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

FULL PUBLIC REPORT

Polyurethane Polymer in WR-18-9264

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**Director
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FULL PUBLIC REPORT**Polyurethane Polymer in WR-18-9264****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

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

NOTIFICATION CATEGORY

Self Assessment: 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 Details of Use.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

Not previously notified.

NOTIFICATION IN OTHER COUNTRIES

US exemption: PPG# 003866

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

The polymer is a component of a polymer dispersion with the marketing name WR-18-9264

CAS NUMBER

None allocated

MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn) >1000

3. COMPOSITION

PLC CRITERIA JUSTIFICATION

The notified polymer contains only low concern functional groups.

<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
Stable Under Normal Conditions of Use	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 will be imported as 15% of a dispersion in water and N-methyl-2-pyrrolidone.

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>	7-12	7-12	7-12	7-12	7-12

USE

The notified polymer is a component of an automotive paint. It is <3% of the paint.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

The notified polymer is imported as a dispersion containing 15% notified polymer in 200L drums or 1000L totes into PPG Australia plant at Clayton Victoria.

Paint Formulation.

Laboratory scale.

The ingredients required for making the paint, including the notified polymer (concentration 15%), will be combined in a laboratory container under stirring. The paint will then be sprayed onto panels in a spray booth having appropriate extraction. The panels are baked in an oven and the finished paint film is subjected to various tests.

Production Scale.

The polymer dispersion (containing 15% notified polymer) is pumped from the 200L drums into the closed mixer via a lance placed by the operator 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 up to 3% notified polymer) will be sampled for testing. When approved the paint will be filled through dedicated pipe work and filling equipment into 200L 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 sprays panels for baking and testing. Several tests such as solids, viscosity and weight per litre are performed on the wet paint.

Filling into drums:

When approved the paint containing the notified polymer is filled into 200L drums through dedicated pipe work. The filling equipment automatically places a short fill pipe through the bung hole in the top of the drum and fills the drum.

Paint Application

The 200L drums of paint (containing up to 3% notified polymer) will be pumped into the circulating mix tank using a dedicated lance, pipe work and pump. Once in the tank a solvent is added (if required) to adjust the paint to application viscosity. The paint will be pumped around a circulating system from which it is sprayed onto car bodies by robots and operators in a dedicated ventilated spray booth. Operators spray the paint onto specific areas of the car that are not painted by 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 15% (pre-manufacture) and 3% (max, 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 expected to wear appropriate protective equipment 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 spray booth.

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 PPE comprising overalls, cap, leather gloves and a respirator with canister filters. Exposure to the notified polymer at a concentration of 3% (max) 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 topcoat 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

Release to the environment during shipping, transport and warehousing will only occur through accidental spills or leaks of the drums or steel packaged containers.

Paint Formulation

During storage and paint manufacture the notified polymer will be released in the following ways:

Spills	- less than 1%, up to 120 kg annually
Import container residue	- less than 3%, up to 360 kg annually to waste contractor.
Equipment cleaning	- up to 0.5%, up to 60 kg annually to solvent recovery plant.

During the paint formulation operations, it is anticipated that there will be minimal release of the notified polymer during manual transfer from the storage containers to the mixers and during filling of paint into containers or during blending since it is undertaken in enclosed systems. Spills will be within bunded areas and collected with inert absorbent material (eg sand) and placed in a sealable container ready for disposal to landfill. The process equipment, blending tanks and mixers, will be cleaned with suitable solvent, which is collected and sent to an onsite solvent recovery plant, with resultant solids being disposed of by incineration in cement kilns.

Import containers will be disposed of via a licensed drum recycler off-site, who will either incinerate the residues or send them to landfill.

Paint Application

Release of the notified polymer to the environment as a result of its use in the automotive industry is expected to include:

Spills	- less than 1%, up to 120 kg annually to landfill.
Container residues	- less than 2%, up to 360 kg annually to landfill.
Overspray and Equipment cleaning	- up to 40%, up to 4.8 tonnes annually to landfill.

All spills will be contained, collected with inert absorbent material (eg sand) and placed in a sealable container ready for disposal to landfill. The paint will be applied within specialised spray booth, generally by robots, therefore transfer efficiency will be quite high (approximately 70%). All overspray will be contained, collected and allowed to harden ready for disposal to landfill. Painting equipment will generally be cleaned with solvent. This effluent will be collected, allowed to harden and then disposed of to landfill with overspray wastes.

Any paint residue in empty paint containers will be allowed to dry and then disposed of with the container to a licensed drum recycler.

6.3.2. Environmental Fate

Waste paint will mostly be landfilled after hardening. The notified polymer contains functionalities which have the potential to hydrolyse in extreme pH conditions. However, in the environmental pH range 4-9 it is expected that the notified polymer will be hydrolytically stable. The notified polymer is not expected to be readily biodegradable. Due to its low water solubility, it is expected that the notified polymer will associate with sediments and organic phases of soils. Over time the notified polymer will slowly degrade to water, simple carbon and nitrogen compounds via abiotic and biotic means. During automotive recycling, the notified polymer will be destroyed.

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	Liquid, never isolated from product.
Melting Point/Glass Transition Temp	Not determined
Density	1.03 kg/m ³ at 25°C
Water Solubility	Not determined. The polymer exists as a dispersion in water. The polymer is expected to be insoluble due to its complex structure and large molecular weight, with the mainly hydrophobic constituents outweighing the relatively small amount of polar functionality.
Dissociation Constant	The polymer is not expected to dissociate under normal environmental conditions (pH4-9) due to its low water solubility. The presence of carboxylic acid groups suggests the polymer will become slightly anionic under basic conditions.
Reactivity	Stable under normal environmental conditions
Degradation Products	None under normal conditions of use.

The product containing the notified polymer has low physical and chemical hazard. The product WR-18-9264 is classified as a non-hazardous according to the criteria of NOHSC; and as a non-dangerous good according to the Australian Dangerous Goods Code.

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

No toxicological 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 ecotoxicological data were submitted.

9.2. Environmental Hazard Assessment

Anionic polymers are known to be moderately toxic to algae. The mode of toxicity is over chelation of nutrient elements needed by algae for growth. The highest toxicity is when the acid is on alternating carbons of the polymer backbone. This does not apply to the notified polymer. The toxicity to algae is likely to be further reduced by the presence of calcium ions, which will bind to the functional groups. The aquatic toxicity is expected to be low.

Further, following application and curing, the notified polymer will be within an inert matrix and hence will be unavailable to organisms. Due to its high molecular weight, the potential for bioaccumulation is low.

10. RISK ASSESSMENT**10.1. Environment**

Exposure will only occur due to use of the notified polymer, as it will not be manufactured in Australia. It will be reformulated into paints that will be used by specialist technicians in the automotive industry, i.e. will not be available for general consumer use. The proposed use pattern and waste management indicates that solid wastes (containing up to 5,280 kg annually of the notified polymer) resulting from the paint manufacture and paint use will be collected and sent to landfill or incineration.

Liquid effluents (containing up to 60 kg) produced from paint formulations will be sent to solvent recovery plants, where, due to its expected low water solubility, the notified polymer will end up in any resultant sludge which will be disposed of by incineration. A small amount of the notified polymer may be present in the final effluent, which will be returned to the sludge tank.

The notified polymer will react with other paint components to form a stable chemical matrix and, once dry, is expected to be immobile and pose little risk to the environment. After the useful life of painted article, the notified polymer will suffer the same fate and the article. If the article is recycled the notified polymer will be destroyed during the heating process to release water vapour, oxides of carbon and nitrogen.

Within a landfill environment, the notified polymer contained in waste from paint manufacture and paint application including cured paint, will be immobile and is expected to breakdown at a very slow rate. If released into the aquatic environment, the notified polymer is expected to partition to particulate matter and accumulate in sediments. Adverse ecotoxicological effects to aquatic organisms are not expected.

The notified polymer is not likely to present a risk to the environment when it is stored, transported, used, recycled and disposed of in the proposed manner.

10.2. Occupational Health and Safety

The OHS risk presented by the notified polymer is expected to be low. The notified polymer

may be present in formulations containing hazardous ingredients. If these formulations 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.

10.3. Public Health

The notified polymer will not be available to the public, Members of the public may make dermal contact with products containing the notified polymer, However, the risk to public health will be negligible because the notified polymer is present bound within a matrix and is unlikely to be bioavailable.

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 in accordance with the schedule item B 12 of the *ICNA Act*. 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

- The following control measures should be implemented by the paint formulator to

minimise environmental exposure during (manufacture, formulation, use) of the notified polymer:

- All process equipment and storage areas should be bunded with process drains going to an on-site effluent treatment plant or collection tank.

Disposal

- The notified polymer should be disposed of to landfill or by incineration, where available.

Emergency procedures

- Spills/release of the notified polymer should be handled by containment and collection by absorbent material in sealable labelled container ready for disposal to 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.