

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

POLYMER OF LOW CONCERN PUBLIC REPORT

Polymer in Zeoglobule PT477

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act) and Regulations. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the Australian Government Department of Health, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Australian Government Department of the Environment and Energy.

This Public Report is 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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SUMMARY

The following details will be published in the NICNAS *Chemical Gazette*:

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS SUBSTANCE	INTRODUCTION VOLUME	USE
PLC/1549	Brother International (Aust.) Pty. Ltd.	Polymer in Zeoglobule PT477	No	≤ 20 tonnes per annum	Component of printer/copier toner

CONCLUSIONS AND REGULATORY OBLIGATIONS

Human Health Risk Assessment

Based on the assumed low hazard and the assessed use pattern, the notified polymer is not considered to pose an unreasonable risk to the health of workers and the public.

Environmental Risk Assessment

Based on the assumed low hazard and the assessed use pattern, the notified polymer is not considered to pose an unreasonable risk to the environment.

Health and Safety Recommendations

- Water insoluble high molecular weight polymers used in the respirable size range ($< 10 \mu\text{m}$) have the potential to cause lung overloading. Respiratory protection and local exhaust ventilation should be used to prevent inhalation exposure if inhalation of particles is expected.
- Service personnel should wear disposable gloves and ensure adequate ventilation is present when removing spent printer cartridges containing the notified polymer and during routine maintenance and repairs.

Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- A copy of the SDS should be easily accessible to employees.
- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS)*, as adopted for industrial chemicals in Australia, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation should be in operation.

Disposal

- Where reuse or recycling are not appropriate, dispose of the notified polymer in an environmentally sound manner in accordance with relevant Commonwealth, state, territory and local government legislation.

Emergency Procedures

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

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 polymer 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 polymer, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified polymer 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 notified polymer is introduced in a chemical form that does not meet the PLC criteria.or
- (2) Under Section 64(2) of the Act; if
 - the function or use of the notified polymer has changed from component of printer/copier toner, or is likely to change significantly;
 - the amount of notified polymer being introduced has increased, or is likely to increase, significantly;
 - the notified polymer has begun to be manufactured in Australia;
 - additional information has become available to the person as to an adverse effect of the notified polymer 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.

Safety Data Sheet

The SDS of products containing the notified polymer were provided by the applicant. The accuracy of the information on the SDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

Applicants

Brother International (Aust.) Pty. Ltd. (ABN: 17 001 393 835)
Level 3, Building A, 11 Talavera Rd,
MACQUARIE PARK NSW 2113

Exempt Information (Section 75 of the Act)

Data items and details exempt from publication include: chemical name, CAS number, molecular and structural formulae, molecular weight, purity, polymer constituents, residual monomers/impurities and import volume.

2. IDENTITY OF POLYMER

Marketing Name(s)

Polymer in Zeoglobule PT477

Other Name(s)

Polymer-TN2

Molecular Weight

Number Average Molecular Weight (Mn) is > 10,000 g/mol

3. PLC CRITERIA JUSTIFICATION

Criterion

Molecular Weight Requirements
Functional Group Equivalent Weight (FGEW) Requirements
Low Charge Density
Approved Elements Only
Stable Under Normal Conditions of Use
Not Water Absorbing
Not a Hazard Substance or Dangerous Good

Criterion met

Yes
Yes
Yes
Yes
Yes
Yes
Yes

The notified polymer meets the PLC criteria.

4. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20 °C and 101.3 kPa	White solid
Melting Point/Glass Transition Temperature	Not determined
Density	1,000 kg/m ³ at 20 °C
Water Solubility	Insoluble
Particle Size	For toner containing the notified polymer: D ₁₀ = 6.325 µm D ₅₀ = 7.68 µm D ₉₀ = 9.400 µm
Reactivity	Stable under normal environmental conditions
Degradation Products	None under normal conditions of use

5. INTRODUCTION AND USE INFORMATION

Maximum Introduction Volume of Notified Chemical (100%) Over Next 5 Years

Year	1	2	3	4	5
Tonnes	≤ 20	≤ 20	≤ 20	≤ 20	≤ 20

Use

The notified polymer at concentrations of ≤ 90% will be imported into Australia as a component of finished printer/copier toners in sealed 0.5 L cartridges. Finished printer/copier toners containing the notified polymer will not be sold to the public.

6. HUMAN HEALTH RISK ASSESSMENT

No toxicological data were submitted. The notified polymer meets the PLC criteria and is therefore assumed to be of low hazard. The risk of the notified polymer to occupational and public health is not considered to be unreasonable given the assumed low hazard and the assessed use pattern.

Although not considered in this risk assessment, NICNAS notes that the notified polymer contains residual monomers that are classified as hazardous according to the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS)*, as adopted for industrial chemicals in Australia.

It is noted that the notified polymer is water-insoluble with molecular weight > 10,000 g/mol and particles of respirable size. Inhalation of polymers with molecular weights > 70,000 g/mol has been linked with irreversible lung damage due to lung overloading and impaired clearance of particles from the lung, particularly following repeated exposure (US EPA, <https://www.epa.gov/reviewing-new-chemicals-under-toxic-substances-control-act-tsca/high-molecular-weight-polymers-new>, accessed on 11/6/19). There is a data gap for polymers with MW between 10,000 and 70,000 g/mol, and uncertainty may exist. If the notified polymer is inhaled at low levels and/or infrequently, it is assumed that it will be cleared from the lungs.

The notified polymer is a component of finished printer/copier toners. Inhalation of toner particles by workers is possible, however this is expected to only occur at a low level and would be reduced by safe work practices and workplace controls such as good ventilation.

7. ENVIRONMENTAL RISK ASSESSMENT

No ecotoxicological data were submitted. Polymers without significant ionic functionality are generally of low concern to the environment (Boethling and Nabholz, 1997).

The notified polymer will be imported in sealed toner cartridges and will not be reformulated or repackaged in Australia. The printer/copier toners containing the notified polymer will not be sold to the public. Accidental spills of the notified polymer during import, transport, storage and use only occur if the packaging is breached. These spills are expected to be absorbed on suitable materials and disposed of to landfill in accordance with local government regulations. Empty cartridges containing residues of the notified polymer will also be sent to landfill for disposal.

Most of the notified polymer is expected to share the fate of the paper to which it has been applied, either subjected to paper recycling processes or being disposed of to landfill at the end of its useful lives. According to the recent Australian National Waste Report (Blue Environment Ltd., 2016), 60% of the waste paper treated with the notified polymer is expected to be recycled domestically. During recycling processes, waste paper is repulped using a variety of chemical agents, which, amongst other things, enhance detachment of inks and coatings from the fibres. Based on its insolubility in water and high molecular weight, the notified polymer discharged to wastewater from paper recycling processes is expected to be effectively removed through adsorption to sludge or by flocculation at wastewater

treatment plants (US EPA, 2013; Boethling and Nabholz, 1997), and only a small proportion of the notified polymer may be released to surface waters after treatment processes.

With 60% release of the notified polymer into the sewer systems through paper recycling processes and no removal within wastewater treatment plants as the worst case scenario, the conservative predicted environmental concentration (PEC) in sewage effluent on a nationwide basis over 260 working days per year is calculated to be 9.46 µg/L [$0.6 \times 20,000 \text{ kg/year} \div 260 \text{ days/year} \div (24.386 \text{ million persons} \times 200 \text{ L/person/day})$]. Thus, release of the notified polymer during the recycling and deinking processes is not expected to lead to ecotoxicologically significant concentrations in the aquatic environment.

Sludge containing the notified polymer may be sent to landfill for disposal or agricultural land for remediation. Based on its limited water solubility and high molecular weight, the notified polymer is expected to have low mobility in landfill and soil (US EPA, 2013). The notified polymer is not expected to be bioaccumulative given its high molecular weight, and it contains no significant percentage of low molecular weight constituents. In landfill, soil and water, the notified polymer is expected to undergo degradation by biotic and abiotic processes, eventually forming water and oxides of carbon.

Therefore, based on its assumed low hazard and this assessed use pattern in toner cartridges, the notified polymer is not considered to pose an unreasonable risk to the environment.

BIBLIOGRAPHY

Blue Environment Pty Ltd (2016) Australian National Waste Report 2016. Canberra, Australia.

Boethling, RS & Nabholz VJ (1997) Chapter 10 Environmental Assessment of Polymers under the U.S. Toxic Substances Control Act. In: Hamilton, JD Sutcliffe R ed. Ecological Assessment of Polymers Strategies for Product Stewardship and Regulatory Programs, 1st ed. New York, Van Nostrand Reinhold, pp 187-234.

US EPA (2013) Interpretive Assistance Document for Assessment of Polymers – Sustainable Futures Summary Assessment, US Environmental Protection Agency, https://www.epa.gov/sites/production/files/2015-05/documents/06-iad_polymers_june2013.pdf.