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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in BYK-SILCLEAN 3700

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Director
Chemicals Notification and Assessment

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Polymer in BYK-SILCLEAN 3700

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Nuplex Industries (Aust) Pty Ltd (ABN 25 000 045 572)
49-61 Stephen Road, Botany NSW 2019

NOTIFICATION CATEGORY
Synthetic Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication:
Chemical name
Other names
CAS number
Number Average Molecular Weight
Weight Average Molecular Weight
Molecular formula
Structural formula
Polymer constituents
Charge density
Reactive functional groups
Impurities
Import volume
Site of reformulation
Purity

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)
Nil

NOTIFICATION IN OTHER COUNTRIES
Nil

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
BYK-SILCLEAN 3700

3. COMPOSITION

DEGREE OF PURITY
High

RESIDUAL MONOMERS
All residual monomers are below the relevant cut-offs for classification of the notified polymer as a hazardous substance.

PLC CRITERIA JUSTIFICATION

Criterion	*Criterion met (yes/no/not applicable)*
Meets Molecular Weight Requirements	Yes
Meets Functional Group Equivalent Weight (FGEW) Requirements	Yes
Low Charge Density	Yes
Approved Elements Only	Yes
No Substantial Degradability	Yes
Water Absorbing	Yes
Low Concentrations of Residual Monomers	Yes
Hazard Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

4. INTRODUCTION AND USE INFORMATION

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	<30	<30	<30	<30	<30

USE

The notified polymer will be used in industrial coatings such as coil and packaging coatings. It may also be used in anti-graffiti paint applications. The predominant usage is in coatings in solvent borne paint systems as an additive to improve the ease of surface cleaning. The notified polymer will be used in final paints in concentrations of 0.1% to 6%.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

The notified polymer will be imported from Germany as a solution (<30% notified polymer) and reformulated to prepare industrial coatings/paint solutions in Australia. Approximately 70% of the notified polymer will be applied as coil coatings and 30% will be applied in industrial spray paint settings.

Coatings/Paint Manufacture:

The notified polymer is mixed with other ingredients under high speed dispersing and blending. Once the batch has been adjusted and passed quality testing, it is filtered and filled into containers, which will be stored on-site in a warehouse until required by customers. The final solution (coatings/paints) contains up to a maximum of 6% notified polymer.

For handling the notified polymer solution and coatings, the minimum protection would be impervious gloves, coveralls and goggles. Coating manufacture employs the use of mixers fitted with exhaust ventilation to capture volatiles at source. Coatings are filled into containers under exhaust ventilation to capture any vapour generated at source.

Coatings/Paint application:

Industrial coating and spray application involves the use of spray, roller coatings or dipping equipment in an environment with an effective filtered exhaust system. As stated above, the minimum protection would be impervious gloves, coveralls and goggles. When the coating is to be sprayed, cartridge type respirators may also be worn.

6. EXPOSURE INFORMATION

6.1. Summary of Environmental Exposure

Under normal methods of coatings manufacture and coating application, release to water is not expected. Paint overspray is trapped in the coil coating process, and where application is via industrial spray paint, overspray is expected to be trapped and ultimately disposed of to landfill. Where used in anti-graffiti paint applications, application will be by qualified personnel. The majority of the notified chemical will be bound in the paint matrix and not be available for direct release to the environment.

Modelling indicates this high molecular weight polymer will be non-volatile and insoluble. It is expected to bind strongly to organic matter. It is unlikely to bioaccumulate. When in equilibrium, it would be expected to predominantly partition to the soil and sediment compartments with a very small proportion in water, and a negligible amount in air. The polymer should not hydrolyse under ambient environmental conditions in the pH range of 5-9.

6.2. Summary of Occupational Exposure

Dermal and ocular exposure can occur during certain formulation processes and also during applications. However, exposure to significant amounts of the notified polymer is limited because of the engineering controls and personal protective equipment worn by workers.

After application and once dried, the paint containing the notified polymer is cured into an inert matrix and is hence unavailable to exposure.

During transport and storage, workers are unlikely to be exposed to the notified polymer except when packaging is accidentally breached.

6.3. Summary of Public Exposure

The notifier has stated that the public will come into contact with the notified polymer after it has been applied to and becomes an integral part of a hard durable industrial coatings such as coil coatings and packaging coatings. The public can also be exposed to the notified polymer when used in anti-graffiti paints applications.

The potential public health exposure would arise from a spill during the transport of the notified polymer solution or coatings/paint containing it.

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20^{o}C and 101.3 kPa	Colourless liquid with ester-like odour.
Melting Point	100-120^{o}C
Density	Not determined.
Water Solubility	The notifier has stated that the notified polymer is insoluble in water. However, no water solubility data are submitted. Siloxanes are known to be very insoluble in water and the rest of the polymer is comprised of hydrophobic groups.
Dissociation Constant	Carboxylate groups are expected to have typical acidity.
Reactivity	Stable under normal environmental conditions
Degradation Products	The paint film containing the notified polymer will slowly deteriorate under the action of UV from sunlight but this will be negligible.

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology
No toxicological data were submitted.

8.2. Human Health Hazard Assessment
The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard.

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology
No ecotoxicological data were submitted.

9.2. Environmental Hazard Assessment
The hydrophobic nature of the notified polymer indicates that most would adsorb onto particles of sediment and sludge, and would therefore not remain in the water compartment and be available for assimilation by aquatic organisms. Furthermore, interaction between this class of compound and the dissolved and suspended organic matter in natural waters can significantly mitigate toxicity of these compounds through reducing effective exposure to sensitive organisms.

Testing of PDMS loadings up to 10000 mg/kg dry weight on activated sludge show that it is expected to behave as an inert material with no significant effects on wastewater treatment process (other than the expected benefit of foam control).

10. RISK ASSESSMENT

10.1. Environment
The environmental risk presented by the notified polymer is expected to be low based on limited likely exposure to the environment.

Polydimethylsiloxanes are unstable in landfill and on dry sediments (Hamelink, 1992; Lehmann *et al*, 1994a and 1994b) because under dry conditions, clay minerals catalyse their hydrolytic decomposition to smaller molecules, some of which may be volatile and enter the atmosphere. However, when released to the atmosphere, low molecular weight organosilanes are apparently rapidly degraded through photolysis (Hamelink, 1992). Therefore in landfill, the notified polymer would eventually degrade and as such poses little risk to the environment. Laboratory results showing degradation of PDMS in soil under laboratory conditions has been extended to the field, and shown that they will degrade under field conditions with very little downward movement (Lehmann *et al*, 2000). Degradation is impacted on by soil moisture with PDMS hydrolysis increasing as soil moisture decreased (Lehmann *et al*, 1998).

10.2. Occupational health and safety
The OHS risk presented by the notified polymer is expected to be low. The notified polymer may be present in formulations containing hazardous ingredients. If these formulations are classified as hazardous to health in accordance with the *NOHSC Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

10.3. Public health
The notified polymer will not be available to the public. Members of the public may make dermal contact with products containing the notified polymer. However, following application, the notified will become trapped within a film and will not be bioavailable. Therefore, the risk to public from exposure to the notified polymer is considered low.

11. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS

11.1. Environmental risk assessment

The notified polymer is not considered to pose a risk to the environment based on its reported use pattern.

11.2. Human health risk assessment

11.2.1. Occupational health and safety

There is Low Concern to occupational health and safety under the conditions of the occupational settings described.

11.2.2 Public health

There is Negligible Concern to public health when used according to the conditions described in this notification.

12. MATERIAL SAFETY DATA SHEET

Material Safety Data Sheet

The notifier has provided MSDS as part of the notification statement. The accuracy of the information on the MSDS remains the responsibility of the applicant.

13. 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.
- 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 NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Environment

- Avoid release to sewer, drains or waterways.

Disposal

- The notified polymer should be disposed of to landfill or be incinerated.
- Contaminated packaging: Empty containers should be sent to local recycling or waste disposal facilities.

Emergency procedures

- Prevent spilt material from entering drains or waterways.
- Soak up with absorbent material and place in a suitable receptacle for recovery or disposal.

13.1. Secondary notification

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

(1) Under subsection 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 subsection 64(2) of the Act:

- if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

No additional secondary notification conditions are stipulated.

References:

J. Hamelink (1992). "Silicones" In *The Handbook of Environmental Chemistry, Vol 3: Detergents*, N.T. de Oude (ed).

R.G. Lehmann, S. Varaprath and C.L. Frye (1994). "Degradation of silicone polymers in soil". *Environ. Toxicol. Chem.* 13 (7): 1061-1064.

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R G Lehmann, J R Miller and G E Kozerski (2000). Degradation of silicone polymer in a field soil under natural conditions. *Chemosphere*, 41:743-749.