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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

PUBLIC REPORT

Polymer in Setaqua 6751

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (Cwlth) (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 Department of Health and Ageing, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Department of Sustainability, Environment, Water, Population and Communities.

For the purposes of subsection 78(1) of the Act, this Public Report may be inspected at our NICNAS office by appointment only at Level 7, 260 Elizabeth Street, Surry Hills NSW 2010.

This Public Report is also 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
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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 CHEMICAL	INTRODUCTION VOLUME	USE
LTD/1650	Nuplex Industries (Australia) Pty Ltd	Polymer in Setaqua 6751	ND*	≤ 100 tonnes per annum	Component of paints

*ND = not determined

CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification
As no toxicity data were provided, the notified polymer cannot be classified according to the *Globally Harmonised System for the Classification and Labelling of Chemicals* (GHS), as adopted for industrial chemicals in Australia, or the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004).

Human health risk assessment
Under the conditions of the occupational settings described, the notified polymer is not considered to pose an unreasonable risk to the health of workers.

When used in the proposed manner, the notified polymer is not considered to pose an unreasonable risk to public health.

Environmental risk assessment
On the basis of the PEC/PNEC ratio and the assessed use pattern, the notified polymer is not considered to pose an unreasonable risk to the environment.

Recommendations

CONTROL MEASURES
Occupational Health and Safety

- A person conducting a business or undertaking at a workplace should implement the following engineering controls to minimise occupational exposure to the notified polymer:
  - Enclosed systems during manufacture and formulation of paints, where possible

- A person conducting a business or undertaking at a workplace should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer:
  - Avoid contact with skin

- A person conducting a business or undertaking at a workplace should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer:
  - Coveralls, safety glasses and impervious gloves

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

- A copy of the (M)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 for the 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

- The notified polymer should be disposed of to landfill.

Emergency procedures

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

Regulatory Obligations

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 chemical 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 chemical, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified chemical/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 polymer has a number-average molecular weight of less than 1000;

or

(2) Under Section 64(2) of the Act; if
  - the function or use of the polymer has changed from a component of paints, or, is likely to change significantly;
  - the amount of polymer being introduced has increased from 100 tonnes per annum, or is likely to increase, significantly;
  - the method of manufacture of the polymer in Australia has changed, or is likely to change, in a way that may result in an increased risk of an adverse effect of the polymer on occupational health and safety, public health, or the environment;
  - additional information has become available to the person as to an adverse effect of the 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.

(Material) Safety Data Sheet
The (M)SDS of the product containing the notified polymer provided by the notifier was reviewed by NICNAS. The accuracy of the information on the (M)SDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Nuplex Industries (Australia) Pty Ltd (ABN: 25 000 045 572)
49-61 Stephen Road
BOTANY NSW 2019

NOTIFICATION CATEGORY
Limited: Synthetic polymer with Mn ≥ 1000 Da.

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication: chemical name, other names, molecular and structural formulae, molecular weight, polymer constituents, residual monomers, import volume, and identity of manufacturer.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed for all physico-chemical endpoints.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None

NOTIFICATION IN OTHER COUNTRIES
None

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
Setaqua 6751 (contains the notified polymer at < 40% concentration)

MOLECULAR WEIGHT
Mn > 1,000 Da

3. COMPOSITION

DEGREE OF PURITY > 99%

HAZARDOUS IMPURITIES/RESIDUAL MONOMERS
None

NON HAZARDOUS IMPURITIES/RESIDUAL MONOMERS (> 1% by weight)
None

ADDITIVES/ADJUVANTS
None

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20 °C AND 101.3 kPa: White liquid dispersion*

Property	Value	Data Source/Justification
Melting Point/Freezing Point	Not determined	Never isolated from aqueous solution
Density*	1080 kg/m^3 at 20 °C	(M)SDS
Vapour Pressure	Not determined	Expected to be low, based on the high molecular weight of the polymer
Water Solubility	Not determined	Expected to be water dispersible based

		on the presence of hydrophilic functionalities and its use in aqueous products
Hydrolysis as a Function of pH	Not determined	The notified polymer contains functional groups that are expected to hydrolyse slowly in the environmental pH range (4-9) at ambient temperature.
Partition Coefficient (n-octanol/water)	Not determined	Expected to have a low partition coefficient on the basis of the water dispersibility.
Adsorption/Desorption	Not determined	Expected to partially adsorb to soil, sediment and sludge based on its high molecular weight
Dissociation Constant	Not determined	The notified polymer is a salt and expected to be ionised in the environmental pH range (4-9)
Flash Point	Not determined	Never isolated from aqueous solution
Flammability	Not determined	Never isolated from aqueous solution
Autoignition Temperature	Not determined	Never isolated from aqueous solution
Explosive Properties	Not determined	Contains no functional groups that imply explosive properties.
Oxidising Properties	Not determined	Contains no functional groups that imply oxidising properties.

*For imported product Setaqua 6751 containing < 40% notified polymer in aqueous solution.

Reactivity
The notified polymer is expected to be stable under normal conditions of use.

Physical hazard classification
Based on the submitted physico-chemical data depicted in the above table, the notified polymer is not recommended for hazard classification according to the *Globally Harmonised System for the Classification and Labelling of Chemicals (GHS),* as adopted for industrial chemicals in Australia.

5. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified polymer will be imported or manufactured in Australia as an aqueous dispersion at < 40% concentration.

MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	≤ 100	≤ 100	≤ 100	≤ 100	≤ 100

PORT OF ENTRY
Sydney

TRANSPORTATION AND PACKAGING
The notified polymer will be imported by sea and transported in Australia by road to customers in 200 L steel drums and 1000 L intermediate bulk containers.

USE
The notified polymer will be used as a component of paint products at < 30% concentration.

OPERATION DESCRIPTION
Manufacture
The notified polymer will be manufactured from its starting materials in closed vessels. When polymerisation is complete the resulting dispersion containing the notified polymer at < 40% concentration will be transferred by mechanical pumps into bulk storage tanks (20-30 tonnes), or directly into 1000 L intermediate bulk containers

or 200 L drums. Samples of the aqueous dispersion containing the notified polymer will be taken for quality control testing through purpose built valves.

Reformulation
At the reformulation site, the aqueous dispersion containing the notified polymer at < 40% concentration will be pumped into mixing tanks where it will be blended with other raw materials. Mixing will be performed under controlled conditions and occur in an enclosed environment, followed by filling of containers for direct distribution to customers.

End-use
The finished paint products containing the notified polymer at < 30% concentration will be used by industry professionals only. Application will be by brush and roller.

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

6.1.1. Occupational Exposure

CATEGORY OF WORKERS

Category of Worker	*Exposure Duration (hours/day)*	*Exposure Frequency (days/year)*
Transport	1	10
Warehouse/storage workers	8	30
Manufacture/Blending	2	50
QC/Testing	1	50
Filling	1	50
Dispatch	< 1	Daily
Painters	8	200

EXPOSURE DETAILS

Transport and storage
Transport and storage workers may come into contact with the notified polymer at < 40% concentration only in the event of accidental rupture of containers.

Manufacture
During manufacture of the notified polymer, dermal and ocular exposure of workers to the notified polymer at < 40% concentration may occur during quality control analysis, connection and disconnection of transfer lines, and cleaning and maintenance of equipment. Exposure is expected to be minimised through the use of enclosed systems and through the use of personal protective equipment (PPE) such as coveralls, safety glasses and impervious gloves.

Formulation of paint products
During formulation of paint products from the notified polymer, dermal and ocular exposure of workers to the notified polymer at < 40% concentration may occur during connection and disconnection of transfer lines, blending, quality control analysis and cleaning and maintenance of equipment. Exposure is expected to be minimised through the use of engineering controls and use of personal protective equipment such as coveralls, safety glasses and impervious gloves.

End-use
Professional painters may have dermal and ocular exposure to the notified polymer at < 30% concentration during application of the paint products by brush and roller and during cleaning processes. Such professionals may use some personal protective equipment (PPE) to minimise exposure. Once the paint is cured, the notified polymer is not expected to be bioavailable and further dermal contact should not lead to exposure.

6.1.2. Public Exposure

Paint products containing the notified polymer will be used by industrial OEM customers only and will not be sold to the public. The public may come into contact with surfaces coated with paints containing the notified polymer; however, once the paint is cured and dried the notified polymer will be trapped within a polymer matrix and will not be bioavailable.

6.2. Human Health Effects Assessment

No toxicological data were provided.

The notified polymer has a high molecular weight (> 1,000 Da), is partially ionised and, although dispersible in water, is expected to have limited water solubility. Hence, it is not expected to be absorbed following oral, dermal or inhalation exposure. Furthermore, it contains a low percentage of low molecular weight species (< 2% < 1000 Da).

The notified polymer contains a structural alert (FGEW = 310 Da) for skin sensitisation (Barratt et al. 1994) and skin and eye irritation (Hulzebos et al. 2005). Given the notified polymer has a low percentage of low molecular weight species, the notified polymer is not expected to be irritating. Skin sensitisation cannot be totally ruled out but is expected to be limited.

Health hazard classification

As no toxicity data were provided, the notified polymer cannot be classified according to the *Globally Harmonised System for the Classification and Labelling of Chemicals (GHS),* as adopted for industrial chemicals in Australia, or the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004).

6.3. Human Health Risk Characterisation

6.3.1. Occupational Health and Safety

While the potential for skin sensitisation effects associated with exposure to the notified polymer cannot be totally ruled out, this is expected to be limited given the low percentage of low molecular weight species (< 2% < 1000 Da). This risk will be further reduced given workers will only be exposed to the notified polymer at up to 40% concentration. Furthermore, the expected use of PPE and engineering controls in place (i.e. enclosed systems during manufacture and formulation) to minimise exposure, will further reduce any potential risk of sensitisation.

Overall, given the uncertain potential risk of sensitisation for the notified polymer, its proposed use concentration and control measures in place to minimise exposure, the risk to workers from use of the notified polymer is not considered unreasonable.

6.3.2. Public Health

Paint products containing the notified polymer will not be sold to the public. The public may come into contact with surfaces coated with paints containing the notified polymer; however, once the paint is cured and dried the notified polymer will be trapped within a polymer matrix and will not be bioavailable. Therefore, the risk to the public associated with the use of the notified polymer at < 30% concentration in paint products is not considered to be unreasonable.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1. Environmental Exposure

RELEASE OF CHEMICAL AT SITE

Manufacture and reformulation of the notified polymer into finished coating products will take place in Australia. Polymerisation occurs in closed vessels and the resulting dispersion containing the notified polymer will be mechanically transferred into storage tanks, intermediate bulk containers or drums for storage and distribution to customers. The release of the notified polymer to the environment at this stage may occur due to accidental spills, sampling and waste from the cleaning of equipment. It is estimated by the notifier that up to 10% of total annual import volume of the notified polymer will be lost as waste during

manufacture/reformulation processes. The majority of these wastes are expected to be collected and disposed of to landfill and up to 1% of the notified polymer is expected to be directed to inner trade waste treatment plants (TWTPs). Residues of the notified polymer are expected to be disposed of to landfill when associated into TWTPs sludge, or released to local sewage treatment plants in TWTPs effluent. Internal TWTPs are expected to remove approximately 50% of the notified polymer through adsorption of the anionic polymer to sludge or by flocculation (Boethling and Nabholz, 1997). Therefore, release of the notified polymer to STPs is up to 500 kg per year (100,000 kg/year × 1% × 50%).

RELEASE OF CHEMICAL FROM USE

The finished coatings products will be applied to wood MDF substrate with roller at industrial coating plants. Approximately 1% of the notified polymer is likely to be released from cleaning of application equipment which is expected to be collected and disposed of to landfill.

RELEASE OF CHEMICAL FROM DISPOSAL

The majority of the notified polymer is expected to share the fate of the articles to which the coating products have been applied to, and hence will eventually be disposed to landfill. A small proportion (1%) of the notified polymer is also expected to enter landfill in the form of dried residues in empty import and product containers.

7.1.2. Environmental Fate

No environmental fate data were submitted. The majority of the notified polymer is expected to be disposed of to landfill as an inert polymeric matrix of cured coatings adhering to articles. In this form, the notified polymer is not expected to be mobile, bioavailable nor bioaccumulative. The uncured notified polymer is not expected to be readily biodegradable; however, bioaccumulation is not expected due to its high molecular weight. In landfill and the aquatic compartment, the notified polymer is expected to eventually degrade biotically and abiotically to form water, oxides of carbon and nitrogen.

7.1.3. Predicted Environmental Concentration (PEC)

For a worst case scenario, the predicted environmental concentration (PEC) is calculated assuming that the release of the notified polymer from wastewater used for equipment cleaning is from a single point source. It is assumed that the industrial processes occur over 260 days per year. The wastewater containing the notified polymer is assumed to be released into one moderate-sized sewage treatment plants (STPs) with a flow of 54 ML/day. It is also assumed that 50% of the notified polymer is removed from effluent via STPs processes given that the notified polymer is an anionic polymer with a high molecular weight (Boethling and Nabholz, 1997). The PEC can be calculated as 17.8 µg/L (= 500 kg/year ÷ 260 days/year × 50% ÷ 54 ML/day) for release to a river and 1.78 µg/L (= 17.8 µg/L × 0.1) for release to the ocean.

7.2. Environmental Effects Assessment

No ecotoxicity data were submitted. Anionic polymers are generally of low concern to fish and aquatic invertebrates (L(E)C50 > 100 mg/L), but can be moderately toxic to algae. The mode of toxic action is overchelation of nutrient elements needed by algae for growth. The highest toxicity is when the acid is on alternating carbons of the polymer backbone. This does not apply to the notified polymer. The EC50 for algae of the most toxic anionic polymers is 3 mg/L. Therefore, the toxicity of the notified polymer is expected to be >> 3mg/L.

The estimation procedure used here is based on data for similar polymers and is considered acceptable for the purpose of risk assessment. However, this toxicity estimation is not considered sufficient to formally classify the acute and long term hazard of the notified polymer to aquatic life under the Globally Harmonised System for the Classification and Labelling of Chemicals (United Nations, 2009).

7.2.1. Predicted No-Effect Concentration

The endpoint for the most sensitive species (Algae) is used to calculate the predicted no-effect concentration (PNEC). An assessment factor of 100 was used as the endpoint for the most sensitive species is conservatively estimated.

Predicted No-Effect Concentration (PNEC) for the Aquatic Compartment		
EC50 (Algae).	>> 3	mg/L
Assessment Factor	100	
PNEC:	>> 30	µg/L

7.3. Environmental Risk Assessment

Risk Assessment	PEC µg/L	PNEC µg/L	Q
Q - River:	17.81	>> 30	<< 0.594
Q - Ocean:	1.78	>> 30	<< 0.059

The risk quotients (Q = PEC/PNEC) for aquatic exposure have been calculated to be < 1. Although the notified polymer has potential to be released into waterways, it is unlikely to pose a risk to the aquatic environment given that it is not expected to bioaccumulate nor is it released at ecotoxicologically relevant concentrations. Therefore, on the basis of the PEC/PNEC ratio and the assessed use pattern, the notified polymer is not considered to pose an unreasonable risk to the environment.

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