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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in Synocure 886 S70

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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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
International Sales & Marketing Pty Ltd (ABN: 36 467 259 314)
262 Highett Rd
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, Other Names, CAS Number, Molecular and Structural Formulae, Spectral Data, Molecular Weight, Polymer Constituents, Residual Monomers/Impurities, Use Details, Manufacture/Import Volume, and Site of Manufacture/Reformulation.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed as follows: Melting Point, Boiling Point, Vapour Pressure, Particle Size, Flash Point, Flammability Limits, Autoignition Temperature, Explosive Properties.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None.

NOTIFICATION IN OTHER COUNTRIES
None.

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
Synocure 886 S70 (>50% of notified polymer in a solvent blend)

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

3. COMPOSITION

DEGREE OF PURITY >90%

HAZARDOUS IMPURITIES/RESIDUAL MONOMERS
With the exception of one, all hazardous impurities and residual monomers were present at levels under the concentration cut-offs. This residual monomer is present at a concentration of >1%, which may result in sensitisation by skin contact (R43).

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

ADDITIVES/ADJUVANTS
None.

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES
None under normal conditions of use.

DEGRADATION PRODUCTS
None under normal conditions of use.

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20 °C AND 101.3 kPa:
Synocure 886 S70 is a liquid; the polymer is a non-crystalline/amorphous solid

Property	Value	Data Source/Justification
Glass Transition Temperature	11.5 °C	Measured.
Density	1065 kg/m^3 at 25 °C	Measured.
Vapour Pressure	Not determined	Based on the high molecular weight of the polymer the vapour pressure is expected to be low.
Water Solubility	4.0 x 10^{-4} g/L, pH 2, 23 ± 2°C 2.2 x 10^{-3} g/L, pH 7, 23 ± 2°C 2.5 x 10^{-3} g/L, pH 9, 23 ± 2°C	Measured.
Hydrolysis as a Function of pH	Not tested	The notified polymer is expected to hydrolyse very slowly over the environmental pH range (4–9) at ambient temperature.
Partition Coefficient (n-octanol/water)	Not tested	The notified polymer is expected to partition to organic phases due to its predominantly hydrophobic structure.
Adsorption/Desorption	Koc not determined	Adsorption of Synocure 886 S70 to calcium carbonate and talc was found to be greater than linseed oil. The notified polymer is expected to adsorb to solids based on its predominantly hydrophobic structure and amphoteric components.
Dissociation Constant	Not tested	The notified polymer contains functional groups that are expected to dissociate over the environmental pH range 4–9.
Particle Size	Not determined	The polymer is in solution.
Flash Point	Not Determined	Imported in solution in flammable solvent.
Autoignition Temperature	465-525 °C	For Synocure 886 S70; Stated on MSDS.
Explosive Properties	Not determined	Expected to be stable under normal conditions of use. The notified polymer contains no functional groups that would imply explosive properties.

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

Reactivity
Reacts further in end-use to cross-link when mixed with the other component of an epoxy 2-part coating. Not compatible with strong oxidising agents.

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 does 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.

5. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified polymer will be introduced into Australia in a solvent blend in 200 L closed head drums. The supplied drums contain >50% (by weight) of the notified polymer.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	1-5	5-10	10-20	10-20	10-20

PORT OF ENTRY
The notified polymer will be imported into Melbourne, VIC or Sydney, NSW.

IDENTITY OF MANUFACTURER/RECIPIENTS
Following its introduction into Australia, the notified polymer will be used in manufacturing processes in the western suburbs of Melbourne.

TRANSPORTATION AND PACKAGING
The notified polymer will be supplied in UN approved 200 L closed head drums. The drums will then be transported within Australia by licensed Dangerous Goods (DG) drivers in licensed DG trucks.

USE
The notified polymer will be used in 2-part epoxy protective coatings for industrial and commercial building applications.

OPERATION DESCRIPTION
Coatings containing the notified polymer will be prepared in a single batch operation *via* a single mixing turbine. The drums of material are added to the process tank by pouring through a loading hatch and the mixer is started. Additional ingredients (solvents, pigments and additives) are added progressively using a written procedure to control the properties of the final mixture. The process is conducted at ambient temperature and pressure. Following quality control testing, the manufactured coatings (containing >25% of the notified polymer) will be transferred to 20 L and 5 L metal ADG compliant containers for storage and sale.

Commercial painting contractors will then apply the coating to structural steel (and related materials) primarily by spray, but also by brush and roller. The notified polymer is one component of an epoxy 2-part coating. The items to be painted are treated in large open workshops with mechanically assisted ventilation. Large projects may also be conducted outdoors.

6. HUMAN HEALTH IMPLICATIONS

6.1 Exposure assessment

6.1.1 Occupational exposure

NUMBER AND CATEGORY OF WORKERS

Category of Worker	*Number*	*Exposure Duration (hours/day)*	*Exposure Frequency (days/year)*
Process Operators	4	6 hours per day	200 days per year
Laboratory Personnel	2	4 hours per day	200 days per year
Warehouse staff	10	2 hours per day	100 days per year
Transport Workers	4	4 hours per day	100 days per year
Painting Contractors	50	4 hours per day	200 days per year

EXPOSURE DETAILS
Transport workers and warehouse staff may come into contact with the imported solution (>50% polymer) or manufactured coatings (>25% polymer) only in the event of accidental rupture of containers.

All processes involved in the coating manufacture use tools or other devices for the transfer of ingredients, and exposure to process operators and laboratory personnel is mitigated by the use of mechanical ventilation and personal protective equipment (PPE: chemical resistant gloves, safety glasses, steeled capped shoes and appropriate industrial clothing).

Commercial painting contractors will apply the coating by spray, brush or roller. Appropriate respiratory and dermal PPE will be used to control exposure.

6.1.2. Public exposure

The notified polymer is intended for industrial use only. The public may be exposed to the polymer or paint in the event of a transport accident. The public may be exposed to the applied coating. However, once the material is dried it is in a stable, inert form.

6.2. Human health effects assessment

No toxicity data were submitted for the notified polymer.

Toxicokinetics, metabolism and distribution.
Based on the high molecular weight (>1000 Da) of the notified polymer, the potential of the notified polymer to cross the gastrointestinal (GI) tract by passive diffusion or to be dermally absorbed after exposure is limited. However, the polymer contains a significant proportion of low molecular weight species (<1000 Da) that may be absorbed.

Irritation and Sensitisation.
The notified polymer does contain a hazardous residual monomer at a concentration of >1%, which may result in sensitisation by skin contact.

Health hazard classification
Based on the available data the notified chemical cannot 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
No toxicological data are available for the notified polymer. It contains a residual monomer with sensitising properties, however, this monomer will be present in the imported product at less than the cut-off concentration for classification. Due to the control measures in place to reduce exposure, including automated processes and the use of PPE, the overall risk of exposure to the notified polymer will be low and it is, therefore, not considered to be unacceptable to the health of workers.

6.3.2. Public health
The notified polymer is intended for use in industrial applications by qualified operators. The public may be exposed to the applied coating. However, once the material is dried it is in a stable, inert form. Therefore, exposure to the general public is very low and is not considered to be unacceptable to the health of the general public.

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 reblended and decanted into end-use containers in Australia. The notified polymer is anticipated to be released as accidental spills (<1% of annual introduction volume), or as residue (<5%) remaining in transport containers and blending equipment. Solvent used to collect the notified polymer when cleaning equipment will be recycled, and any solid waste is expected to be disposed of to landfill. Notified polymer residue within import containers is likely to be thermally decomposed during drum recycling.

RELEASE OF CHEMICAL FROM USE

The end-use product containing the notified polymer is expected to be applied to various substrates by spray painting, brush and roller in both workshop and outdoor situations. Application equipment will be cleaned using solvent, and it is expected that the solvent will be recycled, and the solid waste will be disposed of to landfill.

Overspray is anticipated to account for up to 50% of the annual introduction volume, depending on the size and shape of the article being sprayed. This is likely to be captured by standard engineering practices and, after being allowed to cure, disposed of to landfill. Overspray not captured by controls in outdoor situations may result in release of the notified polymer directly to the soil.

Residual product in end-use containers is expected to be thermally decomposed during metal drum recycling or 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. Notified polymer applied to metal articles will be either thermally decomposed during metal recycling at the end of the substrates useful life, or disposed of to landfill. Cured coating removed by physical means (e.g. sandpaper/scraping) and non-metal articles at the end of their useful life are expected to be disposed of to landfill.

7.1.2 Environmental fate

No environmental fate data were submitted. The notified polymer is expected to be cured into a solid polymer matrix as part of its normal use pattern and is not expected to be bioavailable or biodegradable. Bioaccumulation of the uncured polymer is unlikely due to the high molecular weight of the notified polymer and its limited potential for aquatic exposure. Notified polymer released to soil or disposed of to landfill is not expected to be mobile, thus it will slowly degrade *in situ* primarily by abiotic processes.

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 (PEC) cannot be calculated.

7.2. Environmental effects assessment

No ecotoxicological data were submitted. The toxicity of ionic polymers depends on the cation to anion ratio (CAR), and polymers that pose a concern for the environment have a net cationic charge. The CAR for the notified polymer is 0.8, indicating that it is anionic overall. Therefore, the notified polymer is not expected to pose a significant concern to the environment (Boethling and Nabholz, 1996).

7.2.1 Predicted No-Effect Concentration

A Predicted No-Effect Concentration (PNEC) cannot be calculated as no ecotoxicological data were submitted.

7.3. Environmental risk assessment

A Risk Quotient is unable to be quantified as a PEC and PNEC cannot be calculated. The reported use pattern of the notified polymer indicates that there is no anticipated aquatic release, hence the environmental exposure is expected to be minimal. On the basis of the reported use pattern, the notified polymer is not expected to pose a risk to the environment.

8. CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification

Based on the available data the notified chemical cannot be classified as hazardous according to the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(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

- No specific engineering controls, work practices or personal protective equipment are required for the safe use of the notified polymer itself. However, these should be selected on the basis of all ingredients in the formulation.

  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 chemical 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(2) of the Act; if
  - the function or use of the chemical has changed from a component of protective coatings or is likely to change significantly;
  - the amount of chemical being introduced has increased from 20 tonnes 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.

No additional secondary notification conditions are stipulated.

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

Melting Point 11.5 ºC

Method	In-house method. Resin on glass lamella dried *ca*. 2 hours at 125 ºC. Temperature measured using 2 temperature sweeps (-40 to 130 ºC, 10 ºC/min), Tg determined during second heating.
Remarks	Glass transition temperature (Tg) by DSC, study summary only was provided.
Test Facility	Cray Valley Centre de Recherche de L'Oise, France

Density 1065 kg/m^3 at 25 ºC

Method	In-house method. Resin dried *ca*. 2 hours at 120 ºC. Density of solid calculated from difference in weight between the sample in air and in water. Value is an average of 3 measurements.
Remarks	Study summary only was provided.
Test Facility	Cray Valley Centre de Recherche de L'Oise, France

Water Solubility 4.0×10^{-4} g/L, pH 2, 23 ± 2°C
2.2×10^{-3} g/L, pH 7, 23 ± 2°C
2.5×10^{-3} g/L, pH 9, 23 ± 2°C

Method	In house method. Synocure 886 S70 resin (>50% notified polymer in solvent) was applied onto polyethylene film and dried (120°C, 5 h) to obtain a polymer film of constant weight. In duplicate, samples were weighed and immersed in a water bath for 48 h (23 ± 2°C, pH 2, 7 and 9), then dried (105°C, 2 h) and reweighed. The water solubility was expressed as the difference in weight.
Remarks	Study summary only was provided.
Test Facility	Cray Valley (2009a)

Adsorption/Desorption Koc not determined

Method	Standard NF EN ISO 787/5. Comparative adsorption between linseed oil and Synocure 886 S70 (>50% notified polymer in solvent) was conducted to test the pigment binding power of the resin to calcium carbonate and talc. Synocure 886 S70 displayed a binding power greater than linseed oil, achieving 37% adsorption to calcium carbonate and 63% to talc (cf. linseed oil at 24% and 42% respectively).
Remarks	Study summary only was provided. The notified polymer is expected to adsorb to solids based on its predominantly hydrophobic structure and amphoteric components (US EPA, 2007).
Test Facility	Cray Valley (2009b)

BIBLIOGRAPHY

Boethling RS & Nabholz JV (1996) 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. New York, Van Nostrand Reinhold, pp 187–234.

Cray Valley (2009a) Evaluation of Synocure 886 S70 (Reference No. P090303 and RMN–090661 and HPLC–090646, 26 November 2009). Courbevoie, France, Cray Valley Centre de Recherche de L'Oise. (Unpublished report submitted by notifier).

Cray Valley (2009b) Registration in Australia of Synocure 886 S70 (batch 9J08131327) (Reference No. CAT–Ind–09–JYH–283, 27 November 2009). Courbevoie, France, Cray Valley Centre de Recherche de L'Oise. (Unpublished report submitted by notifier).

NOHSC (1994) National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

NOHSC (1999) National Guidance Material for Spray Painting. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

NOHSC (2003) National Code of Practice for the Preparation of Material Safety Data Sheets, 2nd edition [NOHSC:2011(2003)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

NOHSC (2004) Approved Criteria for Classifying Hazardous Substances, 3rd edition [NOHSC:1008(2004)]. National Occupational Health and Safety Commission, Canberra, AusInfo.

NTC (National Transport Commission) 2007 Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG code), 7th Edition, Commonwealth of Australia

United Nations (2009) Globally Harmonised System of Classification and Labelling of Chemicals (GHS), 3rd revised edition. United Nations Economic Commission for Europe (UN/ECE), <http://www.unece.org/trans/danger/publi/ghs/ghs_rev03/03files_e.html >.

US EPA (United States Environmental Protection Agency) (2007), Interpretive Assistance for the Assessment of Polymers. Updated 22 January 2007: http://www.epa.gov/oppt/sf/pubs/InterpretiveAssistancePolymers0107.pdf Accessed 2010 February 15.