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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

X-93-532

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Director
Chemicals Notification and Assessment

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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Admil Adhesives Pty Ltd (ABN 85 092 730 562) of 5 Alimar Road, Glen Waverley, VIC, 3150.

NOTIFICATION CATEGORY
Limited: Polymer with NAMW ≥ 1000 (greater than 1 tonne per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication:

- Chemical identity
- Purity
- Spectral data
- Import volumes

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed as follows:

- Hydrolysis as a function of pH
- Dissociation constant
- Particle size
- Flammability limits
- Explosive properties

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None

NOTIFICATION IN OTHER COUNTRIES
USA (TSCA) EPA, P-91-0367 (1991)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
X-93-532, POA-8

METHODS OF DETECTION AND DETERMINATION

ANALYTICAL METHOD	Gel Permeation Chromatography, UV Spectroscopy, IR Spectroscopy, ^{1}H NMR
Remarks	Spectra provided.

3. COMPOSITION

DEGREE OF PURITY
High

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified polymer is to be imported as a component (1% wt) of a silicone sealant.

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

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

USE
The notified polymer is imported as a curing agent present in silicone sealants at a concentration of 1%. The silicone sealants are widely used for many industries such as the electronics and construction industry.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, Transport and Storage

PORT OF ENTRY
Not specified

IDENTITY OF MANUFACTURER/RECIPIENTS **Non-Confidential**
The silicone sealant is repackaged at Admil Adhesives, Glen Waverley before being distributed to customers.

TRANSPORTATION AND PACKAGING
The silicone sealant containing the notified polymer is imported in 200 L drums. The sealant is repackaged into 300 g cartridges before being distributed to customers.

5.2. Operation description

Repacking
The sealant is repacked from 200 L drums to cartridges by automatic charge equipment. The cartridges are sealed by the automatic insertion of a plastic plunger on the same machine. The cartridges then roll off into boxes ready for distribution.

End Use
The silicone sealants primary application in the construction industry is to seal windows, roofs etc., to prevent ingress of water. The sealant is expected to be applied directly from cartridges using a caulking gun, although the uncured sealant may be worked using trowels or similar implements.

In the case of the use in electronics, again the silicone is applied with a caulking gun and left to cure.

5.3. Occupational exposure

Exposure Details
Repacking
It is estimated that 30 workers will be involved in repackaging and storage of the notified polymer. The repacking process is automated, therefore, worker exposure to the notified polymer is not expected except in the event of an accident. Workers will wear gloves, chemical protective clothing and eye protection. Local exhaust systems are in place to control inhalation exposure.

End Use
Although operators do not normally have any contact with the uncured silicone, incidental dermal exposure could occur during application of the silicone. Exposure to the cured product is most likely through dermal contact. Once cured it is expected that the notified polymer will not be bioavailable.

5.4. Release

RELEASE OF CHEMICAL AT SITE
Since the notified polymer will not be manufactured or reformulated in Australia, it may potentially only be released to the environment during importation, transportation, re-packaging, use and disposal of the polymer.

Environmental release of the notified polymer is unlikely during importation, storage and transportation, and accidental spills, leaks and catastrophic mechanical failure during a transport accident are the most likely reasons for environmental release. Engineering controls (eg. steel drum specifications, polythene bag liner) and emergency clean-up procedures (i.e. spill response instructions on Material Safety Data Sheet and label) will limit the impact on the environment of such incidents. Imported product will contain only 1 % (w/w) of the notified polymer.

Drums holding the notified polymer will be transported directly from the Port facility to industrial facilities in Australia for storage prior to repackaging into 300 g cartridges using an automated pumping system.

Environmental release of the notified polymer due to spills and leaks or during the repackaging operation is expected to be negligible. Periodically, repackaging equipment will be cleaned using organic solvents (toluene, industrial gasoline).

Waste streams containing the notified polymer include residues in equipment cleaning solvents (up to 5 kg/year) and residues attached to imported drum liners (up to 25 kg/yr). On exposure to air, residues will cure to form an inert polymeric material.

RELEASE OF CHEMICAL FROM USE

The finished product will be used mostly in the field of electronics and building construction as a water sealant (eg. around windows). The sealant will be applied by caulking guns and left to cure.

On exposure to air, the cured and polymerised product is not expected to release the notified polymer. Tests conducted under AS4020:1999 indicate no leaching of the notified polymer from the polymer matrix into water (test report not provided).

Eventually, the majority of the notified polymer will be disposed of in landfill bound within the chemical matrix in the articles into which it has been cast at the end of their useful lifetime.

5.5. Disposal

Wastes containing the notified polymer generated from equipment washing (up to 5 kg/year) will be collected by a waste management firm for incineration.

Drum liners will be sent to landfill or incinerator for disposal.

Residues of notified polymer in emptied cartridges (<60 kg/yr) will be sent to landfill for disposal and/or incinerated.

Most of the notified polymer will eventually be disposed of in landfill bound within the chemical matrix in the articles into which it has been cast at the end of their useful lifetime.

5.6. Public exposure

The silicone sealant containing the notified polymer will only be sold to industry and therefore will not be available to consumers. Public exposure to the cured product is most likely to be through dermal contact. Once cured it is expected that the polymer will not be bioavailable.

6. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa Pale yellow viscous liquid

Pour Point -23.15°C

METHOD	OECD TG 102 Melting Point/Melting Range – Pour Point Method.
Remarks	No significant protocol deviations.
TEST FACILITY	SafePharm Laboratories (2003a)

Boiling Point >300°C at 101.3 kPa

METHOD OECD TG 103 Boiling Point- Differential Scanning Calorimetry (DSC)
Remarks No significant protocol deviations.
Signs of oxidative decomposition at approximately 300°C were observed. The notified polymer thermally decomposed at 377°C. The boiling point has been estimated as >400°C using an adaptation of the Stein Brown method.
TEST FACILITY SafePharm Laboratories (2003a)

Density 997 kg/m^3 at 20°C

METHOD OECD TG 109 Density of Liquids and Solids – Pycnometer method.
Remarks No significant protocol deviations. Solvent used: Distilled water.
TEST FACILITY SafePharm Laboratories (2003a)

Vapour Pressure <$2.6x10^{-8}$ kPa at 25°C

METHOD OECD TG 104 Vapour Pressure – Vapour Pressure Balance.
Remarks Temperature and pressure readings were taken between 110 and 120°C. No statistical analyses were performed, as balance readings were too low and variable for line of best fit to have any meaning. Instead a regression slope was used to provide an estimate of the maximum value for the vapour pressure at 25°C.
TEST FACILITY SafePharm Laboratories (2003b)

Water Solubility 1.32 mg/L at 20°C

METHOD OECD TG 105 Water Solubility - Flask Method.
Remarks Analytical method: GPC.
The preliminary water solubility test indicated that the column elution method should have been performed as the solubility was <0.01g/L. However, due to the physical nature of the test material, it was not possible to use this method.
The final result may be considered as a maximum value as the samples were still hazy after centrifugation. This haziness may have been due to small traces of excess test material or an impurity being present as a fine suspension.
TEST FACILITY SafePharm Laboratories (2003a)

Hydrolysis as a Function of pH Not determined

Remarks The notifier stated that as the test substance is essentially insoluble in water, hydrolysis is not able to be conducted. While GPC can be used in the hydrolysis study, it is not a substance specific method as it is only specific to molecular weight. Furthermore, a suitable accurate recovery of analysis method could not be obtained.

Partition Coefficient (n-octanol/water) log Pow >6.20 (temperature not specified)

METHOD OECD TG 117 Partition Coefficient (n-octanol/water) HPLC Method/Flask Method
Remarks A preliminary assessment was made based on the approximate solubilities of test substance in n-octanol and water and by visual assessment. Definitive testing was performed by HPLC method without pH adjustment as the test material contained no modes of dissociation. The log Pow for the test substance was determined to be >6.20 based on the calibration curve determined for the reference standards.
TEST FACILITY SafePharm Laboratories (2003a)

Adsorption/Desorption – screening test log K_{oc} >5.63 (temperature not specified)

METHOD OECD TG 106 Adsorption - Desorption (HPLC screening method).
Remarks Testing was performed by HPLC method without pH adjustment as the test material contained no modes of dissociation. The log Koc for the test substance

was determined to be >5.63 based on the calibration curve determined for the reference standards.

TEST FACILITY SafePharm Laboratories (2003a)

Dissociation Constant Not determined

METHOD OECD TG 112 Dissociation Constants in Water.
Remarks It is not possible to determine a dissociation constant for the polymer, because there is no mode of chemical dissociation for this compound at environmentally relevant pHs.
TEST FACILITY SafePharm Laboratories (2003a)

Particle Size Not applicable

Remarks Notified polymer is a liquid.

Flash Point 132°C at 101.325 kPa

METHOD EC Directive 92/69/EEC A.9 Flash Point – equilibrium closed cup
Remarks No significant protocol deviations.
TEST FACILITY SafePharm Laboratories (2003b)

Flammability Limits Not determined

Remarks There is no standard test method for determining the flammability limits for liquids. The notified polymer is considered to be not highly flammable.
TEST FACILITY

Autoignition Temperature 378°C

METHOD 92/69/EEC A.15 Auto-Ignition Temperature (Liquids and Gases).
Remarks No significant protocol deviations.
TEST FACILITY SafePharm Laboratories (2003b)

Explosive Properties Non Explosive

METHOD EC Directive 92/69/EEC A.14 Explosive Properties.
Remarks From examination of the structure, there are no chemical groups that would infer explosive properties, therefore the result has been predicted negative.
TEST FACILITY SafePharm Laboratories (2003b)

Reactivity

Remarks Expected to be stable under normal conditions of use. Contact with oxidising materials should be avoided.

ADDITIONAL TESTS

Oxidizing Properties Non Oxidizing

Remarks	From examination of the structure, there are no chemical groups that would infer oxidising properties, therefore the result has been predicted negative
TEST FACILITY	SafePharm Laboratories (2003b)

7. TOXICOLOGICAL INVESTIGATIONS

No toxicity data were submitted.

8. ENVIRONMENT

8.1. Environmental fate

No environmental fate data were submitted.

8.2. Ecotoxicological investigations

No ecotoxicity data were submitted for the notified polymer.

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

There is a low potential for environmental release of the notified polymer during repackaging activities or use of the notified polymer.

The sealant containing the notified polymer will cure and polymerise to an inert matrix and environmental release of the notified polymer is unlikely to occur following its use or disposal of drum liners and cartridges.

Eventually, the majority of the notified polymer will be disposed of in landfill bound within the chemical matrix in the articles into which it has been cast at the end of their useful lifetime.

In landfill, it is anticipated that the cured polymer will not be mobile and will undergo slow abiotic or biotic degradation.

Incineration will destroy the notified polymer resulting in the formation of oxides of silicon and carbon, and water.

The notified polymer is considered to be of low volatility and volatilisation to the atmosphere is not likely to be a major migration pathway. It is not readily soluble in water and is unlikely to hydrolyse in environmental waters over time. With an estimated log Pow of >6.20 the notified polymer has an affinity for lipids and may potentially bioaccumulate in exposed organisms. A log Koc >5.63 indicates that the notified polymer is probably immobile in soils and has an affinity to sediments.

9.1.2. Environment – effects assessment

No data were provided for the notified polymer. However, based on the low water solubility and the relatively high molecular weight, it is anticipated that the notified polymer would have low aquatic exposure.

9.1.3. Environment – risk characterisation

The notified polymer is an additive in composite resins, and as such, most of the polymer will be incorporated into the inert sealant matrix when cured, posing little risk to the environment. Most waste sealant generated during use and in container residues will cure, binding the polymer within the polymer matrix in an inert manner. Given the low volume usage and the low aquatic exposure of the notified polymer, the notified polymer is unlikely to pose an unacceptable risk to the environment. In landfills the notified polymer is likely to remain immobile and leaching is unlikely to occur.

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

Repacking

Due to the automated nature of the repacking process, exposure to the notified polymer is not expected to occur except in the event of an accident or machine malfunction. Even in these cases, exposure is expected to be low due to the low concentration of the notified polymer (1%) and the expected use of personal protective equipment.

End Use

Exposure to the notified polymer at a concentration of 1% could occur during application of the sealant, before the sealant cures. Exposure would be dependent on the size of the application area and the accuracy of, and care taken by, the worker. It is anticipated that the potential for exposure is greater in the construction industry than the electronic industry.

Once the sealant is cured, the notified polymer will not be bioavailable and therefore exposure is expected to be negligible.

9.2.2. Public health – exposure assessment

The public will only have contact with the sealant containing the notified polymer once it has cured. Once the sealant is cured, the notified polymer will not be bioavailable and therefore exposure is expected to be negligible.

9.2.3. Human health - effects assessment

No toxicological data have been provided for the notified polymer and therefore the substance cannot be classified in accordance with the NOHSC Approved Criteria for Classifying Hazardous Substances (NOHSC, 2002).

The notified polymer is an organosilane modified polyether that contains alkoxysilane functional groups. At present all alkoxysilane functional groups in a polymer are classified as a high concern. However in the US, alkoxysilanes with alkoxygroups greater than C2 are classified as moderate concern. Taking this into account along with the relatively high functional group equivalent weight and the fact that there is only a very low percentage of lower molecular weight species, the polymer is expected to be of low hazard.

9.2.4. Occupational health and safety – risk characterisation

Although exposure to the notified polymer may occur during application of the sealant, the risk to workers is expected to be low due to the low concentration of the notified polymer in the sealant and the expected low toxicity of the notified polymer.

Exposure to the notified chemical during repacking is expected to be low and therefore the risk to workers involved in the repacking process is also expected to be low.

Exposure to the notified chemical from contact with the cured sealant is expected to be negligible and therefore the risk to workers from such contact is also expected to be negligible.

9.2.5. Public health – risk characterisation

Exposure to the notified polymer is expected to be negligible and therefore the risk to public health from the proposed use is expected to be negligible.

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

10.1. Hazard classification

No toxicity data were submitted, therefore, the notified polymer cannot be classified under the NOHSC *Approved Criteria for Classifying Hazardous Substances.*

10.2. Environmental risk assessment

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

10.3. Human health risk assessment

10.3.1. Occupational health and safety

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

10.3.2. Public health

There is Negligible Concern to public health when used in the proposed manner.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of the product containing the polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). It is published here as a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

11.2. Label

The label for the product containing the polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994b). The accuracy of the information on the label remains the responsibility of the applicant.

12. 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.

Disposal

- The notified polymer should be disposed of by landfill or incineration.

Emergency procedures

- Spills/release of the notified polymer should be handled by shutting off all ignition sources, containing the spill or leak, and scraping up with rag or other material and placing in container.

12.1. 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(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.

13. BIBLIOGRAPHY

NOHSC (1994a) National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

NOHSC (1994b) 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 (2002) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(2002)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

SafePharm Laboratories (2003a). POA-8: Determination of General Physico-chemical Properties. SPL Project No.763/238. Safepharm Laboratories Ltd, Shardlow, UK. Sponsor: Shin Etsu Chemical Co. Ltd, Tokyo, Japan (unpublished report provided by the notifier).

SafePharm Laboratories (2003b). POA-8: Determination of Hazardous Physico-chemical Properties. SPL Project No.763/239. Safepharm Laboratories Ltd, Shardlow, UK. Sponsor: Shin Etsu Chemical Co. Ltd, Tokyo, Japan (unpublished report provided by the notifier).