

File No: LTD/1155

19 July 2005

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

**FULL PUBLIC REPORT**

**Polymer in BYK-9077**

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 and Heritage.

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**Director  
NICNAS**

## **TABLE OF CONTENTS**

FULL PUBLIC REPORT .....	5
1. APPLICANT AND NOTIFICATION DETAILS .....	5
2. IDENTITY OF CHEMICAL .....	5
3. COMPOSITION.....	5
4. INTRODUCTION AND USE INFORMATION .....	6
5. PROCESS AND RELEASE INFORMATION.....	6
5.1. Distribution, transport and storage.....	6
5.2. Operation description.....	7
5.3. Occupational exposure.....	7
5.4. Release.....	8
5.5. Disposal .....	9
5.6. Public exposure .....	9
6. PHYSICAL AND CHEMICAL PROPERTIES .....	10
7. TOXICOLOGICAL INVESTIGATIONS .....	12
7.1. Acute toxicity – oral .....	12
7.4. Irritation – skin .....	12
7.5. Irritation – eye .....	13
8. ENVIRONMENT.....	13
8.1. Environmental fate .....	13
8.2. Ecotoxicological investigations.....	13
9. RISK ASSESSMENT.....	14
9.1. Environment.....	14
9.1.1. Environment – exposure assessment .....	14
9.1.2. Environment – effects assessment.....	15
9.1.3. Environment – risk characterisation.....	15
9.2. Human health .....	15
9.2.1. Occupational health and safety – exposure assessment.....	15
9.2.2. Public health – exposure assessment.....	16
9.2.3. Human health – effects assessment.....	17
9.2.4. Occupational health and safety – risk characterisation.....	17
9.2.5. Public health – risk characterisation.....	17
10. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS .....	17
10.1. Hazard classification.....	17
10.2. Environmental risk assessment.....	18
10.3. Human health risk assessment.....	18
10.3.1. Occupational health and safety.....	18
10.3.2. Public health.....	18
11. MATERIAL SAFETY DATA SHEET .....	18
11.1. Material Safety Data Sheet.....	18
11.2. Label.....	18
12. RECOMMENDATIONS.....	18
12.1. Secondary notification .....	19
13. BIBLIOGRAPHY .....	19

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14 April 2020

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**Director  
Chemicals Notification and Assessment**

## **FULL PUBLIC REPORT**

<b>Polymer in BYK-9077</b>
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### **1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

Nuplex Industries (Australia) Pty Ltd (ABN 25 000 045 572)  
49-61 Stephen Road  
Botany NSW 2019

Degussa Coatings & Colourants Pty Ltd (ABN 16 079 823 313)  
30 Commercial Drive  
Dandenong VIC 3175

and

Clariant (Australia) Pty Ltd (ABN 30 069 435 552)  
675 Warrigal Road  
Chadstone VIC 3148

NOTIFICATION CATEGORY

Limited: Polymer with NAMW  $\geq 1000$  (greater than 1 tonne per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Identity of chemical;  
Composition; and  
Specific use

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

No variation to the schedule of data requirements claimed.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

Canada

### **2. IDENTITY OF CHEMICAL**

MARKETING NAME(S)

Polymer in Disperbyk-2150  
Polymer in BYK-9077

### **3. COMPOSITION**

DEGREE OF PURITY

HIGH

#### HAZARDOUS IMPURITIES/RESIDUAL MONOMERS

There are no impurities or residual monomers present above the cut off level for hazardous classification.

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

None

#### ADDITIVES/ADJUVANTS

None

#### DEGRADATION PRODUCTS

Under extreme heat conditions (e.g. fire), the paint film containing the notified polymer would burn emitting noxious fumes including oxides of carbon and nitrogen. The paint film will also slowly deteriorate when exposed to UV from sunlight.

#### LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES

No loss of monomers, additives or impurities is expected during the life of the coated materials.

## 4. INTRODUCTION AND USE INFORMATION

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

The notified polymer will not be manufactured in Australia. It will be imported in the form of liquid commercial products containing >50% notified polymer and will be reformulated into pigment concentrate and coating formulations. The pigment concentrate will contain <20% notified polymer, while the end-use paint formulation will contain <5% notified polymer. Paints containing the notified polymer are expected to be sold and used by the paint industry as well as professional and do-it-yourself (DIY) painters.

In addition, the notified polymer will also be imported as a colourant preparation for formulation of printing ink products which will contain <10% notified polymer and the end-use printing ink will contain <5% notified polymer. The printing ink products containing the notified polymer will be used in the industrial printing of paper.

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

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Tonnes</i>	30-50	30-50	30-50	30-50	30-50

#### USE

Component of printing ink and paint products for industrial and general coating applications.

## 5. PROCESS AND RELEASE INFORMATION

### 5.1. Distribution, transport and storage

#### PORT OF ENTRY

Sydney and Melbourne

#### TRANSPORTATION AND PACKAGING

The commercial forms of the polymer will be imported in 200 L drums. The formulated paint products will be stored and transported by road in 1 L, 20 L steel pails or 200 L steel drums.

The colourant preparation for the manufacture of printing ink products will be imported in either 30 kg or 200 kg plastic or steel drums. The printing ink products will be stored and transported by road in 1L, 5L, 10L or 20L plastic containers.

## 5.2. Operation description

### *Paint Manufacture*

Following importation, the polymer will be stored prior to distribution to paint manufacturers. At the paint manufacturer site, workers will connect a vacuum hose line to the drums from which the liquid commercial products containing the notified polymer is pumped to the blender, together with other ingredients. The mixture is blended via an enclosed system using a high speed-dispersing blender. Once combined with other ingredients into the finished paint product, a sample is taken for quality testing prior to automatic filtration and filling into 1 L, 20 L steel pails or 200 L steel drums.

### *Paint Application*

It is estimated that 80% of the manufactured paint will be applied by professional applicators using spray and 20% by brush or roller application. The bulk of the spray painting would be conducted at industrial sites using spray booths. Prior to application, the paint will be stirred and transferred into coater trays. Cleaning and maintenance spray equipment will occur.

### *Printing-ink Formulation*

The notified chemical as a component of colourant preparation will be distributed to printing ink manufacturing companies in Sydney and Melbourne. The colourant preparation will be held in stores until used in manufacturing operations.

During manufacture of the printing ink products, operators will measure and pour the colourant preparation from measuring equipment into mixing vessels. The operators will also rinse packaging and add rinsate from drums and measuring vessels into the mixing vessels using suitable solvents. The ink components will be blended until the required viscosity is achieved and confirmed by quality control. Quality control personnel will conduct regular sampling of mix batches to confirm ink technical characteristics. The blended ink liquid is then pumped via a filtration stage to a packaging area where operators fill end-use containers. The operators will supervise and manually intervene in the filling of end-use containers, as necessary.

Warehouse and transport personnel will carry out routine warehouse operations inspecting or mechanically handling sealed drums of the colourant preparation or of end-use printing ink products.

### *Printing- ink Application*

No details on the printing processes were provided. It is anticipated that printing ink products would be handled and used by the same processes that are in place for similar ink raw materials. The polymer will be incorporated with resins and other components into a dried and cured ink matrix on printed surfaces.

All workers involved in handling and formulating the products containing the notified polymer will wear personal protection equipment (PPE) such as safety glasses, impervious gloves and protective clothing and respiratory protection, as needed.

## 5.3. 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>
<i>Paint manufacture</i>			
Transport and warehousing personnel	10	Not stated	200
Plant operators – high speed dispersing	40	4	30
Plant operators – paint make-up	40	2	30
Quality control personnel	10	8	30
Filling and packaging operators	40	8	30
<i>Paint application</i>			
Paint preparation workers	min. 1000	6	200
Spray painters	min. 100	4	200
Spray equipment cleaners	1000	2	200

### *Printing ink manufacture*

Warehouse & transport personnel	8	1	10
Ink manufacture and packaging operators	20	2	20
Quality control personnel	4	2	20

#### *Exposure Details*

##### *Import, Transport and Distribution*

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

##### *Paint Manufacture*

The majority of coating manufacture is enclosed and automated. Occasionally, coatings manufacture may occur in batch mixers where addition of the liquid commercial products containing the notified polymer is semi-automated, with potential for skin contact when adding to and emptying mixing vessels. Blending of the finished products generally occurs in a closed automated system with dedicated transfer lines, thereby minimising the potential for occupational exposure. However, skin contact with splashes, drips and spills may occur as vacuum lines are connected or disconnected. Blending equipment is fitted with exhaust ventilation systems and there is a regular maintenance programme in place to control airflow levels at regular intervals.

The blended product will be sampled for laboratory analysis and incidental skin contact may occur during sampling and analytical procedures.

Filtration, drum and pail filling are automated and metered processes, and worker intervention is not required unless the filling line requires adjustment. All operations that involve transfer are carried out under exhaust ventilation.

##### *Paint Application*

Industrial and professional painters could have intermittent exposure to paints containing the notified polymer throughout the working year. Mixing and spraying is conducted in spray booths where the over-spray is collected within the spray booth by its filtering system or on masking materials (e.g. kraft and newspaper) and workers use PPE including respiratory protections, as needed. Once the paint is dried and cured, the polymer will become trapped within a film and will not be bioavailable.

##### *Printing-ink Formulation*

During manufacturing and packaging operations, intermittent exposure to the notified polymer is expected when measuring and pouring the colourant preparation from equipment into mixing vessels. Blending of all ingredients for the printing ink products takes place in semi-enclosed mixing vessels. There is the potential for dermal exposure to rinsate when cleaning empty containers and when manually intervening with the blending and filling operations. Exposure to a small amount of the paint containing the notified polymer can occur during regular sampling of mix batches.

##### *Printing-ink Application*

No details on the printing processes were provided. It is anticipated the printing ink products would be handled and used by the same processes that are in place for similar ink raw materials. The polymer will be incorporated with resins and other components in a dried and cured ink matrix on printed surfaces. Once the ink is dried and cured, the notified polymer is bound within an inert matrix and therefore will not be bioavailable.

Workers are provided with appropriate PPE, i.e., safety glasses, impervious gloves, protective clothing, and respiratory protection, as needed. Workers have access to the Material Safety Data Sheet (MSDS).

## **5.4. Release**

### **RELEASE OF CHEMICAL AT SITE**

#### *Paint Manufacture*

Spills may occur during paint coatings manufacture. In this event containment would occur through bunding. Based on a maximum import volume to be used in paint manufacture, it is estimated that 675 kg (notified polymer) per year of waste generated from spillage and cleaning of equipment during



colorant manufacture would be disposed of by landfill or incineration. Up to 1.35 tonnes (notified polymer) per year of the waste generated from cleaning of equipment would be recycled.

During reformulation into pigment concentrate, it is estimated that up to 0.23 tonnes (notified polymer) residual loss in emptied colorant cans and spills from import containers would be disposed of to landfill. It is expected that 1.35 tonnes (notified polymer) per year loss from cleaning operation would be disposed of by recycling or incineration.

#### *Printing-ink Formulation*

During the manufacture of the printing ink products, empty containers of the colourant preparation will be rinsed and the residues added to ink-manufacture mixes. Based on a maximum import volume to be used in ink formulation, <5 kg (notified polymer) per year is expected to be retained in rinsed product containers. The product containers will be sent to a licensed waste disposal company. At the completion of the mixing, any residues in mixing vessels is rinsed with solvent and held for reuse or disposed of via licensed waste disposal companies. It is expected that <25 kg (notified polymer) per year will be consigned to waste from vessel rinsing.

#### RELEASE OF CHEMICAL FROM USE

##### *Paint*

The notified polymer released into the factory environment during paint coating application will be trapped by the standard engineering controls in place. Paints containing the notified polymer may be used by both professional and DIY painters throughout Australia. Twenty percent (20%) of paint application is expected to be used by roller or brush applications with the other 80% being spray-painted. Brushes, rollers, paint trays and spray equipment used for painting with enamel type paints would require cleaning with mineral turps or paint thinners while water based paints would be washed with water.

Liquid waste generated from the above cleaning operations are most likely to be discharged to the domestic waste water systems although professional painters using non-water based paint may have solvent retention containers where waste solvents can be disposed of in an authorised manner. It is estimated that up to 614 kg (notified polymer) per year would be released into sewer system. In most cases empty paint cans containing dried paint residues (675 kg (notified polymer) per year would be disposed of to landfill via household garbage.

However, most waste will be the result of overspray, where up to 10.8 tonnes per year of notified polymer will be sent to landfill.

##### *Printing Ink*

All of the notified polymer included in the printing ink products will be used in the industrial printing of paper. The notified polymer will be incorporated with resins and other components in the dried and cured ink matrix on printed surfaces. At the end of its useful life, the material is expected to be disposed of to landfill, recycling or incineration.

Containers used for printing ink products are expected to be disposed of to landfill with some residues retained in the containers with <25 kg (notified polymer ) per year is expected to be released to landfill. These residues are not expected to be mobile but should be retained in emptied container at the landfill site.

#### **5.5. Disposal**

The wastes will be disposed of by landfill, recycling or incineration.

#### **5.6. Public exposure**

##### *Paint*

Exposure of the general public to the notified polymer will be as a component of paint products either during DIY domestic application of paints or as a component of cured paints. Exposure could involve hundreds or thousands of DIY painters Australia-wide and exposure is estimated to be a maximum of 2 hours per day, 2-3 days per year. Once the paint is dried and cured, the polymer is bound within an inert matrix and therefore will be unavailable for exposure.

##### *Printing Ink*

Members of the public may be exposed to the notified polymer by touching surfaces printed with the ink containing the notified polymer. However, once printed onto the substrate the notified polymer is bound and unavailable for release.

## 6. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance at 20°C and 101.3 kPa** Amber or yellow liquid

**Boiling Point** >100°C

Remarks Test report not provided.

**Density** 1050 kg/m<sup>3</sup> at 20°C

METHOD DIN EN ISO 2811-3

Remarks Test report not provided. Result derived from safety data sheet

TEST FACILITY BYK-Chemie

**Vapour Pressure** <0.1 kPa at 20°C

Remarks Test report not provided.

**Water Solubility** Not determined

Remarks Based on structure-activity information, the notified polymer is expected to have a low water solubility.

**Hydrolysis as a Function of pH** Not determined

Remarks The polymer is insoluble in water and is unlikely to hydrolyse at the environmental pH range of 4-9.

**Partition Coefficient (n-octanol/water)** Not determined

Remarks As the notified polymer is considered to be hydrophobic, it is likely to partition to fat rather than water.

**Adsorption/Desorption** Not determined

Remarks The notified polymer contains hydrophobic groups which are likely to be adsorbed to soil.

**Dissociation Constant** Not determined

Remarks The notified polymer contains chemical group functionality with approximate pKa of 11. It is expected that these chemical groups will only dissociate at low pH <4.5. Therefore, the notified polymer is unlikely to dissociate at the environmental pH range of 4-9.

TEST FACILITY

**Particle Size** Not applicable

Remarks The notified polymer is manufactured and imported as a liquid or paste.

**Flash Point** >100°C

METHOD DIN EN 22719, ISO 2719

Remarks	No test report provided.
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<b>Flammability Limits</b>	Not determined
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Remarks	The notified polymer does not form flammable vapours and therefore expected to be non-flammable.
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<b>Autoignition Temperature</b>	Not determined
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Remarks	The notified polymer does not contain groups that are expected to self-ignite.
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<b>Explosive Properties</b>	Not determined
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Remarks	No explosive properties are predicted based on the structure of the polymer and its flash point.
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<b>Reactivity</b>	
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Remarks	The polymer is stable under normal environmental conditions.
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## 7. TOXICOLOGICAL INVESTIGATIONS

The notifier submitted the following studies conducted on a similar polymer group as read across data for the assessment of potential health effects of the notified polymer. The analogue polymer contains similar starting monomers except for the alcohol monomer, which is homologous to that in the notified polymer.

<i>Endpoint and Result</i>	<i>Assessment Conclusion</i>
Rat, acute oral LD50 >5000 mg/kg bw	low toxicity
Rabbit, skin irritation	moderately irritating
Rabbit, eye irritation	slightly irritating

### 7.1. Acute toxicity – oral

TEST SUBSTANCE Analogue polymer

METHOD OECD TG 401 Acute Oral Toxicity – Limit Test.

Species/Strain Rat/SPF Wistar

Vehicle None

Remarks - Method No significant protocol deviations.

#### RESULTS

<i>Group</i>	<i>Number and Sex of Animals</i>	<i>Dose mg/kg bw</i>	<i>Mortality</i>
I	5/sex	2000	0/10
II	5/sex	5000	0/10

LD50 >5000 mg/kg bw

Signs of Toxicity None

Effects in Organs None

Remarks - Results No mortality was observed. No significant weight differences were observed during the study.

CONCLUSION The notified chemical is of low toxicity via the oral route.

TEST FACILITY Pharmatox GmbH (1998a)

### 7.4. Irritation – skin

TEST SUBSTANCE Analogue polymer

METHOD OECD TG 404 Acute Dermal Irritation/Corrosion.

Species/Strain Rabbit/New Zealand White

Number of Animals 3

Vehicle None

Observation Period 7 days

Type of Dressing Semi-occlusive.

Remarks - Method No significant protocol deviations.

#### RESULTS

<i>Lesion</i>	<i>Mean Score* Animal No.</i>			<i>Maximum Value</i>	<i>Maximum Duration of Any Effect</i>	<i>Maximum Value at End of Observation Period</i>
	1	2	3			
<i>Erythema/Eschar</i>	1	2.3	1.67	3	72 hours	0
<i>Oedema</i>	0.66	1	1	2	72 hours	0

\*Calculated on the basis of the scores at 24, 48, and 72 hours for EACH animal.

Remarks - Results Mild to moderate erythema was observed, which persisted up to 72 hours in all three animals. Very slight oedema was also observed, which persisted up to 72 hours in 2 animals. All animals appeared normal at the end of the observation period. A primary Irritation Index of 2.25 was calculated.

CONCLUSION The notified chemical is moderately irritating to the skin but not classifiable under NOHSC criteria. .

TEST FACILITY Pharmatox GmbH (1998b)

## 7.5. Irritation – eye

TEST SUBSTANCE Analogue polymer

METHOD OECD TG 405 Acute Eye Irritation/Corrosion.

Species/Strain Rabbit/New Zealand White

Number of Animals 3

Observation Period 72

Remarks - Method No significant protocol deviations.

## RESULTS

<i>Lesion</i>	<i>Mean Score*</i> <i>Animal No.</i>			<i>Maximum</i> <i>Value</i>	<i>Maximum Duration</i> <i>of Any Effect</i>	<i>Maximum Value at End</i> <i>of Observation Period</i>
	1	2	3			
<i>Conjunctiva: redness</i>	0	0	0	1	8 hours	0
<i>Conjunctiva: chemosis</i>	0	0	0	0	-	0
<i>Conjunctiva: discharge</i>	0	0	0	1	8 hours	0
<i>Corneal opacity</i>	0	0	0	0	-	0
<i>Iridial inflammation</i>	0	0	0	0	-	0

\*Calculated on the basis of the scores at 24, 48, and 72 hours for EACH animal.

Remarks - Results Mild conjunctival redness and slight lacrimation was observed, which persisted up to 8 hours in 2 animals. All eye irritation effects were resolved within 24 hours.

CONCLUSION The notified chemical is slightly irritating to the eye.

TEST FACILITY Pharmatox GmbH (1998c)

## 8. ENVIRONMENT

### 8.1. Environmental fate

No environmental fate data were submitted The notified chemical is unlikely to bioaccumulate given its high molecular weight which is not expected to cross biological membranes. Over time it will undergo abiotic and biotic biodegradation.

### 8.2. Ecotoxicological investigations

No ecotoxicity data were submitted. Based on the cationic functionality of the notified polymer, and ECOSAR estimates by Environment Canada as provided by the notifier, the predicted toxicities for the fish, daphnia and algae are shown as follows:

Species	Unmitigated toxicity	Mitigated toxicity
Fish	96 h LC50 = 0.39 mg/L	42.9 mg/L
Daphnia	48 h LC50 = 0.046 mg/L	5.06 mg/L
Algae	96 h EC50 = 0.015 mg/L	1.65 mg/L

Based on the above predictions, the notified polymer is expected to be toxic in the aquatic compartment.

## 9. RISK ASSESSMENT

### 9.1. Environment

#### 9.1.1. Environment – exposure assessment

##### *Paint Coating*

The majority the notified polymer will be incorporated with other paint components to form stable paint film that firmly adheres to the primer layer to which it is applied. The majority of waste generated during the formulation process and end use will go to landfill or be incinerated where it is unlikely to present a hazard to the environment, as it is not water soluble and thus will not be mobile in soils. The notified polymer is likely to slowly degrade and become associated with the soil matrix and sediments.

Based on the maximum import volume predicted by the notifier, during the use of the paint, it is estimated that 614 kg of the notified polymer per year will be disposed of to the sewer by the general public due to cleaning of equipment and spills. A PEC for this disposal to sewer can be calculated as follows:

Amount of notified chemical released	614 kg
Number of days paint possibly used	365 days
Population of Australia	20 million
Amount of water released per person to sewer	200 L
Predicted Environmental Concentration in effluent in STP	$\frac{614,000 \times 1000 \times 1000}{365 \times 200 \times 20,000,000}$ = 0.42 µg/L

Given the expected low water solubility and the widespread and diffuse use of the notified polymer, release to sewer is likely to be low. Any notified chemical in the sewer is likely to adhere to suspended organic material or sediments, thus the PEC in receiving waters would be much lower.

Incineration of the waste will destroy the compound with the generation of water vapours and oxides of carbon and nitrogen. At the end of their useful lives, buildings to which the paint has been applied will also be disposed of by landfill.

##### *Printing Ink*

The fate of notified polymer will be dictated by paper disposal trends. The three main routes of paper disposal are landfill, incineration and recycling. Recent literature suggests that current paper recycling rates in Australia are 70-92% (Australian Environmental Review, 2001). Consequently, most of the papers treated with ink products containing the notified polymer could be recycled.

Paper recycling is carried out in paper mills, where it is likely that at least primary sedimentation occurs, and with some facilities also having biological treatment facilities. Therefore, in these facilities it is expected the notified polymer to partially partition into sludge under the usual waste treatment pH, and eventually be disposed of in landfill with other waste sludge. While the water solubility is expected to be low, a worst-case scenario may assume 30% of the notified polymer will stay in the water column. It is anticipated that prolonged residence in an active landfill will eventually degrade the notified polymer contained in sludge or in papers disposed of directly through normal garbage.

Based on a worst-case scenario, a calculated daily PEC in the sewer effluent is 1.5 µg/L. In calculating the PEC, the following were assumed: (1) usage of the maximum import volume is evenly distributed over a 365 day period; (2) usage is nationwide, with a population of 20 million contributing 200 L of water per person per day to the sewer, (3) there is no adsorption or degradation in the sewer prior to release.

Given that the ink product will be specifically for use in industrial printing ink products for paper, the recycling rate for this use may not be as significant as non-industrial paper. Furthermore, the low and diffuse usage and the low water solubility of the notified polymer will further reduce the PEC under the proposed use pattern.

#### **9.1.2. Environment – effects assessment**

No ecotoxicity data were submitted. However, aquatic exposure is expected to be minimal during normal usage of the printing ink and coating paint. Aquatic toxicity is also likely to be limited by the expected low water solubility. Based on the most sensitive estimated mitigated toxicity of 96 h EC50 of 1.65 mg/L for algae, the PNEC is calculated to be 1.65 µg/L taking into account a safety factor of 1000.

#### **9.1.3. Environment – risk characterisation**

##### *Paint*

The majority of the notified polymer will be incorporated at a low concentration level into paints and, once applied and dried, poses little risk to the environment since an inert matrix will be formed. The major loss (<30%) in coating paint application is due to overspray, all of which will be disposed of by landfill.

Wastes will be mainly disposed of to landfill or it may be incinerated. In landfill, the notified chemical is expected to associate with soil and sediment and slowly degrade through biotic and abiotic processes to water and oxides of carbon and nitrogen. If wastes are incinerated then the notified chemical would be destroyed with the production of water vapour, and oxides of carbon and nitrogen.

With release to sewer, due to its expected low water solubility, the notified chemical is likely to become associated with sediment and degrade slowly through the abiotic and biotic processes. The risk quotient is calculated to be  $0.42/1.65 = 0.25$ , indicating that there is unlikely to be an environmental risk to the aquatic compartment.

Furthermore, the limited exposure of the notified chemical to the aquatic compartment due to its expected low water solubility and the relatively high molecular weight, is unlikely to have an adverse effect on aquatic organisms.

The majority of the notified polymer will be applied to surfaces and either share the fate of the surface at the end of its useful life (most likely to landfill) or be removed by sanding. If removed by sanding the coating containing the notified polymer will be broken up into solid particulate matter and most likely disposed to landfill or deposited on nearby ground.

##### *Printing Ink*

Given the low and diffuse use of the ink product and the expected low water solubility, the concentration of the notified polymer in the aquatic compartment is likely to be low. The worst-case risk quotient from recycling is calculated to be  $1.5/1.65 = 0.91$  indicating acceptable environmental risk to the aquatic compartment.

It is expected that any waste generated during use will be disposed of by incineration or to landfill. In landfill the notified polymer contained in sludge or in sheets will degrade slowly via biotic or abiotic processes. Therefore, environmental risk from the reported use pattern of the notified polymer is likely to be low.

### **9.2. Human health**

#### **9.2.1. Occupational health and safety – exposure assessment**

Skin contact will be the main route of exposure, although ocular exposure via inadvertent splashes and spills during particular operations cannot be discounted.

#### *Transport, Warehouse and Storage*

Exposure to the notified polymer is not expected during transport, storage and supply provided the pails and drums remain intact. Transport, storage and supply workers would only be exposed to the notified polymer in the event of an accidental spill or breach of the pails and drums. The nature of the packaging used for transport, e.g., steel and plastic containers, will minimise the likelihood of release or loss of the notified polymer.

#### *Paint Manufacture*

Minimal exposure to the notified polymer at a concentration of >50% pre-manufacture and <5% post-manufacture is expected due to the largely enclosed and automated process and use PPE. However, the possibility of dermal and ocular exposure to drips and spills exists during transfer of the notified polymer and formulated paint product, collection of quality control samples, quality control testing, cleaning of tanks, connecting or disconnecting transfer lines and general maintenance may occur. Dermal exposure to inadvertent drips and spills is possible if paint containers are overfilled.

Overall exposure is expected to be low due to the relatively low concentration of the notified polymer (<5%) in the final paint product and the use of engineering controls, such as closed and automated blending and pumping systems, and the use of PPE such as safety glasses, gloves, and protective clothing.

#### *Paint Application*

Spray painters and paint preparation and equipment cleaning personnel may be regularly exposed to the notified polymer principally at industrial sites using spray booths. Exposure would principally be dermal, however, accidental ocular exposure cannot be discounted. Potential exposure is reduced by the use of PPE including respiratory protection, as needed. Dermal exposure is possible when professional painters apply paint products containing the notified polymer by brush or roller application, however, contact is expected to be intermittent and limited by the use of PPE such as gloves and protective clothing. Exposure to the notified polymer could occur during transfer of the paint and cleaning and maintenance. Overall exposure is expected to be low due to the low concentration of the notified polymer and the use of engineering controls, e.g., spray booths, and PPE.

Exposure to the notified polymer in the dried and cured paint is expected to be negligible as it will be bound within an inert matrix on the painted surface and therefore will not be bioavailable.

#### *Printing-ink Formulation.*

Workers involved in the formulation of printing ink products may be intermittently exposed to the notified chemical (<10%) when measuring and pouring the colourant preparation into mixing vessels, cleaning and maintaining equipment and undertaking quality control activities. Exposure would be principally dermal and is expected to be low and limited due the low concentration of the notified chemical (<5%) in the final ink and the use of PPE such as gloves and protective clothing.

#### *Printing-ink Application*

While no details of the printing process were provided, exposure to the notified polymer in the dried and cured ink is expected to be negligible as it will be bound within an inert matrix on printed surfaces and therefore will not be bioavailable.

### **9.2.2. Public health – exposure assessment**

#### *Paint*

The public may be intermittently exposed to the notified polymer as a component of paint products either during DIY domestic application of paints or as a component of cured paints.



Exposure via domestic application of paints is potentially wide spread albeit infrequent. Exposure will be mainly dermal, however, accidental ocular exposure via splashes and spills cannot be discounted. Overall exposure to the notified chemical is expected to be low due the low concentration in the paint product. In addition, exposure to the notified polymer in the dried and cured paint is expected to be negligible as it will be bound within an inert matrix on painted surfaces and therefore will not be bioavailable.

#### *Printing Ink*

Members of the public may be intermittently exposed to print materials printed with the ink containing the notified polymer. Exposure to the notified polymer in the dried and cured ink is expected to be negligible as it will be bound within an inert matrix on the printed surfaces and will not be bioavailable.

### **9.2.3. Human health – effects assessment**

By analogy, the notified polymer has a low acute oral toxicity and is a moderate skin and slight eye irritant. The molecular weight of the polymer is such as to preclude absorption across biological membranes and any potential systemic effects.

There are no impurities or residual monomers present in the notified polymer above the cut off level for hazardous classification according to the NOHSC *Approved Criteria for Classifying Hazardous Substances* (National Occupational Health and Safety Commission, 1994a).

Based on the available data, the notified polymer is not determined to be a hazardous substance in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC 2004). However, the notified chemical is regarded by the notifier as a skin irritant that can result in redness, itchiness and possible dermatitis and was assigned R38 on the MSDS. .

### **9.2.4. Occupational health and safety – risk characterisation**

The notified polymer is unlikely to be harmful via the oral route and by analogy is slightly irritating to the eye and moderately irritating to the skin. While present at >50% in particular imported products, the imported products are packed in steel and plastic containers. Exposure of transport or storage workers due to accidental rupture of cartridges should be rare. Formulation of the notified polymer either for paint or ink applications results in a low concentration of the notified polymer in the final paint and ink products and negligible exposure via the printed and painted surfaces because the notified polymer will become trapped within a film and will not be bioavailable. PPE, such as respiratory protection as required, is used to limited potential exposure during formulating processes and spray applications.

Therefore, on the basis of the low probability of exposure and the good work practices and safety-handling measures, the notified polymer is unlikely to pose a significant occupational health and safety risk when used in the proposed manner.

### **9.2.5. Public health – risk characterisation**

The notified polymer is not available to the general public. Members of the public may make dermal contact with paint products containing the notified polymer and with surfaces painted or printed with products containing the notified polymer. However, the risk to public health will be negligible because the notified polymer is present at low concentrations in the paint products and when applied to surfaces will become trapped within a film and will not be bioavailable.

Therefore, the notified polymer is unlikely to pose a significant public health risk when used in the proposed manner.

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

### **10.1. Hazard classification**

Based on the available data the notified polymer is not classified as hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances*.

As a comparison only, the classification of notified polymer using the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS) (United Nations 2003) is presented below. This system is not mandated in Australia and carries no legal status but is presented for information purposes.

Based on the available data, the notified chemical does not meet the criteria for the Classification and Labelling of Chemicals according to the United Nations (2003) Globally Harmonised System.

## **10.2. Environmental risk assessment**

The chemical is not considered to pose a risk to the environment based on its reported use patterns.

## **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 as a component of printing ink and paint products in the pattern described.

## **11. MATERIAL SAFETY DATA SHEET**

### **11.1. Material Safety Data Sheet**

The MSDS of the notified chemical (and products containing the notified chemical) provided by the notifier were in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC 2003). The MSDS of the notified chemical is published here as a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

The notifier has assigned the following risk phrase for products/mixtures containing the notified polymer:

- concentration >50%: R38 Irritating to skin

Use the following risk and safety phrases for products/mixtures containing the notified polymer:

- R38 Irritating to skin
- S 24/25 Avoid contact with skin and eyes
- S37/S39 Wear suitable gloves and eye/face protection

Suppliers should label the notified polymer with the signal word ‘Hazardous’ and the risk phrases listed above.

### **11.2. Label**

The label for the notified chemical (and products containing the notified chemical) 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 chemical as introduced.

- S24 Avoid contact with skin
  - S25 Avoid contact with eyes
  - S37 Wear suitable gloves
  - S39 Wear suitable eye/face protection
- No specific engineering controls or personal protective equipment are required for the safe use of the notified chemical as introduced (<5% in product), 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 chemical 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 chemical should be disposed of by incineration, recycling or landfill.

#### Emergency procedures

Place inert, non-combustible absorbent such as vermiculite, sand or soil onto material. Collect the material and place in suitable labelled containers.

### 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
    - uses are proposed which will result in more significant release to the aquatic compartment, a secondary notification should be submitted with results and reports for aquatic toxicity, since this is estimated to be high.
- 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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