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

FULL PUBLIC REPORT

Polymer in UX-5210

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**Director
Chemicals Notification and Assessment**

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Polymer in UX-5210

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

PPG Industries Australia Pty Ltd (ABN 055 500 939) of McNaughton Rd, Clayton, VIC, 3168.

NOTIFICATION CATEGORY

Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical Name, Other Names, Molecular and Structural Formulae, Molecular Weight, Polymer Constituents, Residual Monomers/Impurities and Formulation details.

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

The notified polymer is currently being assessed in the USA.

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Polymer in UX-5210

MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (NAMW) >10000

3. COMPOSITION

PLC CRITERIA JUSTIFICATION

Functional Group	Category	Equivalent Weight (FGEW)
Potential Cationic Functional Group	High Concern	>5000

<i>Criterion</i>	<i>Criterion met (yes/no/not applicable)</i>
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	Yes
Low Charge Density	Yes
Approved Elements Only	Yes
No Substantial Degradability	Yes
Not Water Absorbing	Yes
Not a Hazard Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

4. INTRODUCTION AND USE INFORMATION

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

The notified polymer is imported as the component of the polymer solution UX-5210 at a concentration of 30-40%.

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>	0.5-3	1-4	1-4	1-4	1-4

USE

The notified polymer will be formulated in Australia into finished automotive spray paints. It will be spray applied by robots and operators onto car bodies and then baked to form part of the paint finish of the car.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

Paint Formulation

Laboratory Scale

The ingredients required for making the paint, including the notified polymer (concentration 30-40%), will be combined in a container in the laboratory under stirring. The paint (containing 0-5% notified polymer) will then be sprayed onto panels in a spraybooth having appropriate extraction. The panels are then baked in an oven and the finished paint film subjected to various tests.

Production Scale

The polymer solution (containing 30-40% notified polymer) will be pumped from 200 L drums into the closed mixer via a lance the operator places in the drum. The lance is manually transferred from drum to drum until the required amount of polymer has been added to the mixer. Following mixing with other ingredients, approximately 500 mL of the formulated paint (containing 0-5% notified polymer) will be sampled for testing. When approved the formulated paint will be filled through dedicated pipework and filling equipment into closed head 200 L drums. The filling equipment automatically places a short fill pipe through the bung hole in the top of the drum and fills the drum.

QC Testing

The operator will adjust the paint containing the notified polymer and spray panels for baking and testing. Several tests such as solids, viscosity and weight per litre are performed on the wet paint.

Paint Application

The 200 L drums of paint (containing 0-5% notified polymer) will be pumped into the circulating mix tank using a dedicated lance, pipework and pump. Once in the tank, solvent is added to adjust the paint to application viscosity. This paint will be pumped around a circulation system from which it is sprayed onto car bodies by robots and operators in a dedicated ventilated spray area. Operators spray the paint onto specific areas of the car that are not painted by the robots. The painted cars travel through an oven where the notified polymer undergoes a heat activated chemical reaction with other polymers in the paint, thereby forming the final paint film on the car.

During production breaks, operators use cloths dampened with solvent to clean residual paint from the spray equipment.

6. EXPOSURE INFORMATION

6.1. Summary of Occupational Exposure

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 Formulation

Minimal exposure to the notified polymer at a concentration of 30-40% (pre-manufacture) and 0-5% (post-manufacture) is expected. 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 the tanks and general maintenance. Workers are provided with appropriate protective equipment (PPE) i.e. safety glasses, gloves, and protective clothing as per the Material Safety Data Sheet (MSDS).

Certain quality control tests involve spraying. The potential for exposure by inhalation of the notified polymer is prevented as the paint is only sprayed in a properly designed spraybooth.

Overall exposure is expected to be low due to the relatively low concentration of the notified polymer and the use of engineering controls and PPE.

Paint Application

The majority of the spray application is automatic (by robots). Where manual spray painting occurs (to certain areas of the car) the worker will wear a fully body suit and air supplied respirator. Exposure to the notified polymer at a concentration of 0-5% could occur during transfer of the paint formulation 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 and PPE.

Once the coating has been cured the polymer is bound within an inert matrix and therefore will be unavailable for exposure.

6.2. Summary of Public Exposure

The notified polymer will not be directly available to the public. The notified polymer is used in an automotive paint that is cured prior to reaching the public. Therefore, although the public will come into contact with the exterior of car bodies, the notified polymer will not be available for exposure.

6.3. Summary of Environmental Exposure

6.3.1. Environmental Release

The notified polymer is a component (30-40% w/w) of an imported polymer emulsion product (UX-5210). This product is imported into Australia at Port Melbourne and transported by road in 200 L steel drums to the manufacturing plant in Clayton, Victoria. Potential environmental release arises from accidental spills from either the mishandling of containers in forklift manoeuvring operations or from transport accidents.

At the manufacturing plant, the imported product is stored in 200 L steel drums. It is estimated that 3% of the initial amount of product in the import containers will be left as residue, which represents approximately 120 kg per annum of the notified polymer. This residue will remain in the empty containers that are disposed of to a drum recycler, where the wastes residues are consumed in a high temperature incinerator.

The product is blended with other ingredients into a formulated paint containing 0-5% w/w of the notified polymer, which will be stored in 200 L steel drums. Spills when they occur, should be contained by bunding, collected with absorbent material and sent to a licensed off site waste disposal centre where the notified polymer will be consumed in a high temperature incinerator.

This formulated paint is then sold and transported by road to the end user (a car manufacturing plant) in Altona, Victoria. Potential environmental exposure hazards arise from accidental spills from either the mishandling of containers in forklift manoeuvring operations or from transport accidents

The end user applies the paint to car bodies in a well controlled, and largely automated manufacturing facility. Under normal use procedures, losses of the notified polymer through overspray, mixing of chemicals, cleaning of plant equipment as well as from residues in containers have been estimated to be a maximum of 40%, which equates to a maximum of 1.6 tonne per annum. Wastes from application will be hardened and disposed of to secure landfill. Empty drums that contain residual notified polymer will be sent to drum reconditioners where the waste is incinerated. Residual waste of the notified polymer in paint drums is expected to account for 2% of imported volume (80 kg) per annum.

Once applied the product is then cured and fixed onto the car body by baking. During the process, the notified polymer undergoes a chemical reaction with other components in the paint to form the final paint film. The notified polymer is consequently fixed in the cured paint film matrix on the car body, and has effectively no further environmental exposure.

6.3.2. Environmental Fate

The ultimate fate of the notified polymer will be linked to the disposal of the treated cars or as overspray. The latter is usually directed to landfill where the notified polymer, due to its low expected solubility, is expected to associate with the soil matrix and sediments and slowly degrade through abiotic and biotic processes to water vapour, oxides of carbon and nitrogen. The notified polymer is not expected to hydrolyse, nor is it expected to cross biological membranes due to its high molecular weight and is therefore not expected to bioaccumulate.

7. PHYSICAL AND CHEMICAL PROPERTIES

Limited physicochemical data has been provided for UX-5210 which contains approximately 30-40% notified polymer in water.

Appearance at 20°C and 101.3 kPa	Pale blue liquid (UX-5210)
Boiling Point	Not determined. The polymer solution UX-5210 is reported to boil at 100 °C.
Density	1215 kg/m ³ (notified polymer, calculated) 1060 kg/m ³ at 20°C (UX-5210)
Water Solubility	0.0017 g/L at 20°C (notified polymer)
Dissociation Constant	The notified polymer contains both anionic and potentially cationic groups. The latter are not expected to predominate, except at low pH levels (<4), i.e. below pH levels expected in the natural aquatic environment.
Reactivity	Stable under normal environmental conditions. The notified polymer will thermally degrade at temperatures above 200 °C although the specific temperature is unknown. The notified polymer is incompatible with strong mineral acids, strong alkalis and strong oxidising agents.
Degradation Products	None under normal conditions of use

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

No toxicity data were submitted.

8.2. Human Health Hazard Assessment

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard.

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology

No toxicological data were submitted.

9.2. Environmental Hazard Assessment

Anionic polymers are known to be moderately toxic to algae. The mode of toxic action is overchelation of nutrient elements need by algae for growth. Based on structural considerations it is unlikely that

the highest toxicity to algae observed for anionic polymers would apply to the notified polymer. The toxicity to algae is likely to be further reduced due to the presence of calcium ions, which will bind to the functional groups (Nahbolz *et al.* 1993). Based on structural considerations the polymer is not reasonably anticipated to become cationic in the natural aquatic environment (pH-4-9). Furthermore the FGEW (for the potentially cationic functional group) is much greater than 5000 and therefore the aquatic toxicity is likely to be low.

10. RISK ASSESSMENT

10.1. Environment

Up to approximately 1.8 tonnes per annum of waste notified polymer may be generated during coatings manufacturing and use each year as a result of incidental spills, equipment cleaning, and residues in containers. The majority (approximately 1.6 tonne) of this waste will be sent to landfill for disposal. In landfill, the notified polymer in solid wastes is expected to be immobile, and eventually will degrade through biotic and abiotic processes, and consequently, should not pose a significant risk to the environment

Spills of notified polymer to land are expected to bind to soil and should not be mobile or affect groundwater due to the slight water solubility. Spills of notified polymer to waters are unlikely and are not expected to dissolve due to the slight water solubility, and the product is expected to disperse or to settle to sediment.

Most of the notified polymer used in automotive finishes will eventually be incorporated in metal recycling programs or sent to landfill for disposal following its lifecycle. During reclamation, the notified polymer would be destroyed in furnaces and converted to water vapour, and oxides of carbon and nitrogen.

10.2. Occupational Health and Safety

The OHS risk presented by the notified polymer is expected to be low due to limited exposure as a result of the use of engineering controls and PPE, and the predicted low toxicity of the notified polymer.

10.3. Public Health

The paint formulated with the notified polymer is intended for use by professional spray painters in automotive manufacturing plants only, and will not be sold to the public. Following application, the notified polymer will become trapped within a film and will not be bioavailable. Therefore, the risk to public from exposure to the notified polymer is considered to be negligible.

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

11.1. Environmental Risk Assessment

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

11.2. Human Health Risk Assessment

11.2.1. Occupational health and safety

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

11.2.2. Public health

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

12. MATERIAL SAFETY DATA SHEET**12.1. Material Safety Data Sheet**

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

13. RECOMMENDATIONS

CONTROL MEASURES

Occupational Health and Safety

- No specific engineering controls, work practices or personal protective equipment are required for the safe use of the notified polymer itself, however, these should be selected on the basis of all ingredients in the formulation.

Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- A copy of the MSDS should be easily accessible to employees.
- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Environment

- Prevent uncontrolled release to the environment.

Disposal

- Product: Excess product containing the notified chemical should be collected and allowed to harden prior to disposal to landfill.

Storage

- Product containing the notified polymer should be stored in suitably banded storage facilities.

Emergency procedures

- Spills/release of the notified polymer should be handled by physical containment and disposal of to secure landfill.

13.1. Secondary Notification

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

- (1) Under subsection 64(1) of the Act; if
 - the notified polymer is introduced in a chemical form that does not meet the PLC

criteria.

or

- (2) Under subsection 64(2) of the Act:
- if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.