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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in Synolac PT30X

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 Full Public Report may be inspected at our NICNAS office by appointment only at Level 7, 260 Elizabeth Street, Surry Hills NSW 2010.

This Full 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
NICNAS

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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
International Sales & Marketing Pty Ltd (ABN 36 467 259 314)
262 Highett Road
HIGHETT VIC 3190

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, Structural Formula, Spectral Data, Purity, Polymer Constituents, Residual Monomers/Impurities, Import Volume, Identity of Recipients.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed as follows: Partition Coefficient, Adsorption/Desorption.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None

NOTIFICATION IN OTHER COUNTRIES
None

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
Synolac PT30X (containing the notified polymer at <70%)
Quick Dry Enamel (containing the notified polymer at <40%)

MOLECULAR WEIGHT
Mn >1000 Da.

ANALYTICAL DATA
Reference NMR, IR and GPC spectra were provided.

3. COMPOSITION

DEGREE OF PURITY >90%

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES
None

DEGRADATION PRODUCTS
Noner

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20ºC AND 101.3 kPa: Yellowish liquid

Property	Value	Data Source/Justification
Glass transition temperature	9ºC	Measured
Boiling Point	Not determined	Stable up to 350ºC
Density	1160 kg/m^3 at 25ºC	Measured
Vapour Pressure	<1x10^{-7} kPa at 20ºC	Estimated
Water Solubility	≤ 2.7 × 10^{-3} g/L at 23°C	Measured

Hydrolysis as a Function of pH	Not determined	The notified polymer has hydrolysable groups. However, hydrolysis is expected to be very slow under environmental conditions due to the limited water solubility of the notified polymer
Partition Coefficient (n-octanol/water)	Not determined	The notified polymer is expected to partition from water to n-octanol on the basis of its low water solubility
Adsorption/Desorption	Not determined	The notified polymer is expected to sorb to soil, sediment and sludge based on its low water solubility and high molecular weight
Dissociation Constant	Not determined	The notified polymer does not contain functionality that is expected to dissociate under environmental conditions
Particle Size	Not determined	The notified polymer will be imported in a solution
Flash Point*	26°C	Measured
Flammability**	Upper: 6.6% Lower: 1.1%	Measured
Autoignition Temperature	Not expected to autoignite	Estimated based on stability at temperatures up to 350 °C
Explosive Properties	Not predicted to be explosive	Estimated based on chemical structure

* Refers to the product Synolac PT30X (containing the notified polymer at <70%)
** measured for xylene (a component of Synolac PT30X at 33% concentration)

DISCUSSION OF PROPERTIES
For full details of tests on physical and chemical properties, refer to Appendix A.

Reactivity
The notified polymer was found to be stable in air at up to 350 °C and in nitrogen at up to 380 °C.

Dangerous Goods classification
Based on the submitted physical-chemical data in the above table the notified polymer is not classified according to the Australian Dangerous Goods Code (NTC, 2007). However the data above do not address all Dangerous Goods endpoints. Therefore consideration of all endpoints should be undertaken before a final decision on the Dangerous Goods classification is made by the introducer of the polymer. It should be noted that the product Synolac PT30X containing the notified polymer at <70% concentration is classified as a Dangerous Good – Flammable (Class 3) due to the presence of xylene and ethylbenzene solvents.

5. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified polymer will be imported by sea as a solvent solution at <70% concentration.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	<1000	<1000	<1000	<1000	<1000

PORT OF ENTRY
Melbourne, Sydney, Brisbane, Perth

TRANSPORTATION AND PACKAGING
The notified polymer will be imported in 200 kg steel drums and transported to the customer for reformulation into enamel paints.

USE

The notified polymer will be used at <40% concentration as a component of enamel paints for industrial purposes.

OPERATION DESCRIPTION
The notified polymer will be weighed into a blending vessel with other components of enamel paints via an automated, closed loop mechanism. After blending, containers of the finished enamel paint will be filled via an automated mechanism and distributed to commercial customers for application by spray, roller or brush in industrial settings.

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

6.1.1. Occupational Exposure

EXPOSURE DETAILS
Paint reformulation
Dermal and ocular exposure is possible from spill and splashes when opening the imported steel drums containing the notified polymer at <70% and during connecting and disconnecting transfer lines. There is also potential for dermal and possibly ocular exposure to spills, drips and splashes of paints containing the notified polymer at <40% during cleaning of the blending vessel. The use of personal protective equipment (PPE) such as gloves, eye protection, protective clothing and respiratory protection if ventilation is insufficient, should minimise exposure.

End use
Professional painters working in industrial settings may come into contact with the notified polymer (<40%) through inhalation (during spray application), dermal and ocular routes. The use of personal protective equipment (PPE) such as gloves, overalls, safety glasses and including respirators during spray application and/or local exhaust ventilation should minimise exposure.

After application and once dried, the notified polymer will be trapped in an inert polymer matrix and will not be bioavailable.

6.1.2. Public Exposure
The enamel paint containing the notified polymer at <40% is intended for industrial use only and will not be sold to the public. Members of the public may come into contact with articles that have been coated with paints containing the notified polymer. However, once the paints are dried, the notified polymer will be trapped in an inert polymer matrix and will not be bioavailable.

6.2. Human Health Effects Assessment

No toxicity data were submitted. The notified polymer contains a functional group of concern for irritation/corrosion with a functional group equivalent weight (FGEW) < 5000 Da. However, the potential for irritation/corrosion is expected to be limited by the low percentage of low molecular weight species (<11% < 1000 Da.).

Given the high molecular weight (>1000 Da.) and low water solubility of the notified polymer, absorption across biological membranes is not expected to be significant.

Health hazard classification
As no toxicity data were provided, the notified polymer cannot be classified according to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004).

6.3. Human Health Risk Characterisation

6.3.1. Occupational Health and Safety
The notified polymer may have some potential for corrosion/irritation.

Exposure to the notified polymer present at <70% as imported during reformulation is not expected to be significant for workers given the stated use of closed and automated systems and PPE (gloves, overalls, safety glasses and including respirators during spray application).

Inhalation is expected to be the main route of exposure during manual spray application of paints containing the notified polymer (<40%). Dermal and ocular exposure is also anticipated during application. However, this is expected to be minimised by the stated use of PPE (gloves, overalls, safety glasses and including respirators during spray application). After application and once dried, the notified polymer will be trapped in an inert polymer matrix and will not be bioavailable.

Overall, the risk to workers during reformulation of the notified polymer at <70% as imported, and application of paints containing the notified polymer at <40% is not expected to be unreasonable given the appropriate use of PPE and engineering controls as described above.

6.3.2. Public Health

Members of the public may occasionally come into contact with substrates coated with the notified polymer. However after the paint has been applied and dried, the notified polymer will be cured into an inert matrix and will not be available for exposure, therefore the risk to public health 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

The imported notified polymer will be reformulated and decanted into end-use containers in Australia. The notified polymer is anticipated to be released to the environment from accidental spills (< 1% of annual import volume), or as residues (1%) remaining in empty containers and formulation equipment. The majority of residual notified polymer will be collected with solvent and recycled into subsequent batches.

RELEASE OF CHEMICAL FROM USE

The end-use product containing the notified polymer is expected to be applied to metal substrates in industrial settings by spray, brushes and roller. Overspray is anticipated to account for up to 10% of the paint applied by spray. In the spray booths this is likely to be captured by standard engineering controls and recycled into the next batch or disposed of to landfill. In outdoor settings overspray is likely to be captured by paper which will be disposed of to landfill, or caught in bunded areas. Application equipment will be cleaned using solvent which may be recycled into subsequent batches or disposed of by a licensed waste contractor. Solid waste is expected to be disposed of to landfill. Residual product in end-use containers is expected to be thermally decomposed during metal reclamation processes or disposed of to landfill with the empty containers.

RELEASE OF CHEMICAL FROM DISPOSAL

Notified polymer in coatings is expected to share the fate of the metal articles to which it has been applied. Therefore, the notified polymer is expected to be either thermally decomposed during metal reclamation processes at the end of the articles' useful life, or disposed of to landfill.

7.1.2. Environmental Fate

The majority of the notified polymer is expected to be cured in an inert matrix as part of its normal use pattern as a component of enamel paint. In this form, the notified polymer is not expected to be bioavailable nor biodegradable. Notified polymer in solid waste disposed of to landfill, or in enamel paint spilt to the ground during application, is not expected to be mobile and will slowly degrade *in situ*, by biotic and abiotic processes. The notified polymer will eventually degrade in landfill or by thermal decomposition during metal reclamation processes, to form water and oxides of carbon.

Significant amounts of notified polymer are not expected to be released to the aquatic environment. In the event that minor amounts of notified polymer are disposed of to sewer from the cleaning of equipment, it is expected that it will be removed from influent by up to 90% through adsorption to sludge during sewage treatment processes (Boethling & Nabholz, 1997). Bioaccumulation of the notified polymer is unlikely due to its high molecular weight and its limited release to surface waters.

7.1.3. Predicted Environmental Concentration (PEC)

The notified polymer is not expected to be present at significant concentrations in the aquatic environment because of its very low potential for direct release to surface waters when used in enamel paints. A PEC has therefore not been calculated.

7.2. Environmental Effects Assessment

No ecotoxicological data on the notified polymer were submitted. Polymers without significant ionic functionality are generally of low concern to the aquatic environment.

7.2.1. Predicted No-Effect Concentration

A predicted no-effect concentration (PNEC) has not been calculated for the notified polymer as, based on its reported use pattern, ecotoxicologically significant quantities are not expected to be released to the aquatic environment.

7.3. Environmental Risk Assessment

The risk quotient (Q = PEC/PNEC) for the notified polymer has not been calculated as release to the aquatic environment in ecotoxicologically significant quantities is not expected based on its assessed use pattern as a component in an industrial enamel paint. The majority of the notified polymer will be cured into an inert matrix on metal articles and is ultimately expected to be thermally decomposed during metal recycling or disposed of to landfill. In its cured state the notified polymer is irreversibly bound into the paint enamel matrix and is unlikely to leach or be bioavailable. Due to its limited environmental exposure, the risk of the notified polymer to the environment is not expected to be unreasonable based on its assessed use pattern.

8. CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification

As no toxicity data were provided, the notified polymer cannot be classified according to 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 assessed use pattern, the notified polymer is not considered to pose an unreasonable risk to the environment.

Recommendations

CONTROL MEASURES

Occupational Health and Safety

- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer:
  - Avoid contact with skin and eyes
  - Do not inhale vapours/mists

- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer:
  - Overalls
  - Gloves
  - Goggles

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

- Spray applications should be carried out in accordance with the Safe Work Australia *National Guidance Material for Spray Painting* [NOHSC (1999)] or relevant State and Territory Codes of Practice.

- A copy of the MSDS should be easily accessible to employees.

- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)] workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must 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 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 surface coatings, or is likely to change significantly;
- the amount of polymer being introduced has increased from 1000 tonnes per annum, or is likely to increase, significantly;
- the polymer has begun to be manufactured in Australia;
- 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 MSDS of a product containing the notified polymer provided by the notifier was reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.

APPENDIX A: PHYSICAL AND CHEMICAL PROPERTIES

Glass Transition Temperature 9ºC

Method	The notified polymer was applied to a glass lamella and dried for 2 hours at 125 ºC. The Tg value was determined using differential scanning calorimetry.
Test Facility	Cray Valley (2010)

Density 1160 kg/m^3 at 25ºC

Method	Not provided
Test Facility	Cray Valley (2010)

Water Solubility $\leq 2.7 \times 10^{-3}$ g/L at 23°C

Method	In-house method
Remarks	The test substance was applied to a polyethylene film and dried at 120°C for 5 hours. The test substance/polyethylene film sample was weighed. The sample was then immersed in 800 mL demineralised water at 23 ± 2°C, pH 7 for 48 hours. The sample was removed from the water bath, dried and reweighed. The water solubility of the sample was calculated from the difference in weight of the sample before and after immersion in water. The method was repeated with water at pH 2 and at pH 9. The reported water solubility is for the cured notified polymer. However, the uncured notified polymer is also expected to have low water solubility based on the presence of significant hydrophobic functions and its use in non-aqueous products.
Test Facility	Cray Valley (2010)

Stability Testing Stable at up to 350°C in Air and 380°C in Nitrogen

Method	The notified polymer was applied to a glass plate and dried for 2 hours at 125 ºC. A differential scanning calorimeter was used to raise the temperature at 10°C/min from 30°C to 500°C.
Test Facility	Cray Valley (2010)

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