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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME
(NICNAS)**

FULL PUBLIC REPORT

Polymer in Silikopon EF

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 the Environment, Water, Heritage and the Arts.

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 334-336 Illawarra Road, Marrickville NSW 2204.

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:

Street Address:	334 - 336 Illawarra Road MARRICKVILLE NSW 2204, AUSTRALIA.
Postal Address:	GPO Box 58, SYDNEY NSW 2001, AUSTRALIA.
TEL:	+ 61 2 8577 8800
FAX	+ 61 2 8577 8888
Website:	www.nicnas.gov.au

**Director
NICNAS**

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FULL PUBLIC REPORT**Polymer in Silikopon EF****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 $M_n \geq 1000$ Da.

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication: chemical name, other names, CAS number, molecular and structural formulae, spectral data, purity, molecular weight, polymer constituents, residual monomers/impurities, identity of manufacturer/recipients and confidential details of use.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

No variation to the schedule of data requirements is claimed.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

USA (2005)

Canada (2005)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Silikopon EF (contains 80% notified polymer)

OTHER NAME(S)

Siliconeepoxide resin

MOLECULAR WEIGHT

> 1000 Da

ANALYTICAL DATA

Reference NMR, IR and GPC spectra were provided.

3. COMPOSITION

DEGREE OF PURITY > 90%

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: Liquid

Property	Value	Data Source/Justification
Melting Point/Freezing Point	Not determined	Liquid at ambient temperatures.
Boiling Point	Not determined	Based on the NAMW > 1,000 Da the boiling point is expected to be high.
Density	1,127 kg/m ³ at 25°C	MSDS, method DIN 51757
Viscosity	Approx. 1,200 mPa.s at 25°C	MSDS, method DIN 53015
Vapour Pressure	< 1.3 × 10 ⁻⁹ kPa	Estimated based on the NAMW > 1,000 Da (US EPA, 2007)
Water Solubility	Not determined	Claimed to be insoluble by the notifier, which is consistent with the largely hydrophobic nature of the structure.
Hydrolysis as a Function of pH	Not determined	Hydrolysis of some pendant functional groups may occur at the extremes of the environmental pH range of 4-9.
Partition Coefficient (n-octanol/water)	Not determined	The hydrophobic nature of the notified polymer indicates a strong potential to partition into the octanol phase.
Adsorption/Desorption	Not determined	Expected to be relatively immobile in soil based on the highly hydrophobic structure and possibility of cross-linking with soil.
Dissociation Constant	Not determined	The notified polymer does not contain readily dissociable functionality
Flash Point	117°C	MSDS, DIN EN 22719 (DIN 51758)
Flammability	Not expected to be highly flammable.	Based on flash point.
Autoignition Temperature	Not determined	Expected to be high based on flash point.
Explosive Properties	Not expected to be explosive	The structural formula contains no explosives.

DISCUSSION OF PROPERTIES

Based on the measured flash point, the notified polymer is not classified as flammable but would be considered to be a C1 combustible liquid [NOHSC:1015(2001)].

Reactivity

Stable under normal conditions of use.

5. INTRODUCTION AND USE INFORMATION

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

The notified polymer will not be manufactured within Australia.

The notified polymer will be imported as part of the product Silikopon EF (80% notified polymer).

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

Year	1	2	3	4	5
Tonnes	1-5	1-5	1-5	5-10	5-10

PORT OF ENTRY

Melbourne

TRANSPORTATION AND PACKAGING

The notified polymer will be imported in 200 L steel drums. The reformulated material will be packaged in 5 L and 20 L pails. The notified polymer will be transported throughout Australia by road.

USE

The notified polymer will be used in protective coatings for industrial and commercial applications.

OPERATION DESCRIPTION*Reformulation*

The reformulation of the notified polymer will be conducted by a series of blending and decanting steps with no chemical reactions. The notified polymer and other materials will be added to the process tank which can vary from 1000 to 3000 L capacity. The amount of the notified polymer used per batch will be approximately 100 – 250 kg depending on final batch size and a maximum of 5 batches per month are anticipated although depending on demand patterns up to 2 batches per day may be produced when required. All activities will be carried at ambient temperature. Sampling will occur for quality control purposes. The process vessels will be cleaned by contained solvent washing with the resultant solution captured and stored in 200 L closed head drums for recycling. The reformulated coating containing the notified polymer (< 10%) will be transferred through closed piping into 5 L and 20 L metal pails.

End use

The protective coating containing the notified polymer is intended for industrial use only. The items to be painted are structural steel and associated equipment that will be treated in large open workshops with mechanically assisted ventilation. The application of the coatings containing notified polymer (< 10%) will be predominantly carried out by spray painting although brush and roller application may also be used.

6. HUMAN HEALTH IMPLICATIONS**6.1 Exposure assessment****6.1.1 Occupational exposure****NUMBER AND CATEGORY OF WORKERS**

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration (hours/day)</i>	<i>Exposure Frequency (days/year)</i>
Warehouse staff	10	2	100
Transport workers	4	4	100
Process operators	4	6	200
Laboratory personnel	2	4	200
Painting contractors	50	4	200

EXPOSURE DETAILS*Transport and Storage*

Waterfront, transport and warehouse workers will not be exposed to the notified polymer (at up to 80% in Silikopon EF) except in the case of an accident.

Reformulation

Dermal and ocular exposure to the notified polymer will be possible during the transfer of the imported material Silikopon EF (80% notified polymer) into the process tank, during quality control testing and packaging of the final product. Exposure should be minimised by the use of enclosed systems and expected use of PPE by workers including gloves, protective clothing and safety glasses. Inhalation exposure to the notified polymer should be minimised through the use of enclosed systems and exhaust ventilation.

End use

Dermal, ocular and inhalation exposure to the notified polymer will be possible during spray painting with coatings containing the notified polymer. However exposure should be reduced through the use of mechanically assisted ventilation and PPE including overalls to wrist and ankles, eye protection, nitrile or neoprene gloves and respiratory protection with a cartridge respirator suitable for organic mists and vapours.

6.1.2. Public exposure

There is negligible potential for public exposure to the notified polymer as it will only be used for industrial applications and once cured the notified polymer will be bound within a polymer matrix and will not be bioavailable.

6.2. Human health effects assessment

No toxicity data were submitted.

Toxicokinetics, metabolism and distribution

The notified polymer contains pendant methoxysilane groups. This class of chemical has been flagged as a potential concern for lung toxicity from inhalation of vapours or aerosols (EPA 2002). The vapour pressure of the notified polymer based on its molecular weight is expected to be low ($< 1.3 \times 10^{-9}$ kPa). However, the notified polymer contains a high percentage of low molecular weight species (< 1000 Da), therefore there is potential for inhalation of the vapour of the notified polymer under normal environmental conditions.

Irritation and Sensitisation

The notified polymer does not contain any structural alerts for skin irritation or sensitisation.

Health hazard classification

Based on the limited data provided the notified polymer can not be classified as hazardous 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 has the potential to cause irreversible lung effects from inhalation of its vapours. Although inhalation exposure may occur during reformulation the expected use of engineering controls (enclosed systems and exhaust ventilation) should minimise this risk. Workers most at risk of inhalation exposure will be painters applying the coatings containing the notified polymer ($< 10\%$) by spray application. Provided these workers use the appropriate PPE including respiratory protection with a cartridge respirator suitable for organic mists and vapours and apply the coatings in a well ventilated area, the risk to workers from use of the notified polymer is not considered unacceptable.

6.3.2. Public health

Given the public are unlikely to be exposed to the notified polymer, the risk to public health is not considered unacceptable.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1 Environmental Exposure

RELEASE OF CHEMICAL AT SITE

The notified polymer will be manufactured overseas and imported into Australia in 200 L steel drums. On arrival, the notified polymer will be transported to the formulator, where the notified polymer will be blended with other ingredients and decanted into end-use containers. Up to 6% of the annual introduction volume of notified polymer may remain in blending and associated equipment, being removed using solvent. The notified polymer is expected to react with the other ingredients during the solvent recovery process, being entrapped within an inert polymer matrix and be disposed of to landfill. Residual within import containers is expected to be thermally decomposed during drum recycling.

RELEASE OF CHEMICAL FROM USE

The formulated notified polymer is expected to be applied to various substrates mainly by spray painting in workshop situations. Given the formulation is solvent based (as opposed to water based), aquatic exposure is not expected during application equipment cleaning operations. Rather, application equipment is expected to be cleaned using solvent, which is expected to be sent for recovery. The formulated notified polymer is expected to react with the other ingredients during the solvent recovery process, being entrapped within an inert polymer matrix and be disposed of to landfill.

Overspray is expected to account for up to 50% of the annual introduction volume, depending on the size and shape of substrate to which it is applied. This is expected to be captured by standard engineering practices and, after being allowed to cure, be disposed of to landfill.

Residual within end-use containers is expected to be thermally decomposed during metal drum recycling or be disposed of to landfill with the used containers.

RELEASE OF CHEMICAL FROM DISPOSAL

Applied notified polymer in coatings is expected to share the fate of the substrate to which it has been applied. Should reapplication be required, some coating may be removed by physical means (sandpaper/scraping), and it is expected that this will be disposed of to landfill. Notified polymer that has been applied to metal substrate is expected to be thermally decomposed during metal recycling at the end of the substrates useful life.

7.1.2 Environmental fate

No environmental fate data were submitted. The notified polymer may undergo partial hydrolysis under normal environmental conditions, but is expected to be cured into a solid polymer matrix as part of its normal use pattern. It is unlikely to undergo biodegradation. Bioaccumulation of the polymer is unlikely due to the high molecular weight of the polymer even before curing. The notified polymer is expected to slowly degrade *in situ* primarily by abiotic processes following disposal to landfill.

7.1.3 Predicted Environmental Concentration (PEC)

As aquatic release is not expected at any stage of the notified polymer's lifecycle in Australia, a Predicted Environmental Concentration could not be calculated.

7.2. Environmental effects assessment

No ecotoxicity data were submitted.

7.3. Environmental risk assessment

A Risk Quotient cannot be quantified as a PEC and PNEC cannot be determined. However, the environmental exposure is expected to be minimal. Therefore, the overall risk is considered acceptable.

8. CONCLUSIONS AND REGULATORY OBLIGATIONS**Hazard classification**

Based on the limited data provided the notified polymer can not be classified as hazardous 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 unacceptable risk to the health of workers.

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

Environmental risk assessment

On the basis of the reported use pattern, the notified polymer is not expected to pose a risk to the environment.

Recommendations**CONTROL MEASURES****Occupational Health and Safety**

- Employers should implement the following isolation and engineering controls to minimise occupational exposure to the notified polymer:
 - Exhaust ventilation
 - Enclosed systems during reformulation
- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer:
 - Avoid breathing aerosol
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer during application:
 - Respiratory protection with a cartridge respirator suitable for organic mists and vapours

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 chemical 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 chemical has changed from a component of industrial coatings, or is likely to change significantly;
 - the amount of chemical being introduced has increased from 10 tonnes per annum, or is likely to increase, significantly;
 - the chemical has begun to be manufactured in Australia;
 - additional information has become available to the person as to an adverse effect of the chemical 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 the 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.

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