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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in Tech Bond

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Director
NICNAS

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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Nalco Australia Pty Ltd (ABN 41 000 424 788) of 2 Anderson St, Botany NSW 2019

NOTIFICATION CATEGORY
Limited: Polymer with NAMW ≥ 1,000 (greater than 1 tonne per year).

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

Chemical Name, Other Names, CAS number, Molecular formulae, Structural formulae, Molecular weight, % low molecular weight polymer, Spectral data, Purity, Identity of toxic or hazardous impurities, % weight of toxic or hazardous impurities, Non-hazardous impurities, Identity and % weight of additives/adjuvants, Manufacture/import volume, Polymer constituents, Residual monomers/Other reactants, Degradation Products, and Loss of Monomers, Additives, Impurities

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

Melting point/Boiling point, Specific gravity/Density, Vapour pressure, Water solubility, Hydrolysis as a function of pH, Partition co-efficient, Absorption/Desorption, Dissociation Constant, Particle Size, Flash point, Flammability limits, Autoignition temperature, Explosive properties, and Reactivity.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None

NOTIFICATION IN OTHER COUNTRIES
US EPA PMN (2006)

2. IDENTITY OF CHEMICAL

OTHER NAME(S)
Condensation polymerised silane functionalised aliphatic amine

MARKETING NAME(S)
Polymer in Tech Bond

CAS NUMBER
None

MOLECULAR WEIGHT
Number Average Molecular Weight (Mn) >100,000 Da

SPECTRAL DATA

METHOD	^{29}Si NMR Spectroscopy
Remarks	Resonances in the -40 to -70 ppm range.
TEST FACILITY	Nalco (USA)

METHODS OF DETECTION AND DETERMINATION

METHOD	Atmospheric Pressure Chemical Ionisation Mass Spectrometry (APCI-MS)
Remarks	The mass spectrum of the freshly prepared notified polymer shows evidence of the macromonomeric precursor species, but this species is not present in the mass spectrum of an older sample.
TEST FACILITY	Nalco (USA)

3. COMPOSITION

DEGREE OF PURITY
>90%

HAZARDOUS IMPURITIES/RESIDUAL MONOMERS
None

NON HAZARDOUS IMPURITIES/RESIDUAL MONOMERS (>1% by weight)

Chemical Name	Water		
CAS No.	7732-18-5	*Weight %*	<10%

ADDITIVES/ADJUVANTS

Chemical Name	Isopropanol		
CAS No.	67-63-0	*Weight %*	60-100%
Chemical Name	Methanol		
CAS No.	67-56-1	*Weight %*	1-5%
Chemical Name	Other additives and adjuvants (non-hazardous or below hazard cut-off concentration)		
CAS No.	-	*Weight %*	<1%

DEGRADATION PRODUCTS
In case of fire, the notified polymer may degrade to oxides of carbon, nitrogen and silicon, and ammonia.

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES
Isopropanol, methanol and water will be lost during use. The notified polymer is commercialised in isopropanol solution containing 1-5% methanol. The alcohols in the product are evaporated either in an oven heated to 130ºC or at room temperature.

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified polymer will be imported as a component in products (<10% in isopropanol solution) for industrial or public use.

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

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

USE
The notified polymer will be used in industrial applications, where it will be applied to metal surfaces for protection against corrosion and as a pre-coating before painting. It will be imported in products that will be marketed as “Tech Bond” (a <10% solution of the notified polymer in isopropanol). Upon application of the polymer solution to a metal surface, it binds to metal oxides. Evaporation promotes cross-link formation, to a point where the notified polymer is fully polymerised into a film of 0.1-0.5 µm in thickness. This film is hydrophobic and insoluble in any solvent, and thus protects the metal

surface against corrosion.

The notified polymer may also be marketed to the public as ready-to-use wipes (saturated with <10% notified polymer in isopropanol). These would be intended for use on unpainted metal surfaces (e.g. car or motorcycle parts) for corrosion protection, or as a paint adhesion promoter.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, transport and storage

PORT OF ENTRY
Adelaide

IDENTITY OF MANUFACTURER/RECIPIENTS
Initially, the notified substance will be introduced to a single industrial customer in Australia, located in New Castalloy, Adelaide. Introduction to other industrial customers depends on the success with the initial customer.

TRANSPORTATION AND PACKAGING
Solutions of the notified polymer will be imported in 5 gallon (~19 L) and 55 gallon (~208 L) lined steel drums, as well as in 200 gallon (~757 L) stainless steel totes (Portafeeds). Ready-to-use wipes may be packaged in their final consumer packaging, either individually in foil packages or in multi-wipe tubs.

The notified polymer will be transported directly to the recipient's site by road. As the formulation containing the notified substance is a Dangerous Good by road, the transport vehicle will have appropriate Dangerous Goods markings.

The import containers are expected to be stored at the customer's site until needed.

5.2. Operation description

Industrial use:

Imported products containing the notified polymer (<10% in isopropanol) will be shipped to the customer recipient's site, where they are expected to be stored at the customer site until needed. The customer sites typically operate in 1 to 2 shifts for 5 days each week.

Import containers will be moved to the metal wash station where the notified polymer solution will be transferred into a spray tank, either manually or via a chemical delivery system. In the spray tank, the notified polymer will be diluted tenfold with water to form a <1% solution. Empty containers with residual product are triple rinsed and the rinse water may be either added to the make up tank or discharged to the customer's wastewater treatment facility.

Typically, a quality control (QC) worker who is supervising the spraying and drying operation will pull a 250 mL sample of the spray solution once a day to check the concentration of the notified polymer. This sample will either be put back into the spray tank or sent to the plant's wastewater treatment facility. Additional product containing the notified polymer and water are added to the spray tank as needed to maintain the concentration of the notified polymer at appropriate levels (<1%).

The spray tank and oven are enclosed systems. Metal objects to be coated with the notified polymer will be carried on a mechanical conveyor belt through two rinses with water (to avoid contamination of the spray solution) before entering the spray tank. Inside, objects will be sprayed with the notified polymer solution. Over-spray or drips will be collected and recycled back through the spray tank. Then, the wet objects will be carried through an open area to the oven. Collection trays under the conveyor belt will collect any drips or run-off from objects during their transit to the oven. In the oven, the water will be evaporated from the objects at approximately 130°C. The evaporation promotes the cross-linking of the notified polymer, curing it into a film on the surface of the object. The coated objects will be then used directly to produce finished products, or will be painted.

Periodically (fortnightly to monthly), the solution in the spray tank will need to be refreshed. The aged solution will be dumped via a hard pipe to the plant's wastewater treatment system. One worker will clean the empty spray tank by rinsing it with water. The rinse water will be drained to the wastewater treatment system where it will be combined with other wastewater. Once cleaned, the tank will be filled

with fresh water and fresh notified polymer will be added to the appropriate concentration.

Adjustment of the pH of the wastewater to >8 will remove any residual notified polymer as a precipitated solid. The sludge thus generated will be flocculated and removed by filtration or pressing. Typically, one worker in the plant's treatment facility will perform this step. The sludge will be disposed of with the rest of the plant's sludge to the hazardous or non-hazardous landfill, dependent on the content of the sludge.

Public use:

Multi-wipe tub: Wipes saturated with a solution of <10% notified substance in isopropanol will be pulled out of the tub one at a time by the consumer. The consumer will wipe the metal object to be treated, and then discard the wipe as household rubbish. When the multi-wipe container contains no more wipes, the consumer will discard the empty tub as household rubbish.

Single wipe foil package: The foil package containing a single wipe would be opened by the consumer, who would then apply the wipe to the metal object to be treated. After application, the wipe and the foil package will be disposed of as household rubbish.

5.3. Occupational exposure

Number and Category of Workers

Category of Worker	*Number*	*Exposure Duration (hours/day)*	*Exposure Frequency (days/year)*
Dockside/transport workers	1-2	1-2	5
Chemical Operators at Customer site	2-3	1-4	20-30
QC Chemist at Customer site	1	0.5	240

Exposure Details

Dockside/transport workers: Exposure to the notified polymer is not expected, except in the case of an accident where rupture or leakage of the import containers occurs. This exposure is expected to be mainly dermal or ocular.

Chemical Operators at Customer site: One or more workers could experience dermal, ocular and/or inhalation exposure to the most concentrated solution of the notified polymer (<10%) during the transfer of the imported product into the spray tank. The potential for exposure is higher when manual transfer is used, compared to the use of a chemical delivery system. During manual transfer, the potential for vapour and mist generation may require the use of respirators to avoid exposure to vapours of isopropanol and methanol, and this practice would reduce any inhalation exposure to the notified polymer. The transfer is expected to take <30 minutes.

Typically, one or two workers supervise the spraying and drying operation. Exposure to the notified polymer during the spraying and drying step is not expected since the process takes place in an enclosed, automated system. Manual spraying will not be performed.

Fortnightly to monthly, one worker will periodically clean the tank between the disposing of old solution and adding fresh solution. The time required to clean the tank is expected to be less than 4 hours. Dermal and ocular exposure to low concentrations of the notified polymer is likely during this process; it will be in a dilute form (<1%) that will be further diluted with wash water.

Personal protective equipment (PPE) including safety glasses, coveralls, chemical-resistant apron, rubber boots and chemical gauntlets are recommended to be worn during all work requiring direct contact with products containing the notified polymer.

QC Chemist at Customer site: Once a day, the solution in the spray tank will be checked for the level of actives. These investigations are expected to take approximately 30 minutes. The QC chemist will wear protective glasses with side-shield and a lab coat. The sample will be handled in a well-ventilated area or fume hood.

All workers are likely to experience dermal exposure to the notified polymer cured onto the surfaces of coated metal objects.

5.4. Release

RELEASE OF CHEMICAL AT SITE

No notified chemical release is expected from the notifier's sites as reformulation and repacking will not be performed in Australia.

RELEASE OF CHEMICAL FROM USE

The majority of the product containing the notified polymer will be diluted and applied to the surface of metal articles within a spray tank. Sprayed items will then be heated in an oven to evaporate the solvents and promote cross-linking of the polymer into a protective coating. The spray tank and oven are enclosed systems. Over-spray or drips will be collected and recycled back through the spray tank. Collection trays under the conveyor belt will collect any drips or run-off from objects during their transit to the oven. The coated objects will be then used directly to produce finished products, or will be painted. Empty containers with residual product are triple rinsed and the rinse water may be either added to the make up tank or discharged to the customer's wastewater treatment facility. The rinsed container will be collected by a drum recycler. Periodically (fortnightly to monthly), the solution in the spray tank will need to be refreshed. The aged solution will be dumped via a hard pipe to the plant's wastewater treatment system. The rinse water will be drained to the wastewater treatment system where it will be combined with other wastewater.

A small portion of the polymer may be imported in ready to use wipes. After use, it is anticipated that the wipes would be disposed of to solid waste.

5.5. Disposal

Adjustment of the wastewater from the onsite treatment plant to pH >8 will remove any residual notified polymer as a precipitated solid. The sludge will be disposed of with the rest of the plant's sludge to the hazardous or non-hazardous landfill, dependent on the content of the sludge.

The majority of the notified polymer will be disposed of with the coated articles. These articles will either be recycled to reclaim the metal or consigned to the landfill.

5.6. Public exposure

The public will be exposed to the notified polymer during the use of ready-to-use wipes. This exposure will be primarily dermal, as excess solution is not expected on the wipe. The packaging of the wipes will describe the appropriate use of gloves and use in an area with appropriate ventilation.

The public will also experience dermal exposure to the notified polymer cured onto the surfaces of metal objects coated in the industrial process.

6. PHYSICAL AND CHEMICAL PROPERTIES

Tests on the physical and chemical properties of the notified polymer could only be conducted on the product containing it (<10% notified polymer solution in isopropanol/methanol), as it is never isolated from solution. Several results show only the expected values for isopropanol and methanol. The evaporation of the solvent causes cross-linking of the notified polymer and the formation of an insoluble gel. Full testing of the notified polymer was not completed, as tests on the notified polymer-containing product did not represent the properties of the notified polymer.

Appearance at 20ºC and 101.3 kPa Light yellow liquid (solution polymer)

Melting Point/Freezing Point -35ºC (for the solution polymer)

Remarks The notified polymer solution's melting point is significantly higher than that of isopropanol (-90ºC) or methanol (-98ºC) (ICSC-IPCS, 1999 and ICSC-IPCS, 2000).

TEST FACILITY Nalco (USA) in-house testing (test report not sighted).

Density 800 kg/m^3 at 25.5ºC

Remarks Value taken from the notifier's MSDS for the solution polymer.

For comparison, the density of both isopropanol and methanol is ~790 kg/m^3 (ICSC-IPCS, 1999 and ICSC-IPCS, 2000).

Vapour Pressure 13.33 kPa at 25ºC

Remarks Estimated value only, based on the notified polymer solution.

For comparison, the vapour pressure of isopropanol is 4.4 kPa at 20ºC, and that of methanol is 12.3 kPa at 20ºC (ICSC-IPCS, 1999 and ICSC-IPCS, 2000).

Water Solubility 1.622 g/L at 25ºC (for the macromonomeric species)

Remarks Value estimated using WSKOW v1.41.

The notified polymer, as imported in isopropanol/methanol solution, is found to be readily soluble in water. However, after evaporation of the solvents and cross-linking (e.g. on a surface), the notified polymer is insoluble in any solvent.

Hydrolysis as a Function of pH Not determined.

Remarks Based on the chemical structure of the notified polymer, hydrolysis at environmental pH is not expected.

Partition Coefficient (n-octanol/water) log P_{ow} = -3.98 (for the macromonomeric species)

Remarks Estimated using KOWWIN v1.67. Based on the predicted partition coefficient the notified polymer would be expected to partition in aqueous phase. However, given the charged nature of the polymer it would be expected to bind to the mineral content of soils and sediments.

Adsorption/Desorption log K_{oc} = 9.737 (for the macromonomeric species)

Remarks Estimated using PCKOCWIN v1.66. Based on the predicted log K_{oc} the notified polymer would be expected to bind strongly to charged soils and sediments.

Dissociation Constant pKa = 9.5-10.5

Remarks Based on compounds with similar functional groups to the notified polymer.

Flash Point 22ºC

Remarks Taken from the notifier's MSDS for the notified polymer solution. The value is similar to those of isopropanol (11.7ºC) and methanol (11ºC) (ICSC-IPCS, 1999 and ICSC-IPCS, 2000).

Flammability Limits Test not conducted (solution polymer)

Autoignition Temperature Test not conducted (solution polymer).

Remarks As an indicator of the likely properties of the notified polymer solution, the auto-ignition temperature of isopropanol is 456°C, and that of methanol is 464°C (ICSC-IPCS, 1999 and ICSC-IPCS, 2000).

Explosive Properties Test not conducted (solution polymer)

Reactivity The notified polymer will further cross-link and form an insoluble gel upon evaporation of solvents.

7. TOXICOLOGICAL INVESTIGATIONS

No toxicity data were submitted for the notified polymer.

8. ENVIRONMENT

8.1. Environmental fate

No environmental fate data were submitted.

8.2. Ecotoxicological investigations

8.2.1. a Acute toxicity to fish

TEST SUBSTANCE	An acceptable analogue of the notified polymer
METHOD	USEPA: EPA/600/4-90/027
Species	Fathead minnow (*Pimephales promelas*)
Exposure Period	96 h
Auxiliary Solvent	Non specified
Water Hardness	44 mg $CaCO_3$/L
Remarks – Method	Test solutions were prepared by direct addition of product to dilution water Test solution pH was raised to approximately 8.0 S.U. via addition of 1N NaOH. The solution were mechanically stirred for a minimum of 10 minutes, and then split between respective test chambers. Temperature: 24.7-25.2ºC, DO 7.1-8.3 mg/L, pH: 7.81-8.08, specific conductivity:128-226 µmhos/cm.

RESULTS

Concentration mg/L		*Number of Fish*	*Mortality*				
Nominal	*Actual*		*1 h*	*24 h*	*48 h*	*72 h*	*96 h*
PC		30		0	0	0	0
6.25		30		0	0	0	0
12.5		30		0	0	0	0
25		30		6	18	18	19
50		30		11	15	19	19
100		30		13	22	25	25

LC50	22.4 mg/L at 96 h (95% confidence limits 21.4-23.2 mg/L)
NOEC	12.5 mg/L at 96 h
LOEC	25 mg/L at 96 h
Remarks – Results	Sub lethal effects were not reported. LC50 values were determined by linear interpolation.
CONCLUSION	The analogue of the notified polymer is slightly toxic to Fathead minnows.
TEST FACILITY	ASci Corporation Environmental Testing (2005)

8.2.1. b Acute toxicity to fish

TEST SUBSTANCE	An acceptable analogue of the notified polymer
METHOD	USEPA: EPA/600/4-90/027
Species	Rainbow trout (*Oncorhynchus mykiss*)
Exposure Period	96 h
Auxiliary Solvent	Non specified
Water Hardness	44 mg $CaCO_3$/L
Remarks – Method	Test solutions were prepared by direct addition of product to dilution water Test solution pH was raised to approximately 8.0 S.U. via addition of 1N NaOH. The solution were mechanistically stirred for a minimum of 10 minutes, and then split between respective test chambers.

Temperature: 12.5-12.9ºC, DO: 9.2-10.8 mg/L, pH: 7.31-8.05, specific conductivity: 128-265 µmhos/cm

RESULTS

Concentration mg/L		*Number of Fish*	*Mortality*				
Nominal	*Actual*		*1 h*	*24 h*	*48 h*	*72 h*	*96 h*
PC		30		0	0	0	0
62.5		30		0	0	0	0
125		30		0	0	0	0
250		30		0	2	2	2
500		30		0	0	1	1
1,000		30		2	8	30	30

LC50	737 mg/L at 96 h (95% confidence limits 727-746 mg/L)
NOEC	500 mg/L at 96 h
LOEC	1,000 mg/L at 96 h
Remarks – Results	Sub lethal effects were not reported. LC50 values were determined by linear interpolation.

CONCLUSION — The analogue of the notified polymer is very slightly toxic to Rainbow trout.

TEST FACILITY — ASci Corporation Environmental Testing (2005)

8.2.2. Acute/chronic toxicity to aquatic invertebrates

TEST SUBSTANCE — An acceptable analogue of the notified polymer

METHOD — USEPA: EPA/600/4-90/027

Species	*Daphnia magna*
Exposure Period	96 h
Auxiliary Solvent	Non specified
Water Hardness	44 mg $CaCO_3$/L
Remarks - Method	Test solutions were prepared by direct addition of product to dilution water Test solution pH was raised to approximately 8.0 S.U. via addition of 1N NaOH. The solution were mechanistically stirred for a minimum of 10 minutes, and then split between respective test chambers. Temperature: 19.8-19.9ºC, DO: 6.7-9.1 mg/L, pH: 7.83-8.09, specific conductivity: 128-269 µmhos/cm

RESULTS

Concentration mg/L		*Number of D. magna*	*Number Immobilised*	
Nominal	*Actual*		*24 h*	*48 h*
PC		20	0	0
62.5		20	0	0
125		20	0	0
250		20	0	0
500		20	0	0
1,000		20	0	14

LC50	857 mg/L at 48 h (95% confidence limits 813-917 mg/L)
NOEC	500 mg/L at 48 h
LOEC	1,000 mg/L at 96 h
Remarks - Results	Sub lethal effects were not reported. LC50 values were determined by linear interpolation.

CONCLUSION — The analogue of the notified polymer is very slightly toxic to *Daphnia*

magna.

TEST FACILITY ASci Corporation Environmental Testing (2005)

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

The majority of the notified polymer will be thermally cured on the surface of the articles to which it has been applied, forming a very high molecular weight and stable film. As the coating degrades over time, any fragments, chips and flakes of the coating will be of little concern as they are expected to be inert. The surfaces coated with the polymer are likely to be either recycled for metal reclamation or be placed into landfill at the end of their useful life (5-20 years). When recycled the polymer would be destroyed in furnaces and converted to water vapour and oxides of carbon, silicon and nitrogen.

Application waste from cleaning of application equipment will be disposed of to landfill within sludge from the onsite wastewater treatment plant. The notified polymer that is disposed of to landfill is expected to degrade via biotic and abiotic process over time to form simple organic compounds.

A small proportion of the notified polymer may be imported in ready to use wipes for the treatment of metal surfaces to prevent corrosion. The wipes are expected to be disposed of to solid waste after use. It is anticipated that this waste will be disposed of to landfill. Evaporation of the solvents from the wipes will lead to the cross linking of the polymer to form an inert solid.

The polymer is not expected to cross biological membranes, due to its high molecular weight and as such, it should not bioaccumulate.

9.1.2. Environment – effects assessment

The following table is a summary of the available data for the analogue of the notified polymer:

Test	Species	Results
Acute Toxicity: Fish	Rainbow trout *Oncorhynchus mykiss*	LC50 (96 h) = 737 mg/L (nominal)
Acute Toxicity: Fish	Fathead minnow *Pimephales promelas*	LC50 (96 h) > 22.4 mg/L (nominal)
Acute Immobilisation: *Daphnia*	*Daphnia magna*	LC50 (48 h) = 857 mg/L (nominal)

The notified chemical is slightly toxic to fish and practically non-toxic to daphnids. The Predicted No Effect Concentration (PNEC) is derived from the LC50 of Fathead minnow divided by an uncertainty safety factor of 1,000 (as analogue toxicity data exist for only two trophic levels) and is calculated as 22.4 µg/L.

9.1.3. Environment – risk characterisation

No aquatic exposure is anticipated during normal use of the polymer. During the application of the anticorrosion coating, notified polymer wastes could be generated. It is expected that the majority of this waste will be disposed of in approved landfills as inert solid waste, with a small proportion being incinerated. In landfill, the solid wastes should be contained and not pose a significant risk to the environment.

The majority of the notified polymer will be incorporated into the coatings that will be applied to surfaces and cured in an inert matrix, which may be painted over. As such, the polymer will share the fate of the surfaces to which it has been applied at the end of their useful life (5-20 years). Hence, it will either be disposed of to landfill or destroyed by incineration during recycling of the metal surfaces to which it is applied.

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

Dockside/transport workers: Low-level dermal or ocular exposure is possible, but is only expected to occur under exceptional circumstances.

Chemical Operators at Customer site: Exposure of workers to both the most concentrated solution of the notified polymer (<10% in isopropanol/methanol) and to use concentrations (<1% in primarily water) is expected. These exposures are expected to be low if good industrial practices are maintained.

The potential for the most significant levels of dermal, ocular and/or inhalation exposure to the notified polymer exist during manual transfer of the imported solutions of the notified polymer to the spray tank, if precautions to minimise splashing and/or mist/vapour generation are not implemented. However, exposure during this process is expected to be of relatively short duration and/or infrequent, and is expected to be limited by the use of the recommended PPE. Respiratory protection, such as a respirator, is likely to be worn to limit inhalation exposure to the solvents present. This would also restrict any inhalation exposure to the notified polymer.

During the cleaning of the spray tank, workers will experience dermal and ocular exposure to very low concentrations of the notified polymer. This exposure, while of significant duration (~4 hours) occurs reasonably infrequently, and is likely to be controlled using PPE.

QC Chemist at Customer site: Dermal or ocular exposure may be experienced during analysis of the spray solution. However, significant exposure to the notified polymer in not expected, as only small amounts of low concentration solution (<1%) will be handled, for only a short time each day.

Dermal exposure to the notified polymer cured on the surfaces of coated objects is expected to be negligible, as the notified polymer will be bound within a cross-linked matrix and not bioavailable.

9.2.2. Public health – exposure assessment

Members of the public will be exposed to the notified polymer during the use of ready-to-use wipes. This exposure is expected to be dermal, and intermittent or infrequent. Assuming the recommended use of gloves, exposure to the notified polymer is expected to be minimal. Dermal exposure of fingertips to a <10% solution of the notified polymer in isopropanol is expected when gloves are not worn.

The public will also experience dermal exposure to the notified polymer cured onto the surfaces of metal objects coated in the industrial process. However, in this form, the notified polymer is bound within a cross-linked matrix and is therefore unavailable to cause exposure.

9.2.3. Human health – effects assessment

No data is available to assess the likely toxic effects of the notified polymer. Therefore, it cannot be classified in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC 2004). However, based on its chemical and physicochemical properties, some assumptions on its expected properties can be made.

The notified polymer has a very high molecular weight (>100,000 Da) and a lack of molecular weight species with a NAMW <10,000 Da in its molecular weight distribution. In addition, it is highly water-soluble. Therefore, absorption of the notified polymer is not expected following exposure by any route.

Inhalation exposure of the notified polymer may result in toxicity to the lung. Some similar polymers are thought to be a concern for lung toxicity from inhalation of vapours or aerosols, based on data for a number of low molecular-weight polymers (US EPA, 2002). The FGEW for the groups of concern within the notified polymer is outside of the US EPA's molecular weight range for possible concern. In addition, these groups are mostly bound within the structure of the notified polymer (i.e., not pendant), which reduces the level of concern for this type of toxicity. In addition, the NAMW of the notified polymer is >100,000 Da. Its water solubility means that it is likely to be retained within mucus, and thus be cleared from the lung should inhalation exposure occur. Therefore, the notified polymer is not expected to cause significant lung toxicity.

9.2.4. Occupational health and safety – risk characterisation

As the notified polymer is unlikely to be absorbed, and because the expected exposure of workers is low, it is expected to pose a low risk to their health and safety.

The greatest risk is likely to result from inhalation exposure to mists containing the notified polymer, during manual transfer operations. However, inhalation of the solvents (isopropanol/methanol) presents a greater risk, so appropriate precautions are likely to be implemented to limit mist formation or to prevent worker exposure to such mists.

9.2.5. Public health – risk characterisation

As the public will not experience more than low-level dermal exposure during the use of ready-to-use wipes, and because the notified polymer is unlikely to be absorbed, it presents a low risk to public health.

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

10.1. Hazard classification

Due to the lack of available data, 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

The notified polymer is presents a low risk to occupational health and safety under the conditions of the occupational settings described.

10.3.2. Public health

The notified polymer presents a low risk to public health as an ingredient of ready-to-use wipes for treatment of unpainted metal surfaces.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of the notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC 2003). 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 notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC 1994). The accuracy of the information on the label remains the responsibility of the applicant.

12. 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 as introduced and as diluted for use:
  - *Prevent the formation of mists during handling of solutions containing the notified polymer.*

- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer as introduced and as diluted for use:
  - *safety glasses, coveralls, chemical-resistant apron, rubber boots and gloves/chemical gauntlets*
  - *respirator (where mists of the notified polymer solution occur)*

  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.

Public Health

- The following measures should be taken to minimise public exposure to the notified polymer:
  - *Packaging of ready-to-use wipes should specify the use of gloves during application.*

Disposal

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

Emergency procedures

- The following procedures should be carried out for spills or accidental release of the notified polymer:
  - *For small spills, soak up spill with absorbent material. Place residues in a suitable, covered, properly labelled container. Wash affected area.*
  - *For large spills, contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contaminated surfaces should be cleaned with water or with aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material.*

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 Section 64(1) of the Act; if
- the polymer has a number-average molecular weight of less than 1,000 Da.

or

(2) Under Section 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.

13. BIBLIOGRAPHY

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