
CAS No.: 108-88-3
Weight percentage: 0.462
Toxic properties: R11; R20; not present above cut-off

Chemical name: Ethylbenzene
CAS No.: 100-41-4
Weight percentage: 0.112
Toxic properties: R11; R20; not present above cut-off

Chemical name: Xylene
CAS No.: Mixture of 4 isomers; 95-47-6
Weight percentage: 0.372
Toxic properties: R10;R20/21;R38

Chemical name: Glycidyl methacrylate
CAS No.: 106-91-2
Weight percentage: 0.003

Chemical name: Acrylol morpholine
CAS No.: None given.
Weight percentage: 0.003

**Non-hazardous Impurities
(> 1% by weight):** None.

Additives/Adjuvants: None.

5. USE, VOLUME AND FORMULATION

The notified polymer is an ingredient used to coat the surface of ferrite particles which act as carriers in the colour developers of photocopiers. The imported products contain up to 0.26 % notified polymer and each packet contains 650 g of developer. No manufacturing or reformulation will occur in Australia. Approximately 50 kg/year of notified polymer will be imported.

6. OCCUPATIONAL EXPOSURE

The notified POLYMER SPF-3 will be imported as part of the finished product, AColour Developers. The notified substance will be imported in 650 g aluminium-laminated packets,

which will be packed in cartons (15 packets per carton). The cartons will be transported from the dockside to the Fuji Xerox warehouse, where they will be stored prior to being distributed to service outlets around Australia. It is anticipated that waterside workers, transport drivers and warehouse workers (5-10 workers, 2-3 hours/day, 10-15 days/year) would only be exposed to the material in the event of an accident.

Replacement of the developer involves removal of the old developer from the photocopier and loading of the new developer. This process is carried out by Customer Service Engineers only (50 workers, 5-20 minutes/day, 40-160 days/year). The procedure will not be carried out by the public and involves emptying the old developer from a reservoir into a tray or recovery bag, then refilling the reservoir directly from the container of the new developer. The old developer is repackaged at the time of replacement and disposed of to landfill.

The replacement procedure for the developer may involve exposure of the developer to the air. The mean particle size is *ca.* 50 μm and is therefore within the inspirable range. As only the mean particulate size was given, some particles may also be within the expirable range. Skin contamination may occur when cleaning the photocopier. Inhalational exposure may occur if dust clouds are generated during maintenance.

As the notified polymer will not become dissociated from the carrier particles during developer replacement, exposure to the notified polymer during this procedure will be negligible. The Customer Service Engineers wear cotton gloves during the developer replacement procedure.

It is considered unlikely that waterside workers and transport drivers will be exposed to the notified polymer. A Material Safety Data Sheet will be available to users of the product.

7. PUBLIC EXPOSURE

The imported products containing up to 0.26 % notified polymer will not be sold to the public but only to office type environments. The products will only be handled by trained Customer Service Engineers. The public is unlikely to come into contact with the notified polymer since the polymer is bound to paper and dry. Exposure to unbound polymer on paper is considered to be minimal.

8. ENVIRONMENTAL EXPOSURE

Release

The developer is distributed in packets (not fully sealed units) which are opened prior to insertion into copier machines and therefore some environmental release is expected prior to and during use.

The notifier has indicated that up to 1% of the total import volume of the notified polymer may be released as a result of spills and leaks. A further 2% is expected to be released as spillage during developer replacement. The notifier has indicated that between 30 and 50% of the notified polymer will be released in exhausted developer. The notifier did not indicate percentages of residue remaining in empty developer packages but it is estimated that this will

be *ca.* 2%. Assuming a maximum import volume of 50 kg, up to 27.5 kg of the notified polymer released via these avenue will be discarded to landfill.

Significant release of the notified polymer is also expected to occur at landfill sites where waste paper is discarded. In addition, polymer removed from the paper during recycling is likely be incorporated with the waste sludge which will then be discarded to landfill or incinerated.

Although there is a risk of release of this polymer during transport, it is considered that the risk to be low as the polymer is contained in individual, sealed packets. Collection of spilt material will be disposed of to either landfill or incineration.

Fate

During recycling, waste paper is pulped and de-inked using a variety of dispersing and wetting agents, organic solvents and bleaches. After pulping, the contaminants and 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. Polymer removed from the paper will most likely be incorporated with the sludge remaining from recycling. Sludge is likely to be discarded to landfill or incinerated. Combustion of the notified polymer is likely to yield water and oxides of carbon, nitrogen and hydrogen.

Once in landfill, leaching of the toner/polymer mix is unlikely to occur due to the low solubility of the substance. The polymer is expected to degrade slowly via biotic and abiotic processes.

Any polymer accidentally entering waterways would be expected to 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 is not expected to bioaccumulate.

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicological data submitted.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The notified polymer will not be manufactured or reformulated in Australia and will be imported as a component of a developer for photocopiers.

The major release of the notified chemical is not expected to occur until the notified chemical is disposed of to landfill in the recovery bag or when paper containing the notified chemical is recycled or disposed of. The notified chemical would remain either bound to waste paper, or to sludge that results from recycling processes and may be sent to landfill or incinerated.

Accidental spills of the notified chemical, either during replacement of developer or during transport, are expected to be minimal. Spilt material and notified chemical remaining in spent packets will be disposed of to landfill. Movement of the notified chemical by leaching from landfill sites is not expected.

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

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

Hazard Assessment

No toxicological data was submitted for the notified polymer. The levels of hazardous impurities and unreacted monomers in the polymer are low. The NAMW is greater than 1000, indicating that it is unlikely to cross biological membranes. A small number of reactive functional groups are present. Based on this information, the notified polymer is unlikely to be a hazardous substance under NOHSC Approved Criteria for Hazardous Classifications (NOHSC 1999).

The particles to which the polymer is bound have a mean particulate size of 50 μm . The MSDS supplied by the notifier indicates that products containing the notified polymer are unlikely to cause significant effects if swallowed and are not skin or eye irritants.

Occupational Health and Safety

Transport and storage of the developer containers is unlikely to result in worker exposure except in the event of accidental spillage. Customer Service Engineers will perform additions of developer and replacement of a used developer container and are expected to be exposed infrequently to the notified polymer as the developer container is re-filled, *i.e.* sealed and loaded directly into a printing machine. In addition, exposure to the developer containing the notified polymer may occur during machine cleaning and maintenance and whilst clearing paper feed problems, with risk of inhalational and dermal exposure likely in the event of contact with the developer.

Given its likely low toxicity and very low concentration in the developer, the notified polymer will not pose a significant health risk in the occupational environment.

Workers handling printed paper are not at risk of adverse health effects as the polymer is fixed to the paper and not available for exposure or dermal uptake. The notified polymer is combined within a polymer matrix and is not expected to degrade or decompose under normal use conditions. There is not expected to be any natural loss of monomers, reactants, additives, or impurities from the polymer matrix when applied in a dry bound form to paper.

Disposable gloves should be worn to prevent skin irritation and workers should avoid any generation of dust when handling the developer. Spilt residues should be swept up manually or using a dust explosion-proof vacuum cleaner and placed within a waste container.

Public Health

There is negligible potential for public exposure to the notified polymer arising from its use

as a component in photocopying developers. Based on the toxicity profile and use pattern, the notified polymer will not pose a significant hazard to public health.

13. RECOMMENDATIONS

To minimise occupational exposure to POLYMER SPF-3, the following guidelines and precautions should be observed:

- Avoid generation of dust clouds;
- Cotton gloves should be worn to prevent dermal exposure;
- Spillage of the notified polymer should be avoided. Spillage should be swept up manually or by vacuum cleaner and placed within a waste container;
- Good personal hygiene should be practised to minimise the potential for ingestion;
- A copy of the MSDS should be easily accessible to employees.

14. MATERIAL SAFETY DATA SHEET

The MSDS for the notified chemical was provided in a format consistent with the *National Code of Practice for the Preparation of Material Safety Data Sheets* [NOHSC (1994)].

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 may be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

16. REFERENCES

National Occupational Health and Safety Commission (1999). List of Designated Hazardous Substances [NOHSC:10005(1999a)]. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1999b). Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1999)]. Canberra, Australian Government Publishing Service.

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.