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

FULL PUBLIC REPORT

Polymer in KH-740

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Street Address:	334 - 336 Illawarra Road MARRICKVILLE NSW 2204, AUSTRALIA.
Postal Address:	GPO Box 58, SYDNEY NSW 2001, AUSTRALIA.
TEL:	+ 61 2 8577 8800
FAX	+ 61 2 8577 8888.
Website:	www.nicnas.gov.au

**Director
NICNAS**

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FULL PUBLIC REPORT**Polymer in KH-740****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

PPG Industries Australia Pty Ltd, ABN (82 055 500 939) of McNaughton Road, 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, CAS Number, Molecular and Structural Formulae, Molecular Weight, Polymer Constituents, Residual Monomers/Impurities.

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

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Polymer in KH-740

3. COMPOSITION

PLC CRITERIA JUSTIFICATION

<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 into Australia at 20%.

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>
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<i>Tonnes</i>	0.6	0.9	0.9	0.9	0.9
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USE

The notified polymer is a component of auto paint and will be present in the final product at less than <1%.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

The notified polymer is imported as a dispersion mixture containing 20% notified polymer in 200 L drums into PPG Australia plant at Clayton, Victoria.

Paint Formulation

Laboratory Scale

The ingredients required for making the paint, including the notified polymer (concentration 20%), will be combined in a container in the laboratory under stirring. The paint (containing 0.7% 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 dispersion (containing 20% 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 0.7% 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 0.7% 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 20% (pre-manufacture) and 0.7% (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 i.e. safety glasses, gloves, and protective clothing as per the 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 0.7% 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 primer 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 9 kg annually
Import container residue	- less than 3%, up to 27 kg annually to waste contractor
Equipment cleaning	- up to 0.5%, up to 4.5 kg to onsite 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 offsite, 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 9 kg annually to landfill
Container residue	- less than 2%, up to 18 kg annually to landfill
Overspray and	
Equipment cleaning	- up to 40%, up to 360 kg 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 functional groups 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 and not be mobile. Over time the notified polymer will slowly degrade to water, simple carbon and nitrogen compounds via abiotic and biotic means. During automobile 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	1068 kg/m ³ (calculated)
Water Solubility	127 mg/L at 20°C for product. This was a gravimetric determination of the soluble fraction. A known amount of the product containing the notified polymer was vigorously shaken with a known amount of water, then allowed to settle after which an aliquot of the water fraction was taken, weighed, dried and reweighed. The water solubility was determined by the change in weight of the sample.
Dissociation Constant	The notified polymer is not expected to dissociate under normal environmental conditions (pH 4 - 9) except at the low pH end.
Particle Size	Not relevant
Reactivity	Stable under normal environmental conditions
Degradation Products	None under normal conditions of use

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

No toxicological studies 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 needed by algae for growth. The highest toxicity is when the acid is on alternating carbons of the polymer backbone. This is unlikely to 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 (Nabholz *et al.* 1993). The aquatic toxicity may be expected to be low.

Further, following application and curing, the notified polymer will be within an inert matrix and be unavailable to organisms. Due to its large molecular weight, the potential for bioaccumulation is very 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 423 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 up to 4.5 kg) produced from paint formulation 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 interact 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 as the article. If the article is recycled then 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 unlikely to be bioavailable.

Therefore, the risk to public from exposure to the notified polymer is considered 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

- The following control measures should be implemented by paint formulator to minimise environmental exposure during use of the notified polymer:
 - All process equipment and storage areas should be banded 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, then storage of 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.

14. REFERENCES

Nabholz JV, Miller P & Zeeman M (1993) Environmental Risk Assessment of New Chemicals Under the Toxic Substances Control Act (TSCA) Section Five. In: Landis WG, Hughes JS & Lewis MA eds, Environmental Toxicology and Risk Assessment. ASTM STP 1179. American Society for Testing and Materials, Philadelphia, p 49.