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

FULL PUBLIC REPORT

Polymer in Bykumen-WS

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**Director
Chemicals Notification and Assessment**

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FULL PUBLIC REPORT**Polymer in Bykumen-WS****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

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

and

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

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:

Identify of chemical;
Composition; and
Import volume

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

No variation to the schedule of data requirements is claimed.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

None known

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Polymer in Bykumen-WS

3. COMPOSITION

DEGREE OF PURITY

High

DEGRADATION PRODUCTS

The paint film containing the notified polymer may slowly deteriorate when exposed to UV rays from sunlight. Under extreme heat conditions, the paint containing the notified polymer would burn emitting noxious fumes of oxides of carbon and nitrogen.

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES

None

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 as a component of a product at 48.9% (wt) concentration in 2-butoxy ethanol. The product will be formulated to produce colourants, which contain <3% (between 0.86 to 2.45%) notified polymer. The colourants will be blended with paints at an average of 8-10% colourant in the final tinted product.

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>	<5	<5	<5	<5	<5

USE

The notified polymer will be used as a wetting and dispersing additive in water based industrial coatings such as paints containing water reducible acrylics or urethanes, urea formaldehyde alkyd systems or amino alkyds. The coatings are recommended for applications such as water based general industrial, wood finishing, metal deco, architectural coatings, maintenance coatings for plastic and rubber latex products.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, Transport and Storage

PORT OF ENTRY

Not stated

IDENTITY OF MANUFACTURER/RECIPIENTS

Nuplex Industries (Aust) Pty Ltd (ABN 25 000 045 572)

49-61 Stephen Road

Botany NSW 2019

and

Degussa Coatings & Colorants Pty Ltd (ABN 16 079 823 313)

30 Commercial Drive

Dandenong VIC 3175

TRANSPORTATION AND PACKAGING

The product containing the notified polymer will be imported and stored in 190 kg polyethylene coated drums. It will be transported from the dockside by road to the notifier's site for formulation into a range of aqueous pigment colourants. The pigment colourants will be packed in sealed cardboard cartons containing either 2 × 4 litre cans or 6 × 1 litre cans of colourants. The pigment colourants will be distributed to numerous paint companies within Australia for the colouration of paint bases.

Approximately 60% of the finished colourants will be exported overseas. Coatings for overseas markets are dispatched on shrink-wrapped pallets.

5.2. Operation Description

The imported product containing the notified polymer will be blended at the notifiers' sites to form a pigment colourant. The colourants containing the notified polymer are multicomponent mixtures and manufacture involves manually weighing out individual components into a mixing vessel and blending by mechanical agitation. The blended mixture is circulated through a bead mill to finely grind and disperse the pigment component to obtain the desired colour strength and shade of the colourant mix. Once tested and approved by the quality control technician, the colourant is filled into cans on an automatic filling and labelling machine, which also packs the cans into cardboard boxes.

The finished colourants would be used for tinting of paint bases at the paint manufacturing site

(~95%). Alternatively, the finished colourant is supplied to paint stores (~5%) who will carry out tinting before supplying paints to customers. Tinting include adding the required amount of colourant and paint base into a dispensing tube and mixing using a shaker machine. Tinted base paints contain approximately 0.15% notified polymer.

The majority (75%) of the tinted paint will be applied by brush/roller, with a limited application by industrial spray painting. Once spraying is completed, the spray equipment is cleaned.

5.3. Occupational exposure

Number and Category of Workers

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration</i>	<i>Exposure Frequency</i>
<i>Paint manufacture</i>			
Storemen	3		
Workers involved in weighing, mixing and bead milling operations	6	20min to 6 hrs/day	4 days/week, 4 weeks/year
Workers involved in filling cans of coatings	4	3 hrs/day	4 days/week for 4 week working period
Quality control/chemists and Technical service/Development chemist	4-8	1 hr/day	4 days/week for 4 week working period
Sales Personnel	2000	30min/day	5 days/week, 48 weeks/year
Cleaning operations	2	30 min/day	4days/week for 4 week working period
<i>Paint application</i>			
Professional painters	Not stated	4 hrs/day	5 days/week

Exposure Details

Dermal, ocular and inhalation exposure to the notified polymer is possible when manually weighing the product containing the polymer directly into a mixing vessel, or into stainless buckets and then adding into a mixing vessel. Skin and eye contamination can also occur from spillage and splashes during blending in a high-speed mixer.

Workers may also be exposed to drips and spills when overfilling cans with coatings, while connecting and disconnecting filling lines, and when cleaning buckets, mixing vessels and filling equipment.

Intermittent dermal exposure to the coating preparations is possible when collecting samples for quality testing.

Dermal, ocular and inhalation exposure may occur when opening containers of paint and tinting of coating products prior to application, during paint application, and cleaning of mixing and application equipment.

Workers handling the colourants and tinted paints in an industrial environment will wear personal protective equipment (PPE) including impervious gloves, coveralls and goggles. Organic vapour respirators are also required for workers involved in mixing or milling process. Where the tinted paint is to be sprayed, spray operators will wear anti-static flame retardant overalls, anti-static footwear and cartridge type respirators, in addition to the PPE mentioned above.

5.4. Release

RELEASE OF CHEMICAL AT SITE

The notified polymer will not be manufactured in Australia. Colourants and coatings will be manufactured by a variety of companies throughout Australia. Spills may occur during manufacture. In this event containment occurs through bunding. As the polymer is not volatile there would be negligible release to atmosphere. The notifier has estimated that less than 80 kg per year of the

notified polymer will be wasted due to the cleaning of process equipment, containers and spills.

RELEASE OF CHEMICAL FROM USE

There is no release of the polymer to the general environment from industrial use. Polymer released into the factory environment during paint application will be trapped by the standard engineering controls in place.

Paint waste containing the polymer will be generated from the coating equipment. Loss due to overspray captured in the spray booth could be up to 40% amounting to a maximum of 500 kg per annum based on the import volume. This loss would be disposed of to an authorised landfill site.

It is expected that <5% of the import volume will be available for retail sale. It is assumed that 95% of the notified polymer is applied and encapsulated on the paint surface with the remaining 5% present as residual paint in emptied paint container (2.5%) and residual paint on application equipment. It is assumed that all application equipment is washed although it is likely that a proportion of brushes and rollers will be disposed of to landfill. Therefore, 6.25 kg of the notified polymer is expected to be disposed of to landfill (residue in can) and 6.25 kg of the notified polymer is expected to be released to sewer or drain.

A small amount of the paint will remain in the empty containers (2.5%). These containers are collected by licensed drum recyclers who will clean them via incineration. It is estimated that approximately 6.25 kg of the notified polymer will be lost in this manner.

5.5. Disposal

Wasted polymer will be generated annually during the manufacture of the paint and in coating equipments. This waste will be disposed of through licensed waste disposal contractors, generally this is likely to be landfilled but may be incinerated. It is expected that the drums recycling will be cleaned by incineration. Waste paint such as from overspray is also most likely to be land filled.

5.6. Public exposure

The notified polymer will be used as an ingredient of coating products and are sold to the public in the form of DIY paints. Members of the public may make dermal contact with the notified polymer when using the paint products and by touching coated articles.

6. PHYSICAL AND CHEMICAL PROPERTIES

The physical and chemical properties tabulated below are for the product containing the notified polymer, unless otherwise indicated.

Appearance at 20°C and 101.3 kPa	Clear light brown oily liquid.
Boiling Point	Not determined
Remarks	Decomposes at temperatures below boiling point. Test report not provided.
Density	1100 kg/m ³
Remarks	Test report not provided. The tests were conducted to relevant German Quality Standard DIN53217 which is equivalent to the OECD Test Guideline 109. The results of the internal BYK Chemie test were reported on the product data sheet and MSDS.
Vapour Pressure	Not determined.
Remarks	The notified polymer has high molecular weight and as such is expected to be non-volatile. The vapour pressure of the polymer solution was estimated to be 2 mmHg at 20°C. This was based on the vapour pressure of the solvent contained in the polymer solution.

Water Solubility

Not determined.

Remarks Test report not provided. On the basis of the octanol/water partition report, the notifier indicates that the proportion of polymer found in water was between 82 and 89%. The notifier has extrapolated to state that water solubility is high (in the order of 800-900 g/L). While this is not valid, as it does not take into account the ratio of octanol and water, it is clear from the partition coefficient that the polymer has appreciable water solubility.

Hydrolysis as a Function of pH
 $t_{1/2} > 7$ days at 50°C and by extrapolation $t_{1/2} > 1$ year at 25°C

METHOD OECD TG 111 Hydrolysis as a Function of pH.
EC Directive 92/69/EEC C.7 Degradation: Abiotic Degradation: Hydrolysis as a Function of pH. Quantitation procedure is the same as that used for the absorption test.

<i>pH</i>	<i>T</i> (°C)	<i>t</i> _{1/2}
7	50	>7 days
9	50	>7 days

REMARKS The tests were performed at pH 1.2, 4.0, 7.0 and 9.0 for a period of one week at 50°C. It was noted that 35.5 and 32.2 % of the test compound was hydrolysed at the pH of 7 and 9, respectively after one week. At pH 1.2 and 4.0, the product precipitated after one week. Therefore, the $t_{1/2}$ for the test compound at 50°C is likely to be >7 days at pH 7 and 9 and by extrapolation $t_{1/2} > 1$ year at 25°C

TEST FACILITY Applied Consumer Services, Inc (2002)

Partition Coefficient (n-octanol/water)

log Pow at 20°C = 0.15

METHOD OECD/OCID TG 107 (shake flask). Quantitative procedure uses methylene blue reaction (Snell FD and Hilton CL, 1966-1974).

REMARK Based on the results submitted, three experiments were performed at octanol/water ratios of 8:37.5, 24:24 and 5.3:44. The respective Pow calculated were 0.12, 0.117 and 0.220. The mean of the Pow was determined to be 0.150.

TEST FACILITY Applied Consumer Services, Inc (2002)

Adsorption/Desorptionlog K_{oc} not determined

METHOD OECD TG 106 Adsorption - Desorption Using a Batch Equilibrium Method. The methylene blue colorimetric quantitation procedure given in Encyclopaedia of Industrial Chemical Analysis (Snell FD and Hilton CL, 1966-1974) was used.

<i>Soil Type</i>	<i>% Absorption</i>	<i>% Desorption</i>
01-101, O'Neil	79.6	15.8
Firemont	97.9	7.11

Remarks The adsorption test was performed using 01-101, Neil soil (no details such as pH, organic carbon content given), parallel methodology at 25°C. The mixture was stirred and samples were taken at 4, 6, 24 and 48 h. The respective % adsorption was determined to be 59.4, 48.4, 80.5, and 78.7. The average % absorption for the 24 and 48 h was determined to be 79.6%.

The desorption test was based on adsorption results at 24 h when equilibrium is reached. This was done by treating 40 mL of 4.25% polymer with 8 g of soil and stirred. The samples were then taken at 2, 4, 24 and 30 h. After 24 h the samples was centrifuged, the supernatant was discarded and 40 mL of CaCl₂ reagent was added. The process was repeated at each of the stirring times. Extracts were collected for each time for testing. The % desorption was determined to be 15.8 at

30 h.

TEST FACILITY The same procedure was repeated for test performed in Firemont soil (no details such as pH, organic carbon content given). The average adsorption % was determined to be 97.9 and the average desorption % was 7.11.
Applied Consumer Services, Inc (2002)

Dissociation Constant

No pKa values

METHOD OECD TG 112 Dissociation Constants in Water.
Remarks Dissociation was examined at pH 1.2, 4.0 and 9.0 using GPC columns and UV detection at 225 nm at 25°C. The procedure was developed after several unsuccessful attempts under other conditions. Dissociation constants were not able to be determined.

TEST FACILITY Applied Consumer Services, Inc (2002)

Particle Size

Not determined

Remarks The notified polymer will be imported as a polymer solution.

Flash Point

72°C (polymer solution)

Remarks Based on solvent.

Flammability Limits

Not determined

Remarks The notified polymer does not form flammable vapours.

Autoignition Temperature

Not determined.

Remarks Test not provided

Explosive Properties

Not determined

Remarks No explosive properties are predicted based on the structure and flash point.

Reactivity

Remarks The notified polymer is stable under normal conditions of use.

7. TOXICOLOGICAL INVESTIGATIONS

No toxicity data were submitted.

8. ENVIRONMENT

No ecotoxicological data were submitted.

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

Based on the release information in Section 5.4, it is expected that the exposure of the notified polymer to the environment to be low. Assuming 6.25 kg of the notified polymer is released to sewer per annum from washwater discharge and not removed during sewage treatment processes, the daily release on a nationwide basis to receiving waters is estimated to be 17.1 g/day. Assuming a national population of 19.5 million and that each person contributes an

average 200 L/day to overall sewage flows, the predicted concentration in sewage effluent on a nationwide basis is estimated as 4.39 mg/L.

Amount entering sewer annually	6.25 kg
Population of Australia	19.5 million
Amount of water used per person per day	200 L
Number of days in a year	365
Estimated PEC	4.39mg/L

Based on the respective dilution factors of 1 and 10 for inland and ocean discharges of effluents, the PECs of the notified chemical in freshwater and marine water are approximately 4.39 or 0.439 mg/L, respectively.

Fate

The notified polymer is a high molecular weight polymer and is considered to be non-volatile. Therefore, its loss to the atmosphere is unlikely to be significant. In view of the low log Pow and high molecular weight, the bioaccumulation potential is considered to be low (Connell, 1990). Leaching in landfill is unlikely to occur as once the notified polymer is applied and encapsulated on the paint surface, it is likely to be bound within a cured film, from which it is unlikely to be bioavailable. The adsorption/desorption characteristics of the notified polymer further indicate that the notified polymer is likely to be strongly adsorbed to soils.

9.1.2. Environment – effects assessment

No ecotoxicological data were submitted.

9.1.3. Environment – risk characterisation

As the majority of the notified polymer will be incorporated into the manufactured articles, it is likely to be bound within a cured film, from which it is unlikely to be bioavailable. Treated articles when landfilled or incinerated are unlikely to be an environmental hazard. Given its largely industrial lifecycle it is unlikely to be released to the environment in significant quantities.

It is noted that the water-soluble notified polymer will be released to the sewer and the polymer has adjacent COOH functionalities, known to be the feature of highest toxicity to algae (Nabholz, 1993). However, given the low PEC calculated as a result of the discharge of equipment washwater to sewer and the strong adsorption to soils, an environmental risk to aquatic environment is unlikely to arise under the reported use pattern.

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

During colourant manufacture, skin contamination, and intermittent eye and inhalation exposure can occur when opening containers, weighing and manually adding individual ingredients into a mixing vessel and when blending the paint mixture. Exhaust ventilation is in place during colourant manufacture. Limited exposure to the colourant is expected during filling and packing operations since these activities are carried out in an automated equipment. Personal protective equipment (PPE) includes impervious gloves, overalls and eye protection when carrying out the above activities. In addition to above PPE, organic vapour respirators are required for workers involved in mixing or milling process. The PPE is required to limit exposure to the solvent in the imported product and will preclude significant exposure to the notified polymer.

Exposure to small amounts of the coating mixture by the laboratory workers is minimised by wearing laboratory coats, gloves and eye protection.

Skin contamination, and limited ocular exposure can occur when tinting base paints prior to application and paint application. Paint shop workers and architectural workers will have the highest exposure to the colourants, as PPE is often limited to overalls or equivalent clothing. Inhalation of spray mist can also occur during spray paint application, although application by

this method is very limited. Spray painting is conducted in a correctly designed spray booths. Painters in an industrial environment will wear similar PPE to that recommended when handling the imported product and the coating mixture. For spray painters, a respiratory protection is also recommended to prevent exposure during spray painting.

Limited dermal and eye exposure is possible when carrying maintenance work and cleaning of equipment after coating formulation and paint application. Workers wear similar PPE as above.

Containers are sealed and exposure during transport and storage is not expected. Transport workers and storemen are unlikely to be exposed to the notified polymer except in the event of accident. Similar PPE as above applies when required to clean spills.

9.2.2. Public health – exposure assessment

The finished coating mixtures are sold to the public in the form of DIY paints. The main route of exposure would be dermal. DIY painters are advised to wear gloves during paint application. Widespread exposure to articles coated with the paint containing the notified polymer is expected. However, exposure will be negligible because the notified polymer will be bound within a cured paint film.

9.2.3. Human health - effects assessment

No toxicological data have been provided for the notified polymer. The notified polymer has a high molecular weight, and is not expected to be absorbed across the skin or other biological membranes, and therefore systemic toxicity would be limited.

Based on the presence of hazardous organic solvents, the notifier classified the imported product containing the notified polymer as a hazardous substance with risk phrases: Harmful by inhalation, in contact with skin and if swallowed (R20/21/22); irritating to eyes and respiratory system (R36/R37) (NOHSC, 1999a). There is a NOHSC exposure standard for 2-Butoxyethanol of 25 ppm or 121 mg/m³ time-weighted-average (TWA) (NOHSC, 1995).

The Material Safety Data Sheet (MSDS) for the coating preparation lists a number of health effects. The potential health effects are likely to relate to solvents present in the coating preparation rather than the notified polymer.

9.2.4. Occupational health and safety – risk characterisation

The coating formulation involves manual addition of the imported product containing the notified polymer into a mixing vessel. Subsequent processes are generally automated and enclosed, limiting any exposure to the notified polymer present in the imported product and manufactured coating.

Limited occupational exposure is expected during quality control testing, tinting, application of coating and when cleaning equipment since the notified polymer is present in the coating preparation at low concentration (average 3%).

Worker exposure during transport and storage is not expected except in the event of accident.

The notified polymer is considered to be non-hazardous. However, the presence of a number of solvents in the coating product may require more stringent precautions to be taken to prevent worker exposure. Adequate ventilation systems are in place to maintain exposure to levels below the relevant occupational exposure standards. The largely enclosed and automated operations involved, and the use of PPE specified in the MSDS when handling the imported product and the coating products containing the notified polymer, would ensure that the occupational risk posed by the notified polymer is low when used as specified in the notification.

9.2.5. Public health – risk characterisation

The notified polymer will be used as an ingredient of coating products available to the public.

Members of the public may make dermal contact with the notified polymer when using the coating products and by touching coated articles. However, the risk to public health from the notified polymer is low because the polymer is present in the coating products at low concentrations (0.15% on average) and it is likely to be bound within a cured film, from which it is unlikely to be bioavailable.

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

10.1. Hazard classification

Based on the available data the notified chemical is not classified as hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999).

10.2. Environmental risk assessment

The 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 No Significant Concern to public health when used as a component of coating products.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of the [products containing the chemical](#) 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 products containing the chemical 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

- Employers should implement the following engineering controls to minimise occupational exposure to the notified polymer:
 - Exhaust ventilation during spray application
 - Enclosed and automated spray paint application
- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer:
 - During transfer operations and cleaning of equipment, avoid spills and splashing
 - Spray application should be conducted in a down draft spray booth.
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer:
 - Chemical resistant gloves
 - Protective clothing which protects the body, arms and legs
 - Goggles or face shield
 - Appropriately selected respirator during spray paint application

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

- Wastes generated during industrial application should be disposed of through a licensed waste contractor. Wastes generated during domestic use should be disposed of according to the following instructions: "Do not pour unwanted paint down the drain. Keep unwanted paint in sealed containers for disposal via special chemical waste collections. Empty paint containers should be left open in a well-ventilated area to dry out. When dry, recycle steel containers via steel can recycling programs. Disposal of empty paint containers via domestic recycling programs may differ between local authorities. Check with your local council first."

Emergency procedures

- Spills/release of the notified polymer should be handled by collecting spillage with non-combustible absorbent materials and placing in a suitable container for disposal according to Local, State and Federal Government waste regulations.

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(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.

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