

File No: LTD/1386

February 2009

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

**FULL PUBLIC REPORT**

**KZ-551**

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 the Environment, Water, Heritage and the Arts.

For the purposes of subsection 78(1) of the Act, this Full Public Report may be inspected at our NICNAS office by appointment only at 334-336 Illawarra Road, Marrickville NSW 2204.

This Full 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:

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:	<a href="http://www.nicnas.gov.au">www.nicnas.gov.au</a>

**Director  
NICNAS**

## TABLE OF CONTENTS

<u>FULL PUBLIC REPORT</u> .....	3
1. APPLICANT AND NOTIFICATION DETAILS.....	3
2. IDENTITY OF CHEMICAL .....	3
3. COMPOSITION.....	3
4. PHYSICAL AND CHEMICAL PROPERTIES.....	4
5. INTRODUCTION AND USE INFORMATION.....	5
6. HUMAN HEALTH IMPLICATIONS.....	5
7. ENVIRONMENTAL IMPLICATIONS .....	7
8. CONCLUSIONS AND REGULATORY OBLIGATIONS.....	9
<u>APPENDIX A: PHYSICAL AND CHEMICAL PROPERTIES</u> .....	11
<u>BIBLIOGRAPHY</u> .....	12

**FULL PUBLIC REPORT****KZ-551****1. APPLICANT AND NOTIFICATION DETAILS**

## APPLICANT(S)

PPG Industries Australia Pty Ltd (ABN 82 055 500 939)  
McNaughton Rd  
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, Other Names, Molecular and Structural Formulae, Molecular Weight, Spectral Data, Purity, Polymer Constituents, Residual Monomers/Impurities and Use Details.

## VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed as follows: Melting point, boiling point, vapour pressure, hydrolysis as a function of pH, partition coefficient, absorption/desorption, dissociation constant, flash point and flammability limits.

## PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

## NOTIFICATION IN OTHER COUNTRIES

USA

**2. IDENTITY OF CHEMICAL**

## MARKETING NAME(S)

KZ-551  
RC-59-2064 (containing the notified polymer at 70%)

## CAS NUMBER

Not assigned

## MOLECULAR WEIGHT

> 1000 Da

## ANALYTICAL DATA

Reference IR and GPC spectra were provided.

**3. COMPOSITION**

DEGREE OF PURITY > 97%

## HAZARDOUS IMPURITIES/RESIDUAL MONOMERS

The notified polymer contains hazardous impurities, however these are all present at below the cut-offs for classification.

## NON HAZARDOUS IMPURITIES/RESIDUAL MONOMERS (&gt; 1% by weight)

None

## ADDITIVES/ADJUVANTS

None

## LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES

None under normal conditions of use

## DEGRADATION PRODUCTS

None under normal conditions of use

**4. PHYSICAL AND CHEMICAL PROPERTIES**

APPEARANCE AT 20°C AND 101.3 kPa: A clear viscous slightly yellow liquid\*

Property	Value	Data Source/Justification
Melting Point/Freezing Point	Not determined	Will be imported as a component of a solution from which it will not be isolated.
Boiling Point	Not determined	Will be imported as a component of a solution from which it will not be isolated.
Density	1131 kg/m <sup>3</sup>	Estimated based on the density of the polymer solution (1048 kg/m <sup>3</sup> ) and the density of the solvents present in the solution.
Vapour Pressure	< 1.3 × 10 <sup>-8</sup> kPa	Estimated based on the NAMW > 1,000 Da (US EPA, 2007)
Water Solubility	172 mg/L at 20°C	The polymer is predicted to be moderately water soluble which is consistent with the mainly hydrophobic structure of the notified polymer containing a significant fraction of hydrophilic moieties.
Hydrolysis as a Function of pH	Not determined	The notified polymer contains hydrolysable functions of high concern that can react within the environmental pH range of 4 – 9.
Partition Coefficient (n-octanol/water)	Not determined	A moderate to high partition coefficient is expected based on its mainly hydrophobic and partly hydrophilic structure and the moderate water solubility of the notified polymer.
Adsorption/Desorption	Not determined	The notified polymer is predicted likely to adsorb to soil from water due to the mainly hydrophobic structure.
Dissociation Constant	Not determined	Dissociation is unlikely to occur under normal environmental pH range of 4–9 since no dissociable functionality exists.
Flash Point*	34°C	MSDS
Flammability*	Upper: 0.5% Lower: 11.2%	MSDS
Autoignition Temperature*	367°C	MSDS
Explosive Properties	Not expected to be explosive	The structural formula contains no explosives.

\* For product RC-59-2064 containing 70% notified polymer in solvent solution.

## DISCUSSION OF PROPERTIES

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

*Reactivity*

Stable under normal environmental conditions. Incompatible with strong acids, bases and oxidisers.

## 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 in the product RC-59-2064 (Contains the notified polymer at 70%) in 200 L drums. The notified polymer may also be manufactured at the PPG Clayton Facility.

### 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>	10-30	10-30	10-30	10-30	10-30

### PORT OF ENTRY

Melbourne

### TRANSPORTATION AND PACKAGING

The product RC-59-2064 (containing the notified polymer at 70%) will be imported by ship in 200 L steel drums and transported from the wharf to the notifier's site by road. After reformulation the product containing the notified polymer (at < 30%) will be transported to the car manufacturer's site by road in 200 L steel drums.

### USE

A component of automotive spray paint for use in original equipment manufacture. Products containing the notified polymer will not be sold to the public.

### OPERATION DESCRIPTION

The notified polymer will be imported into Australia in 200 L drums. The notified polymer may also be manufactured within Australia.

If it is manufactured within Australia the notified polymer will be synthesised in a closed reaction vessel. It will then be transferred through dedicated pipework to a thinning vessel where it is mixed with solvents as required, and will also be sampled for quality control testing. The solution containing the notified polymer (at 70%) will then be filtered and pumped through automated filling equipment into 200 L drums.

The notified polymer will be reformulated into paint at PPG Industries Australia Pty Ltd. It will be pumped from the drums via a lance into a closed mixing vessel and combined with the other paint ingredients. The paint containing the notified polymer at < 30% will undergo quality control testing before being pumped into 200 L drums for delivery to customers.

At the customer sites the paint will be pumped from the drums into a mixing tank and diluted to the required viscosity for application. The finished paint will be then pumped around a circulation system from which it will be sprayed onto automotive parts by robots and workers. The painted automotive parts will then travel through an oven where the notified polymer will undergo a heat activated chemical reaction with other polymers in the paint, thereby forming the final paint film on the car.

## 6. HUMAN HEALTH IMPLICATIONS

## 6.1 Exposure assessment

### 6.1.1 Occupational exposure

#### NUMBER AND CATEGORY OF WORKERS

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration (hours/day)</i>	<i>Exposure Frequency (days/year)</i>
<b>Paint and resin manufacture at PPG site</b>			
Laboratory polymer manufacture	1	6	10
Laboratory paint manufacture	3	8	80
Process sampling, testing and filling	6	6	7
Paint makeup	18	4	200
Quality control testing during paint make-up	3	4	200
Filling into drums	3	4	200
<b>Paint application at customer site</b>			
Adding paint to the circulation tank	18	2	200
Spray painting	30	8	200
Cleaning of spray equipment	18	2	200

#### EXPOSURE DETAILS

Dermal and ocular exposure to the notified polymer may occur due to drips, spills and splashes during processes such as transfer of the solution containing the notified polymer to and from the mixing tanks, taking and testing quality control samples, connecting filling lines and maintenance and cleaning of equipment. However, exposure will be minimised by engineering controls such as the use of local exhaust ventilation and the use of personal protective equipment such as gloves, goggles and protective clothing.

Spray painters may come into contact with the notified polymer through dermal, inhalation and ocular routes. However, exposure will be limited as the spray paint will be applied in a spray booth with a down draft by either robots or workers using protective equipment including vapour masks and full protective clothing. After application the paint containing the notified polymer will be cured into an inert matrix and the notified polymer will not be bioavailable.

### 6.1.2. Public exposure

The products containing the notified polymer will not be sold to the public. Therefore the public will only be exposed to the notified polymer in the event of accidental spill during transportation. The public will come into contact with surface coatings on automobiles containing the notified polymer. However, the notified polymer will not be bioavailable, as it will be cured into an inert solid shortly after application.

## 6.2. Human health effects assessment

No toxicological data were submitted for the notified polymer. In the absence of toxicological data on the notified polymer, the known hazards of epoxides have been considered (US EPA, 2002).

#### *Toxicokinetics, metabolism and distribution.*

The notified polymer is not expected to be significantly absorbed across biological membranes, based on the high number average molecular weight (> 1000 Da). However, some absorption may occur as the notified polymer contains < 20% of species with molecular weight < 1000 Da and < 5% of species with a molecular weight < 500 Da.

#### *Irritation and sensitisation.*

Epoxy resins can be both irritants and sensitisers. Species of low molecular weight (< 1000) have a higher sensitising potential compared with oligomers of higher molecular weight (HSE, 2003).

#### *Carcinogenicity and reproductive toxicity*

The notified polymer contains epoxide functional groups with a functional group equivalent weight of < 500. Chemicals containing epoxy functional groups are of concern for reproductive effects and carcinogenicity, with greatest concern for singly substituted epoxy groups like that present in the notified polymer (US EPA, 2002). According to the US EPA, compounds with epoxy functional group equivalent weights of > 1,000 or molecular weights greater than 1000 Da are presumed not to pose a hazard under any conditions, with health concerns

limited to molecules < 500 Da if only dermal exposure is present. As the notified polymer contains < 20% of species with a molecular weight < 1000 Da and < 5% of species with a molecular weight of < 500 Da, long term adverse effects from exposure to the notified polymer can not be ruled out.

#### *Observations on Human Exposure.*

The notified polymer has been used in the USA since September 2006 and the notifier has stated that a similar resin was used from January 2003 to September 2006 in the USA and since July 1999 in Japan. No adverse health effects have been reported from the use of the similar resins or the notified polymer.

#### **Health hazard classification**

Based on the available data the notified polymer is not classified as hazardous under the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004)

### **6.3. Human health risk characterisation**

#### **6.3.1. Occupational health and safety**

Due to the presence of low molecular weight species the notified polymer is likely to be irritating, may cause sensitisation and could cause long term effects. The amount of the notified polymer with a number average molecular weight < 1000 Da and < 500 Da is < 20% and < 5% respectively. At this concentration, the risk of sensitisation and long-term effects for workers exposed to the notified polymer cannot be ruled out.

#### *Manufacture and reformulation*

The main route of exposure to the notified polymer for workers during manufacture and reformulation is expected to be dermal. The risk to workers is considered to be low due to the limited exposure expected. However, as the risk of sensitisation and long-term effects cannot be ruled out workers should wear coveralls, impervious gloves and eye protection to prevent exposure as a precaution.

#### *End-use*

Dermal, ocular and inhalation exposure is expected to be the primary route of exposure during spray painting although exposure will be limited by the lower concentration of the notified polymer in the paint (< 30%) and the use of engineering controls. However, as a precaution workers should wear coveralls, impervious gloves and eye protection to prevent exposure. During spray application the risk to workers is considered to be low if spray application is conducted by robotics or in an adequately ventilated spray booth by workers wearing respiratory and skin protection for medium/high hazard substances recommended in the NOHSC National Guidance Material for Spray Painting (NOHSC, 1999). Exposure and hence the risk of sensitisation and long-term effects would be greater if workers were to conduct spray application without the use of engineering controls and appropriate PPE. The lower concentration in the paint would reduce the risk but adverse effects cannot be ruled out.

After application the paint containing the notified polymer will be cured into an inert matrix and the notified polymer will not be bioavailable and hence the risk from exposure to it is not considered to be unacceptable.

#### **6.3.2. Public health**

The notified polymer is not available to the public, except after the product has been applied and cured and the notified polymer becomes bound within a matrix. The notified polymer will not be bioavailable and hence the risk to the public is negligible.

## **7. ENVIRONMENTAL IMPLICATIONS**

### **7.1. Environmental Exposure & Fate Assessment**

#### **7.1.1 Environmental Exposure**

##### **RELEASE OF CHEMICAL AT SITE**

The notified polymer will be imported in 200L closed head steel drums. Release to the environment during shipping, transport and warehousing will only occur through accidental spills or leaks of the drums or steel packaged containers. However, the applicant supplied the following information regarding the release in case the manufacture occurs at PPG Clayton in Australia in the future.

During polymer manufacture residual waste is generated in two ways. Once polymerization is completed the polymer will be pumped from the reactor to the thinning vessel. The solvents required to thin the polymer will

be used to wash down the reactor and also pumped to the thinning vessel, so there will be no waste in the reactor. The polymer in the thinning vessel will be pumped through a filter into 200L drums. The thinning vessel will be pressurised to push the final polymer out and be cleaned with solvent. This solvent and the polymer residues will be collected and sent to the solvent recovery plant on site, where the sludge from this plant will be collected by a licensed contractor and further processed to remove solvent. The solid waste including the notified polymer will be sent to landfill. The second waste source comes from the changing of the filters. Typically one filter is used per batch, however, it could be up to eight filters. The used filters containing residues of notified polymer will be put in a prescribed waste bin and removed from site by a licensed contractor to be dumped in landfill. If this polymer is manufactured at Clayton, a maximum of 2% of polymer would go to landfill from the polymer manufacturing process.

During paint manufacture and packaging, spills are expected to be minimal. When spills occur, they will be contained by bunding, collected with absorbent material and sent to a licensed landfill. Empty drums, whether from imported polymer or locally manufactured polymer, will be sent to drum reconditioners where the waste is incinerated. Drum residual waste is expected to be 3% of imported (or manufactured) volume.

Residual waste from the mixing vessel is anticipated to be 0.5% of imported polymer volume. This waste is collected when the mixing vessel is cleaned, and is sent to the onsite solvent recovery system. Solid residues from this system, containing the notified polymer, are sent to landfill.

In summary, up to 2.5% of the imported or manufactured polymer will be sent to landfill as waste and 3% will be incinerated in the recycling process of the drums that are used to contain the notified polymer.

#### RELEASE OF CHEMICAL FROM USE

Under normal use procedures, losses of the notified polymer through overspray, mixing of chemicals and cleaning of plant equipment have been estimated to be up to 37%. Wastes from application will be hardened and disposed of to landfill.

Empty drums that contained the paint will be sent to drum reconditioners where the waste will be incinerated. Residual waste of the notified polymer in paint drums is expected to be 3% of imported volume.

#### RELEASE OF CHEMICAL FROM DISPOSAL

Most of the notified polymer undergoes a chemical reaction with other polymer components in the paint during the paint baking process, to form the final paint film, and is not available for direct release to the environment. Disposal of the automobile may be through landfill or recycling, and the fate of the notified polymer contained in the paint will be related to that of the automobile.

#### 7.1.2 Environmental fate

No release of the notified polymer to the aquatic environment is expected based on the report use pattern. All the wastes will be either sent to landfill or be incinerated during the container recycling process. Also the notified polymer applied to automotive bodies will either go to landfill with the substrates or be incinerated forming small molecules of water and oxides of carbon during the recycling process of the substrates.

In landfill, the notified polymer is not expected to leach and is likely to undergo biotic and abiotic degradation processes into small molecules of water and oxides of carbon.

No environmental fate data were submitted. The potential for bioaccumulation of the polymer is low due to the high molecular weight.

#### 7.1.3 Predicted Environmental Concentration (PEC)

The calculation of PEC is not necessary since no significant release of the notified polymer to the aquatic compartment is expected based on the report use pattern.

#### 7.2. Environmental effects assessment

No ecotoxicity data were submitted. The polymer contains functionalities of high concern. However, it would not be an issue since the polymer will be cured into inert matrix during the paint baking process after being applied to automotive bodies, and also very limited release to the aquatic environment is expected.

#### 7.3. Environmental risk assessment

The risk of an adverse effect on the environment from the intended use of the notified polymer is acceptably low based on the reported use pattern.



## 8. CONCLUSIONS AND REGULATORY OBLIGATIONS

### Hazard classification

Based on the available data the notified polymer is not classified as hazardous under the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)].

### Human health risk assessment

Under the conditions of the occupational settings described where spray application is carried out in a highly controlled manner, the notified polymer is not considered to pose an unacceptable risk to the health of workers.

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

### Environmental risk assessment

On the basis of the reported use pattern, the notified polymer is not considered to pose a risk to the environment.

### Recommendations

#### REGULATORY CONTROLS

##### Health Surveillance

- As the notified polymer is of a chemical class with known sensitising properties, employers should carry out health surveillance for any worker who has been identified in the workplace risk assessment as having a significant risk of sensitisation.

#### CONTROL MEASURES

##### Occupational Health and Safety

- Employers should implement the following engineering controls to minimise occupational exposure to the notified polymer in formulated coating products:
  - Spray application should be conducted in a down draft spray booth
- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer as introduced and in formulated coating products:
  - Avoid skin and eye contact
  - Avoid breathing aerosol
  - Use of coatings containing the notified polymer should be accordance with the NOHSC National Guidance Material for Spray Painting (NOHSC, 1999) or relevant State and Territory Codes of Practice.
  - Avoid skin contact with uncured coating when removing personal protective equipment.
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer in formulated coating products:
  - Impermeable gloves;
  - Coveralls;
  - Eye protection;
  - Suitable respirators during spray 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 chemical 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 or incinerated during container recycling processes.

#### 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 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;
  - used for spray application that is not conducted in a highly controlled industrial environment.

or

- (2) Under Section 64(2) of the Act; if
  - the function or use of the chemical has changed from a component of automotive spray paint, or is likely to change significantly;
  - the amount of chemical being introduced has increased from 30 tonnes, or is likely to increase, significantly;
  - the method of manufacture of the chemical in Australia has changed, or is likely to change, in a way that may result in an increased risk of an adverse effect of the chemical on occupational health and safety, public health, or the environment;
  - additional information has become available to the person as to an adverse effect of the chemical 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 products containing the notified polymer provided by the notifier were reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.

**APPENDIX A: PHYSICAL AND CHEMICAL PROPERTIES****Water Solubility** 172 mg/L at 20°C

Method Determined by analysing the solids of the supernatant from a mixture of 10 grams of the notified polymer and 50 grams of water that was shaken for one minute followed by 48 hours of standing before the analysis.

Remarks The test result is consistent with the mainly hydrophobic structure of the notified polymer containing a significant fraction of hydrophilic moieties.

Test Facility PPG Industries Australia Pty Limited (no study report provided)

### **BIBLIOGRAPHY**

- FORS (Federal Office of Road Safety) (1998) Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG code), 6th Edition, Canberra, Australian Government Publishing Service
- HSE (2003) An assessment of skin sensitisation by the use of epoxy resin in the construction industry. Research Report 079. Health and Safety Executive, England.
- NOHSC (1994) National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.
- NOHSC (1999) National Guidance Material for Spray Painting. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.
- NOHSC (2003) National Code of Practice for the Preparation of Material Safety Data Sheets, 2<sup>nd</sup> edition [NOHSC:2011(2003)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.
- NOHSC (2004) Approved Criteria for Classifying Hazardous Substances, 3<sup>rd</sup> edition [NOHSC:1008(2004)]. National Occupational Health and Safety Commission, Canberra, AusInfo.
- United Nations (2003) Globally Harmonised System of Classification and Labelling of Chemicals (GHS). United Nations Economic Commission for Europe (UN/ECE), New York and Geneva.
- US EPA (United States Environmental Protection Agency) (2007), Interpretive Assistance for the Assessment of Polymers. Updated 22 January 2007:  
<http://www.epa.gov/oppt/sf/pubs/InterpretiveAssistancePolymers0107.pdf> Accessed (17 December 2008)
- US EPA (United States Environmental Protection Agency) (2002). TSCA New Chemicals Program (NCP) Chemical Categories. <http://www.epa.gov/opptintr/newchems/pubs/chemcat.htm> Accessed (02 February 2009)