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

**FULL PUBLIC REPORT**

**Epoxy polymer in F3118**

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**Director  
NICNAS**

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<b>Polyester epoxy in F3118</b>
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**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

Limited-small volume: Polymer with NAMW  $\geq$  1000.

## EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical Identity

Other names

Molecular Weight

Polymer constituents

Residual monomers

Hazardous impurities

Use Details

Import volume

## 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)

Epoxy polymer in F3118

## MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn) &gt; 1000

## METHODS OF DETECTION AND DETERMINATION

METHOD	Gel Permeation Chromatography and IR spectroscopy
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**3. COMPOSITION**

## DEGREE OF PURITY

&gt; 99%

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

None

## ADDITIVES/ADJUVANTS

None

## DEGRADATION PRODUCTS

No detailed examination of degradation products has been carried out. The polymer is not expected to degrade, decompose or depolymerise under the conditions of use. In the event of fire, combustion products are likely to include miscellaneous hydrocarbons, carbon monoxide, carbon dioxide, nitrogen oxide and water.

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

The notified polymer contains only very low levels of residual monomers, in addition, losses of volatile residual monomers during repackaging and storage is not expected due to the closed systems and sealed storage vessels used. Once the coating is cured losses of any residual monomer present due to volatility or leaching is not expected.

## 4. INTRODUCTION AND USE INFORMATION

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

The notified polymer is to be imported as a component of the product F3118. The manufacture of the notified polymer and its formulation into F3118 will not occur in Australia. F3118 will be repackaged in Australia prior to distribution to end-users.

#### 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>	< 1	< 1	< 1	< 1	< 1

#### USE

The notified polymer will be imported as a component of F3118 at a concentration of < 5%. The polymer is further diluted to a concentration of < 4% prior to application. The notified polymer is a component of automotive spray coatings.

## 5. PROCESS AND RELEASE INFORMATION

### 5.1. Distribution, transport and storage

PORT OF ENTRY  
Melbourne

#### IDENTITY OF MANUFACTURER/RECIPIENTS

The notified polymer is repackaged at the PPG Industries Australia Ltd, Clayton, VIC before distribution to car repair shops across Australia.

#### TRANSPORTATION AND PACKAGING

The product F3118 containing the notified polymer (< 5%) will be imported in 200 L closed head screw capped drums and transported by road to the warehouses for storage until required and repackaged into 5 L cans for distribution by road to the end-users.

### 5.2. Operation description

The notified polymer will not be manufactured in Australia. The notified polymer will be imported as a component in F3118.

#### *Repacking*

The product F3118 containing the notified polymer is transferred from the imported drums by manually opening the drums followed by automated mechanical lifting and decanting of the open drums into the large mixing vessel. Subsequent repacking occurs via an automated procedure under local exhaust ventilation.

#### *End-Use*

The product containing the notified polymer will be diluted by manual addition of a tinter to the coating tin and manual shaking or stirring. The diluted coating will contain <4% of the notified polymer. The resulting product will then be applied to vehicles using a spray gun. The majority of these spray

applications will occur in a spray booth. The level of ventilation present in the spray booth will vary between workshops. In smaller automotive refinish repairs shops spray applications may occur outside of a spray booth.

### 5.3. Occupational exposure

#### *Number and Category of Workers*

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration</i>	<i>Exposure Frequency</i>
Transport and Storage Personnel	4	2-4 h/day	100-130 days/yr
Repacking and Maintenance Personnel	4	4-6 h/day	100-150 days/yr
Spray Application	3000	5 h/day	300 days/yr

#### *Exposure Details*

##### *Transport and Storage*

Transport, warehouse and stores personnel will wear personal protective equipment (PPE) (overalls/ industrial clothing as appropriate) when receiving and handling consignments of the imported product containing the notified chemical (up to 5% notified polymer). The product will be handled in the warehouse by forklift handling of pallets or manual handling of individual packages. During transport and warehousing, workers are unlikely to be exposed to the notified chemical except when packaging is accidentally breached

##### *Repacking and Maintenance*

Workers may come into contact with the notified polymer at a concentration of up to 5% through dermal and ocular routes from direct contact with drips, spills and splashes during transfer of the product containing the notified polymer to the mixing vessel system, equipment cleaning and maintenance.

##### *Spray Application*

Spray painters may come into contact with the notified polymer at a concentration of up to 5% through dermal and ocular routes from direct contact with drips, spills and splashes during transfer of the coating formulation to both hand spraying equipment and the circulation tank of the robotic spraying system, manual coating application, contact with contaminated surfaces and PPE and equipment cleaning and maintenance. Workers may also be exposed to the notified polymer (concentration up to 4%) by inhalation of coating aerosols containing the notified polymer during manual spray application.

After application and once dried, the coating containing the notified polymer is cured into an inert matrix and the polymer is hence unavailable to exposure.

### 5.4. Release

#### RELEASE OF CHEMICAL AT SITE

The notified polymer is imported as part of a coating which is sold as an automotive refinish coating. It is delivered to the PPG Industries site in Clayton Victoria plant in 200 L steel drums which is to be downsized to 5 L cans. Release to the environment during shipping, transport and warehousing will only occur through accidental spills or leaks of the packaged containers.

Downsizing of the coating from the 200 L import drums to the 5 L containers is undertaken in a manufacture closed system environment. Spills are controlled by bunding within the plants. Wastes produced during downsizing are expected to be 2%. These wastes are collected and processed through an onsite solvent recovery plant, with resultant solids being disposed of by incineration in cement kilns.

#### RELEASE OF CHEMICAL FROM USE

The notified polymer is used in coating in automotive applications. The process used by end users would result in waste generated from overspray, cleaning of the application equipment and empty coating containers.

The transfer efficiency as a result of the spray application is approximately 70% due to the application only in industrial setting. Thus 30% (300 kg) will be captured as overspray and collected within the spray booth through its filtering system or on masking material as newspaper. This will be disposed of

following drying by a licensed waste management company.

Cleaning of the application equipment will generate waste which will be collected and disposed of in the same manner as waste water from spray booth involving licensed waste disposal contractors. The wastes are treated and disposed of by landfill.

2% of waste is generated as a result of a small amount of coating remaining in the container. This will dry to form a non-leacheable solid and be disposed by landfill.

#### 5.5. Disposal

The wastes generated will be disposed of by landfill or incineration.

#### 5.6. Public exposure

The product containing the notified polymer will not be available to the public. Although the public will make contact with car surfaces containing the notified polymer, there is little potential for exposure since the polymer is trapped within the coating matrix.

### 6. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance at 20°C and 101.3 kPa</b>	Light straw coloured viscous liquid (Solvent solution containing > 60% notified polymer)
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<b>Melting Point/Freezing Point</b>	Not determined.
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Remarks	Polymer not isolated from solution.
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<b>Boiling Point</b>	Not determined.
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Remarks	Polymer not isolated from solution.
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<b>Density</b>	1030 kg/m <sup>3</sup> at 20°C (Solvent solution containing >60% notified polymer)
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Remarks	Full study report not provided.
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<b>Vapour Pressure</b>	Not determined
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Remarks	Polymer not isolated from solution. Volatility is expected to be low to moderate based on the polymers structure and NAMW.
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<b>Water Solubility</b>	Not determined
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Remarks	Based on the structure the water solubility is expected to be moderate to low since there is a mixture of hydrophobic and hydrophilic groups.
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<b>Hydrolysis as a Function of pH</b>	Not determined
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Remarks	The notified polymer contains epoxide functionalities and other functional groups, which may undergo hydrolysis under extreme temperature and pH conditions. However, its water solubility is expected to be low and thus it would be unlikely to hydrolyse within the pH range of 4-9.
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<b>Partition Coefficient (n-octanol/water)</b>	Not determined
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Remarks	Due to the hydrophobic nature of the notified polymer, it is likely to mainly partition to the organic phase.
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<b>Adsorption/Desorption</b>	Not determined
Remarks	The notified polymer is likely to adsorb to the soils due to its hydrophobicity.
<b>Dissociation Constant</b>	Not determined
Remarks	The notified polymer contains no dissociative functional groups.
<b>Particle Size</b>	Not determined.
Remarks	Polymer not isolated from solution.
<b>Flash Point</b>	32°C (Solvent solution containing >60% notified polymer)
Remarks	The notified polymer itself would not be expected to have a low flash point due to its high molecular weight. The low flash point is attributed to significant proportion of flammable solvents in the test substance.
<b>Flammability Limits</b>	Not determined.
Remarks	Not expected to be flammable. Polymer not isolated from solution.
<b>Autoignition Temperature</b>	No determined.
Remarks	Not expected to auto-ignite. Polymer not isolated from solution.
<b>Explosive Properties</b>	Not determined.
Remarks	Not expected to be explosive. The notified polymer does not contain functional groups that infer explosive properties.
<b>Reactivity</b>	
Remarks	The notified polymer is stable under normal conditions of use.



## **7. TOXICOLOGICAL INVESTIGATIONS**

No toxicity data were submitted.

## **8. ENVIRONMENT**

### **8.1. Environmental fate**

No environmental fate data were submitted. The notified polymer's NAMW of  $> 1000$  suggests that it is unlikely to cross biological membranes and bioaccumulate (Connell 1989).

### **8.2. Ecotoxicological investigations**

No ecotoxicity data were submitted.

Poly nonionic polymers with NAMW  $> 1000$  are of low concern to the aquatic environment.

## **9. RISK ASSESSMENT**

### **9.1. Environment**

#### **9.1.1. Environment – exposure assessment**

The majority of the notified polymer will be incorporated with other components to form a hard surface coating on automobiles and which will usually be covered by further layers of surface coatings. The majority of the wastes generated during the repacking in to smaller containers and end use will go to landfill or be incinerated.

In landfill, solid wastes containing the polymer will be immobile and not leach into the aquatic compartment, but should slowly degrade and become associated with the soil matrix. Although the notified polymer contains hydrolysable groups, hydrolysis should not occur under environmental pH range due to the expected low water solubility.

Given the expected low water solubility, low usage volume and the widespread and diffuse use of the notified polymer, release to the aquatic compartment from the cleaning of the application equipment is likely to be low.

Incineration of the waste will destroy the compound with the generation of water vapours and oxides of carbon and nitrogen. At the end of their useful lives, vehicles to which the coating has been applied will also be disposed of to landfill.

#### **9.1.2. Environment – effects assessment**

No ecotoxicity data were submitted. However, aquatic exposure is expected to be minimal during normal usage of the coating. Aquatic toxicity is also likely to be limited by the expected low water solubility and nonionic form of the polymer.

#### **9.1.3. Environment – risk characterisation**

The majority of the notified polymer will be incorporated at a low concentration level into coatings and, once applied and dried, possess little risk to the environment since a cured and inert matrix will be formed. Wastes generated during repackaging and application are expected to be landfilled or incinerated. The major loss (30%) in coating application is due to overspray, all of which will be disposed of to landfill.

If spilt on land, the notified polymer is expected to become immobilized in the soil layer. Due to its expected low water solubility, the polymer will remain bound within the soils and sediments of the landfill and be slowly degraded by the abiotic processes. If wastes are incinerated then the notified polymer would be destroyed with the production of water vapour, and oxides of carbon and nitrogen.

The majority of the notified polymer will be applied to surfaces and share the fate of the surface at the end of its useful life (most likely to landfill).

The limited exposure of the notified polymer to the aquatic compartment due to its industrial settings, nonionic form, expected low water solubility and the relatively high molecular weight, is unlikely to have an adverse effect on aquatic organisms.

### **9.2. Human health**

#### **9.2.1. Occupational health and safety – exposure assessment**

##### *Transport and distribution*

Transport, storage and warehouse workers are not expected to have any contact with the notified polymer, except in the case of an accident.

##### *Repacking*

Due to the automated nature of the repacking operations minimal exposure to the notified chemical is expected. However, dermal and potentially ocular exposure to the notified polymer (at a concentration of 5%) could occur to drips, spills and splashes when opening the drums or from contact with residues of the notified polymer during equipment cleaning and maintenance.

Exposure would be limited by the use of PPE.

#### *End-Use*

Exposure to the notified polymer (< 5%) could occur during mixing, transfer and spray application of the coating containing the notified polymer and through contact with surfaces and PPE contaminated with uncured coating. Dermal and ocular exposure could occur during all of these activities with inhalation exposure also potentially occurring during spray application. Exposure will be dependent on the engineering controls present at the car repair workshop such as use of robotics, use of spray booth, presence of exhaust ventilation and the PPE worn by workers. Varying level of controls are likely at the large number of sites in which the coating will be used. Exposure is expected to be minimal in car repair shops where the coating is sprayed in an adequately ventilated spray booth by workers using protective equipment or applied by robotics. The level of exposure per application is expected to be greater in car repair shops where application may not occur in a spray booth or the spray booth does not have adequate ventilation. Exposure will be minimised by spray application in a well ventilated area and the use of PPE in accordance with the MSDS.

### **9.2.2. Public health – exposure assessment**

Public exposure to the notified chemical is expected to be negligible as the coating containing the notified polymer is not sold to the public and once the coating is cured the notified polymer will be bound within the coating matrix.

### **9.2.3. Human health – effects assessment**

No toxicological data have been provided for the notified polymer and therefore the substance cannot be classified in accordance with the NOHSC Approved Criteria for Classifying Hazardous Substances (NOHSC, 2004).

The notified polymer contains epoxide functional groups with a functional group equivalent weight of < 500. The health concern for this type of functionality with an equivalent weight of < 1000 are cancer and reproductive effects. However, health concerns are restricted to species with molecular weights <1000, and <500 if exposure is limited to the dermal route (US EPA, 2006). As the notified polymer contains < 20% of species with a molecular weight < 1000 and < 10% of species with a molecular weight < 500, long term adverse effects from exposure to the notified polymer cannot be ruled out.

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).

### **9.2.4. Occupational health and safety – risk characterisation**

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 notified polymer is introduced at a concentration < 5% and hence the concentration of species with a molecular weight < 1000 and < 500 is < 1% and < 0.5% respectively. At this concentration, the risk of sensitisation and long-term effects for workers exposed to the notified chemical cannot be ruled out.

#### *Repacking*

Dermal exposure is the main route of exposure for workers involved in repacking. The risk to repacking workers is considered to be low due to the limited exposure expected and the low concentration of low molecular weight species < 500 in the coating (<0.5%). 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*

During transfer and mixing of the coating where dermal is exposure expected to be the primary route of exposure, due to the limited exposure expected and the low concentration of low

molecular weight species < 500 (<0.5%) in the coating. 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 spraybooth 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 is greatest for workers conducting spray application without the use of engineering controls and appropriate PPE. The low concentration of low molecular weight species < 1000 (<1%) in the coating would minimise the risk but adverse effects cannot be ruled out.

#### **9.2.5. Public health – risk characterisation**

Public exposure to the notified chemical is expected to be negligible and as such the risk to the public is also expected to be negligible.

### **10. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS**

#### **10.1. Hazard classification**

No toxicological data was available and therefore it is not possible to classify the notified chemical as a hazardous substance in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004). However, the notified polymer contains epoxide functional groups and based on data available for this chemical category may be irritating, cause sensitization and have long term adverse health effects.

and

No toxicological data was available, the classification of **polymer** using the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS) (United Nations 2003) was not possible. This system is not mandated in Australia and carries no legal status but is presented for information purposes.

#### **10.2. Environmental risk assessment**

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

#### **10.3. Human health risk assessment**

##### **10.3.1. Occupational health and safety**

There is Low Concern to occupational health and safety only if spray application is carried out with a high level of control.

##### **10.3.2. Public health**

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

### **11. MATERIAL SAFETY DATA SHEET**

#### **11.1. Material Safety Data Sheet**

The MSDS of the product containing the notified chemical provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC 2003). It is published here as a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

#### **11.2. Label**

The label for products containing the notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace*

*Substances* (NOHSC 1994). The accuracy of the information on the label remains the responsibility of the applicant.

## 12. 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 chemical 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 in accordance with the NOHSC National Guidance Material for Spray Painting (NOHSC, 1999)
  - 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 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.

#### Disposal

- The notified chemical should be disposed of by landfill or incineration

#### Emergency procedures

- Contamination of drains and waterways should be avoided by containing and absorbing spills with sand or earth. The waste can then be collected and sealed in appropriately labelled drums for disposal.

### 12.1. 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 Section 64(1) of the Act; if
  - the notified polymer is introduced at a concentration > 5%
  - if the person who introduces the notified polymer into Australia becomes aware that the percentage of low molecular weight species (< 1000) in the polymer is > 20%
- or
- (2) Under Section 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.

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