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July 2012

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

PUBLIC REPORT

RW-7022-83B

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 Sustainability, Environment, Water, Population and Communities.

For the purposes of subsection 78(1) of the Act, this Public Report may be inspected at our NICNAS office by appointment only at Level 7, 260 Elizabeth Street, Surry Hills NSW 2010.

This Public Report is also available for viewing and downloading from the NICNAS website or available on request, free of charge, by contacting NICNAS. For requests and enquiries please contact the NICNAS Administration Coordinator at:

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**Director
NICNAS**

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SUMMARY

The following details will be published in the NICNAS *Chemical Gazette*:

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS SUBSTANCE	INTRODUCTION VOLUME	USE
LTD/1614	PPG Industries Australia Pty Limited	RW-7022-83B	Yes	≤ 2 tonnes per annum	Component of coatings for the aerospace industry

CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification

Based on the presence of the isocyanate functional group in the notified polymer, the notified polymer should be considered for hazard classification according to the *Globally Harmonised System for the Classification and Labelling of Chemicals (GHS)*, as adopted for industrial chemicals in Australia. The recommended hazard classification is presented in the table below.

<i>Hazard classification</i>	<i>Hazard statement</i>
Respiratory Sensitisation (Category 1)	H334 – May cause allergy or asthma symptoms or breathing difficulties if inhaled

Based on the presence of the isocyanate functional group in the notified polymer, the notified polymer is recommended for hazard classification according to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004) with the following risk phrase:

Xn; R42 May cause sensitisation by inhalation.

Human health risk assessment

Under the conditions of the occupational settings described, the notified polymer is not considered to pose an unreasonable risk to the health of workers.

When used in the proposed manner, the notified polymer is not considered to pose an unreasonable risk to public health.

Environmental risk assessment

On the basis of the assessed use pattern, the notified polymer is not considered to pose an unreasonable risk to the environment.

Recommendations

REGULATORY CONTROLS

Hazard Classification and Labelling

- The notified polymer should be classified as follows:
 - Respiratory Sensitisation (Category 1): H334– May cause allergy or asthma symptoms or breathing difficulties if inhaled
- The following should be used for products/mixtures containing the notified polymer:
 - Conc. ≥ 1%: H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled

Health Surveillance

- As the notified polymer contains isocyanate functional groups, employers should carry out health surveillance for any worker who has been identified in the workplace risk assessment as having a

history of isocyanate sensitivity, asthma or other pulmonary condition and who may be adversely affected by isocyanate exposure.

CONTROL MEASURES

Occupational Health and Safety

- Employers should implement the following engineering controls to minimise occupational exposure to the notified polymer:
 - Spray booths where possible during spray application
 - Spray application to occur in well-ventilated areas when spray booths cannot be used
- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer:
 - Avoid contact with skin and eyes
 - Avoid breathing vapours
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer:
 - Isocyanate resistant gloves, coveralls and goggles
 - Appropriate respiratory protection for any process where inhalation exposure may occur

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

- A short term exposure limit (STEL) of 0.07 mg/m³ and long term time-weighted-average (TWA) exposure limit of 0.02 mg/m³ applies for the airborne concentration of all isocyanates in the workplace [NOHSC: 1003(1995)]. Employers should ensure that this exposure standard for isocyanates is not exceeded for all areas where the notified polymer will be handled.
- Spray applications should be carried out in accordance with the Safe Work Australia *National Guidance Material for Spray Painting* [NOHSC (1999)] or relevant State and Territory Codes of Practice.
- 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 *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)] workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Disposal

- The notified polymer should be disposed of to landfill.

Emergency procedures

- Spills or accidental release of the notified polymer should be handled by physical containment, collection and subsequent safe disposal.

Regulatory Obligations

Secondary Notification

This risk assessment is based on the information available at the time of notification. The Director may call for the reassessment of the chemical under secondary notification provisions based on changes in certain circumstances. Under Section 64 of the *Industrial Chemicals (Notification and Assessment) Act (1989)* the notifier, as well as any other importer or manufacturer of the notified chemical, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified chemical/polymer is listed on the Australian Inventory of Chemical Substances (AICS).

Therefore, the Director of NICNAS must be notified in writing within 28 days by the notifier, other importer or manufacturer:

- (1) Under Section 64(1) of the Act; if
 - the polymer has a number-average molecular weight of less than 1000;or
- (2) Under Section 64(2) of the Act; if
 - the function or use of the polymer has changed from a component of coatings for the aerospace industry or is likely to change significantly;
 - the polymer has begun to be manufactured in Australia;
 - additional information has become available to the person as to an adverse effect of the polymer on occupational health and safety, public health, or the environment.

The Director will then decide whether a reassessment (i.e. a secondary notification and assessment) is required.

Material Safety Data Sheet

The MSDS of the notified polymer provided by the notifier was reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

PPG Industries (Australia) Pty Ltd (ABN 82 055 500 939)
Mc Naughton Road
Clayton VIC 3168

NOTIFICATION CATEGORY

Limited: Synthetic polymer with $M_n \geq 1000$ Da.

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication: chemical name, CAS number, other names, molecular and structural formulae, molecular weight, analytical data, impurities and additives/adjuvants,

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed as follows: water solubility, hydrolysis as a function of pH, partition co-efficient, absorption/desorption and dissociation constant.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

Unknown

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

RW-7022-83B

MOLECULAR WEIGHT

$M_n > 1,000$ Da

ANALYTICAL DATA

Reference GPC spectra was provided.

3. COMPOSITION

DEGREE OF PURITY < 50%

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES
None under normal conditions of use

DEGRADATION PRODUCTS

No degradation, decomposition or depolymerisation of the notified polymer is expected to occur under normal conditions of use.

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20 °C AND 101.3 kPa: Clear yellow viscous liquid

Property	Value	Data Source/Justification
Melting Point/Freezing Point	-52 °C	Measured
Boiling Point	Decomposes without boiling at > 250 °C	Measured
Density	1172 kg/m ³ at 20 °C	Measured
Vapour Pressure	< 1.33 x 10 ⁻¹¹ kPa at 20 °C	Measured
Water Solubility	Not determined	Not tested due to the presence of end-groups that readily react with water to form carbon dioxide and insoluble polymeric masses.
Hydrolysis as a Function of pH	Not determined	Not tested due to the presence of end-groups that readily react with water to form carbon dioxide and insoluble polymeric masses. The core of the notified polymer contains groups that are expected to hydrolyse only very slowly in the environmental pH range (4–9) at ambient temperature.
Partition Coefficient (n-octanol/water)	Not determined	The notified polymer is expected to react with water and octanol to form carbon dioxide and insoluble polymeric masses
Adsorption/Desorption	Not determined	Not tested due to the presence of end-groups that readily react with water to form carbon dioxide and insoluble polymeric masses
Dissociation Constant	Not determined	The notified polymer has no dissociable functions
Particle Size	Not determined	Notified polymer is a liquid
Flash Point	> 230 °C	Measured
Flammability	Not highly flammable	Measured
Autoignition Temperature	475 °C	Measured
Explosive Properties	Not explosive	Estimated
Oxidising Properties	Not oxidising	Estimated

DISCUSSION OF PROPERTIES

For full details of tests on physical and chemical properties, refer to Appendix A.

Reactivity

The notified polymer rapidly reacting with water to form an insoluble urea and carbon dioxide.

Physical hazard classification

Based on the submitted physico-chemical data depicted in the above table, the notified polymer is not recommended for hazard classification according to the *Globally Harmonised System for the Classification and Labelling of Chemicals (GHS)*, as adopted for industrial chemicals in Australia.

5. INTRODUCTION AND USE INFORMATION

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

The notified polymer will be imported as a solvent solution at < 50% concentration.

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>	< 2	< 2	< 2	< 2	< 2

PORT OF ENTRY

Melbourne, Sydney, Brisbane and Perth.

TRANSPORTATION AND PACKAGING

The notified polymer will be imported in sealed approximately 1 L or 4 L containers and transported by road or rail.

USE

The notified polymer is a component (at < 25% concentration) of two part exterior coatings for the aerospace industry.

OPERATION DESCRIPTION

The notified polymer will not be manufactured, reformulated or repackaged in Australia. The coating component containing the notified polymer at < 50% will be mixed with the base component and in some instances a thinner. The mixed coating containing the notified polymer at < 25% will then be applied to the metal surface via spray.

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

6.1.1. Occupational Exposure

CATEGORY OF WORKERS

<i>Category of Worker</i>	<i>Exposure Duration (hours/day)</i>	<i>Exposure Frequency (days/year)</i>
Transport	2-3	10-15
Application	6	260

EXPOSURE DETAILS

Transport and storage

Transport and storage workers are not expected to be exposed to the notified polymer except in the unlikely event of an accident.

Dermal, ocular or inhalation exposure to the notified polymer at concentrations up to 50% may occur during mixing and spray application, and during cleaning and maintenance of equipment. Exposure should be mitigated by the use of ventilated environments (including spray booths and/or aircraft hangars) and personal protective equipment (PPE: goggles, impervious gloves, appropriate industrial clothing and respirators during spray operations).

Once the coating is cured and dried, the notified polymer will be reacted into an inert matrix and will not be bioavailable.

6.1.2. Public Exposure

The notified polymer is intended for industrial use only. Therefore, the public may be exposed to the imported product only in the event of a transport accident. Given the intended use of the notified polymer in the aerospace industry and that the coatings containing the notified polymer will be cured, public exposure from articles to which the coating has been applied is not expected.

6.2. Human Health Effects Assessment

No toxicity data were submitted.

The notified polymer contains isocyanate functional groups that are of concern for irritation, dermal and respiratory sensitisation, and pulmonary toxicity (Barratt, 1994; Kirk-Othmer, 1995; NOHSC, 1990; US EPA 2010).

The US EPA specifies that structures with isocyanate equivalent weights of $\geq 5,000$ are presumed not to pose a hazard under any conditions. In addition, concerns are generally confined to species with molecular weights $< 1,000$ Da. The isocyanate functional group equivalent weight of the notified polymer is $< 5,000$ and although its number average molecular weight is $> 1,000$ Da, it contains a large proportion ($> 40\%$) of low molecular weight species $> 1,000$ Da. Hence the health concerns of the notified polymer associated with the isocyanate functionality cannot be ruled out.

As there is presently not a reliable animal model for testing diisocyanates for potential respiratory sensitisation, the US EPA assume that all diisocyanates may be potential human respiratory sensitizers. It has also been reported that isocyanates may also cause respiratory sensitisation by skin contact (US EPA, 2010).

Health hazard classification

Based on the presence of the isocyanate functional group in the notified polymer, the notified polymer should be considered for hazard classification according to the *Globally Harmonised System for the Classification and Labelling of Chemicals (GHS)*, as adopted for industrial chemicals in Australia. The recommended hazard classification is presented in the table below.

<i>Hazard classification</i>	<i>Hazard statement</i>
Respiratory Sensitisation (Category 1)	H334 – May cause allergy or asthma symptoms or breathing difficulties if inhaled

According to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC 2004), substances containing isocyanate functional groups should be classified as hazardous if there is no evidence to indicate that the substance does not cause respiratory hypersensitivity. Thus, the notified polymer is recommended for hazard classification according to the Approved Criteria with the following risk phrase:

Xn; R42 May cause sensitisation by inhalation.

6.3. Human Health Risk Characterisation

6.3.1. Occupational Health and Safety

Toxicological data was not supplied for the notified polymer. On the basis of the presence of isocyanate functional groups and the large proportion of low molecular species, the notified polymer may cause irritation, dermal and respiratory sensitisation, and pulmonary toxicity.

Inhalation exposure of workers to aerosols of the notified polymer at concentrations up to 25% may occur during spray application. The majority of spray application is expected to take place in ventilated spray booths with respiratory protection that should lower the potential for inhalation exposure to occur and thus also the potential for adverse respiratory effects. When spray operations do not occur in spray booths there is a greater risk of adverse respiratory effects. This risk should be lowered by ensuring that the application area is well ventilated and that appropriate respiratory protection is worn.

Employers should ensure that airborne levels of isocyanates remain below the exposure standard set by Safe Work Australia in all areas where spray operations occur [NOHSC: 1003(1995)]. Where respiratory protection is deemed to be appropriate for reducing isocyanate exposure, it should consist of an appropriately fitted and maintained air-line respirator or self-contained breathing apparatus complying with the appropriate Australian Standard.

Spray applicators may be dermally exposed to the notified polymer at concentrations up to 50%. Irritation and sensitisation may occur as a result of dermal exposure. Dermal exposure is expected to be minimised by the wearing of personal protective equipment by workers, including gloves, goggles, and coveralls.

In summary, the risk to workers associated with exposure to the notified polymer is not considered

unreasonable provided that the stated engineering controls (particularly spray booths), safe work practices and appropriately fitted and maintained PPE (particularly respiratory protection, but also gloves, goggles and coveralls) are used.

6.3.2. Public Health

The notified polymer is intended for use in industrial applications only. The public may come into contact with surfaces coated with the coating containing the notified polymer. However the notified polymer will be reacted into an inert matrix and will not be bioavailable. Therefore, the risk to the health of the public from use of the notified polymer is not considered to be unreasonable.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1. Environmental Exposure

RELEASE OF CHEMICAL AT SITE

No manufacturing of the notified polymer will take place in Australia. Release of the notified polymer to the environment during importation, storage, and transport is unlikely. The most likely source of a release to the environment during these activities will be a transport accident. However, the capacity and specifications of the import containers are likely to minimise the extent of any such releases. Releases that do occur as a result of accidents are expected to be physically contained, absorbed on inert material and sent for disposal to landfill.

RELEASE OF CHEMICAL FROM USE

During industrial use of the notified polymer, it is estimated that < 0.5% of total import volume will be spilt. These spills will be contained and disposed of to landfill. Less than 1% of the notified polymer may remain as residues in the product containers and these are expected to be disposed of to landfill. Equipment used to mix or apply the coating formulations may be rinsed with solvent and these washes are expected to undergo a treatment during which time the notified polymer will be collected and disposed to landfill. It is estimated that 1% of notified polymer used in solvent-borne coatings may be released to sewage treatment plants due to application equipment rinsing.

The coating formulations containing the notified polymer are applied by spray techniques. It is anticipated that up to 10% of the coating product will be released as overspray and be collected as waste material. As the application of coatings will be conducted at industrial sites in designated spray booths, the overspray will be captured in the spray booth and on kraft paper or newspaper. The product will then dry onto the paper and be disposed of to landfill.

RELEASE OF CHEMICAL FROM DISPOSAL

The majority of the notified polymer will share the fate of articles to which it has been applied and therefore is expected to be disposed of to landfill or thermally decomposed during metals reclamation processes.

7.1.2. Environmental Fate

Approximately 90% of the annual import volume of notified polymer is expected to be applied to aerospace articles with a substantial part of the remainder expected to be collected as overspray. Therefore, the majority of the imported quantity of notified polymer is expected to be ultimately disposed of to landfill in articles at the end of their useful life or thermally decomposed during metal recycling. When disposed of to landfill, the majority of the notified polymer is expected to be held within a cured polymer matrix and is not expected to be mobile, bioavailable nor biodegradable in this form. In the unlikely event the notified polymer is released to surface waters, it is expected to hydrolyse on contact with water to form intractable polymeric masses which are expected to be neither bioavailable nor bioaccumulative.

7.1.3. Predicted Environmental Concentration

A predicted environmental concentration (PEC) was not determined because no aquatic exposure of the notified polymer is expected based on its reported use pattern. Moreover, on contact with water the notified polymer is expected to react rapidly with water to form carbon dioxide and insoluble inert polyurea compounds.

7.2. Environmental Effects Assessment

No ecotoxicity data were submitted. The notified polymer is expected to react rapidly with water to form carbon dioxide and insoluble inert polyurea compounds. Therefore, in the unlikely event that the notified polymer is released to the aquatic compartment, it is not likely to be bioavailable nor bioaccumulative and is expected to be of low concern to the aquatic environment.

7.2.1. Predicted No-Effect Concentration

A predicted no-effect concentration (PNEC) has not been calculated for the notified polymer as no aquatic exposure is expected based on its reported use pattern.

7.3. Environmental Risk Assessment

The risk quotient ($Q = PEC/PNEC$) for the notified polymer has not been calculated as release to the aquatic environment is not expected based on its reported use pattern. The majority of the notified polymer will ultimately be cured into an inert matrix. In its cured state, the notified polymer is irreversibly bound within an inert matrix, and is not expected to be bioavailable nor mobile. Based on its limited environmental exposure, the notified polymer is not considered to pose an unreasonable risk to the environment.

APPENDIX A: PHYSICAL AND CHEMICAL PROPERTIES**Melting Point** -52 °C

Method OECD TG 102 Melting Point/Melting Range.
Remarks Determined using differential scanning calorimetry (DSC).
Test Facility NOTOX (2010)

Boiling Point Decomposes without boiling at > 250 °C

Method OECD TG 103 Boiling Point.
Remarks Determined using DSC. Boiling of the test substance was not observed below the temperature at which reaction and/or decomposition started (> 250 °C)
Test Facility NOTOX (2010)

Density 1172 kg/m³ at 20 °C

Method Standard Test Method for Density of Liquid Coatings, Ink and Related Products (ASTM D1475)
Test Facility PPG Industries (2010)

Vapour Pressure < 1.33x 10⁻¹¹ kPa at 20°C

Method OECD TG 104 Vapour Pressure.
Remarks At 20°C by isothermal thermogravimetry
Test Facility NOTOX (2010)

Flash Point > 230 °C

Method Standard Test Method for Flashpoint of Liquids by Setaflash Closed-Cup Apparatus (ASTM D3278)
Test Facility PPG Industries (2010)

Flammability Not highly flammable

Method EC Council Regulation No 440/2008 A.12 Flammability (Contact with Water).
Remarks No evaluation of a gas and/or spontaneous ignition of the test substance in contact with water was observed in all tests
Test Facility NOTOX (2010)

Autoignition Temperature 475 °C

Method EC Council Regulation No 440/2008 A.15 Auto-Ignition Temperature (Liquids and Gases).
Test Facility NOTOX (2010)

Explosive Properties

Method EC Council Regulation No 440/2008 A.14 Explosive Properties.
Remarks The molecular structure of the substance does not contain groups associated with explosive properties.
Test Facility NOTOX (2010)

Oxidizing Properties

Method EC Council Regulation No 440/2008 A.21 Oxidizing Properties (Liquids).
Remarks The molecular structure of the substance does not contain chemical groups that acts as an oxidising agent.
Test Facility NOTOX (2010)

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