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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in PPG2790-301A/190K

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Director
Chemicals Notification and Assessment

TABLE OF CONTENTS

Polymer in PPG2790-301A/190K

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
PPG Industries Australia Pty Ltd (ABN 82 055 500 939) of McNaughton Road, Clayton South, VIC, 3168.

and

Cytec Australia Holdings Pty Ltd (ABN 45 081 148 629) of Suite 1, Level 1, 21 Solent Circuit, Baulkham Hills, NSW, 2153

NOTIFICATION CATEGORY
Limited: Polymer with NAMW ≥ 1000

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication:
Chemical Identity
Polymer composition
Purity
Spectral data
Detailed use

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

OTHER NAME(S)
Epoxy modified alkyd resin acid

MARKETING NAME(S)
The notified polymer is not isolated and therefore does not have a trade name. It is a component of a finished resin named PPG2790-301A/190K.

METHODS OF DETECTION AND DETERMINATION

METHOD	Gel Permeation Spectroscopy
Remarks	Spectra provided

3. COMPOSITION

DEGREE OF PURITY
High

DEGRADATION PRODUCTS
Decomposition products consist of oxides of carbon and phosphorus.

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES
None known

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified polymer is imported as a component (<24%) of a finished resin.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	1-10	1-10	1-10	1-10	1-10

USE
Component of resin used as a metal packaging coating.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, transport and storage

PORT OF ENTRY
Melbourne

IDENTITY OF RECIPIENTS
The resin containing the notified polymer is relabelled at the receiving warehouse in Victoria, before being supplied to 1-2 facilities in Victoria and Queensland.

TRANSPORTATION AND PACKAGING
The resin containing the notified polymer is imported and supplied in 200 L steel drums.

5.2. Operation description

No manufacture, reformulation or repackaging of the notified polymer occurs in Australia.

Coating
The resin containing the notified polymer is transferred to a tank by automated pumping equipment. The transfer hose is attached to the steel drum and the product drawn into the top of the tank bath by automatic transfer. Packaging, which is suspended on a conveyor is immersed into the tank and electroplated. On leaving the tank, the parts are rinsed with an ultrafiltrate solution, which flows back into the tank. The coated packaging is then cured by being passed through a heated zone.

5.3. Occupational exposure

Number and Category of Workers

Category of Worker	*Number*	*Exposure Duration*	*Exposure Frequency*
Transport and storage workers	4-6	6 hrs/day	10 days/year
Transfer operators	4	2 hrs/day	250 days/year
Electrodeposition coating operators	4	2 hrs/day	250 days/year
Oven curing operators	4	2 hrs/day	250 days/year

Exposure Details
Import, transport and distribution
During transport and storage, workers are unlikely to be exposed to the notified polymer except when packaging is accidentally breached.

Coating
Minimal exposure is expected during the coating process due to the automated nature of the process.

However, dermal and possibly ocular exposure to drips and spills could occur during the connection and disconnection of transfer hoses, quality control collection and sampling and general cleaning and maintenance. Workers will be provided with appropriate protective equipment such as safety glasses, gloves and protective clothing.

Once the coating has been cured the polymer is bound within an inert matrix and therefore will be unavailable for exposure.

5.4. Release

RELEASE OF CHEMICAL AT SITE

Environmental release of the notified polymer is unlikely during importation, storage and transportation. Containers holding the notified polymer will be transported directly from the Port facility to a facility for relabelling prior to distribution to 1-2 facilities where the notified polymer will be used. Accidental spills, leaks and catastrophic mechanical failure during a transport accident are the most likely reasons for environmental release. Engineering controls (eg. 200 L steel drum specifications) and emergency clean-up procedures (ie. spill response instructions on Material Safety Data Sheet and label) will limit the impact on the environment of such incidents.

RELEASE OF CHEMICAL FROM USE

Release of the notified polymer during use is expected to be limited to potential spills and leaks, and periodic discharges of cleaning washwaters to sewer. The polymer is applied by dipping (electrodeposition bath) to metal containers. The processes are enclosed, largely automated and engineering controls to contain the notified polymer are established. After dipping into the formulation containing the notified polymer, parts are rinsed with an ultrafiltrate solution, which flows back into the tank for reuse. The coating is then cured by heating. Once the coating has been cured the polymer is bound within an inert matrix and therefore will be unavailable for environmental release.

The electrodeposition bath is cleaned every 1 or 2 years. The bath contents are transferred to an enclosed storage tank via permanent piping. Water washing is used to rinse down the internal walls of the bath as the contents are being transferred. Residual washings and sludge from the bottom of the tank are removed by licensed waste contractors. The notifier estimates that wastes generated may contain < 50 kg/annum of the notified polymer. After collection, the waste is treated by flocculation, filtration and centrifugation, which separate the solid material from the water. The treated effluent is discharged to sewer and the solid sludge is dried and sent to secure landfill. The notifier estimates that the majority of the notified polymer would partition to the sludge.

5.5. Disposal

The majority of the notified polymer will be applied to metal packaging containers, which will eventually be metal recycled or sent to landfill for disposal. Spill clean up wastes are likely to be sent to incinerator or landfill for disposal. Emptied imported drums, potentially containing up to 1% of the notified polymer, will be sent to landfill for disposal. Electrodeposition bath wastes are treated prior to disposal of sludge (expected to contain most of the notified polymer) to landfill and effluent to sewer for further treatment.

5.6. Public exposure

The notified polymer will not be directly available to the public. The notified polymer is used in a packaging coating that is cured prior to reaching the public. Therefore, although the public may come into contact with the coated packaging, the notified polymer will not be available for exposure.

6. PHYSICAL AND CHEMICAL PROPERTIES

Limited physicochemical data has been provided for a 60% solution of the notified polymer in 2-butoxyethanol and 1-methoxy-2-propanol.

Appearance at 20°C and 101.3 kPa	Brown clear liquid
Melting Point/Freezing Point	Not determined

Remarks The notified polymer is not isolated from solution

Boiling Point 100-200ºC (polymer solution)

Remarks This boiling point range is considered to be due to the solvent content of the polymer solution.

Density 1179 kg/m^3 at 20ºC (notified polymer estimated)

Remarks This figure has been calculated from the density of the polymer solution = 1070 kg/m^3 and the density of the solvents in that solution.

Vapour Pressure Not determined

Remarks The notified polymer is not expected to be volatile. The vapour pressure of the polymer solution would be dictated by the solvent content.

Water Solubility Based on chemical structure, the notified polymer is not expected to be soluble in water. The solubility of water in the polymer solution is 100-150 g/L.

METHOD In accordance with DIN 55 955 -B
Remarks An aliquot of polymer solution (10 g) was sequentially diluted in 0.5, 1.0 and 1.5 g of water. After each dilution, the solution was homogenised and observed for the presence of undissolved media. A turbid solution was obtained after homogenisation with 1.5 g of water but not at lower dilutions indicating water absorption by the notified polymer.
TEST FACILITY Surface Specialities Austria GmbH (2004), Laboratory, Graz, Austria.

Hydrolysis as a Function of pH Not determined

Remarks Hydrolysis is unlikely to occur in the environmentally-relevant pH range of 4-9 due to the expected low water solubility.

Partition Coefficient (n-octanol/water) Not determined
Remarks Based on low water solubility, the notified polymer may potentially have an affinity to octanol.

Adsorption/Desorption Not determined
Remarks Based on low water solubility, the notified polymer may potentially have an affinity to organic carbon.

Dissociation Constant Not determined

Remarks The notified polymer contains terminal acidic functional groups which are expected to be dissociated under normal environmental conditions.

Particle Size Not determined

Remarks The notified polymer is introduced as a polymer solution.

Flash Point 47.5ºC (polymer solution)

METHOD DIN EN ISO 1523.
Remarks This flash point is considered to be due to the solvent content of the polymer solution. Data taken from Material Safety Data Sheet. Study report not provided.

Flammability Limits Not determined

Remarks The notified polymer is not expected to be flammable. The flammability of the polymer solution is expected to be dictated by the solvent content

Autoignition Temperature Not determined

Remarks The notified polymer is not expected to be flammable. The autoignition temperature of the polymer solution is expected to be dictated by the solvent content

Explosive Properties Not predicted to be explosive

Remarks From examination of the structure, there are no chemical groups that would infer explosive properties, therefore the result has been predicted negative.

Reactivity

Remarks Expected to be stable under normal conditions of use and handling. Hazardous polymerisation does not occur.

7. TOXICOLOGICAL INVESTIGATIONS

No toxicity data were submitted

8. ENVIRONMENT

8.1. Environmental fate

No environmental fate data were submitted.

8.2. Ecotoxicological investigations

No ecotoxicity data were submitted.

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

The use pattern for the notified polymer indicates there will be limited potential for environmental release of the notified polymer to the aquatic environment and no predicted environmental concentration (PEC) for the aquatic environment has been derived.

The notified polymer is not expected to be soluble in water and during wastewater treatment (eg. flocculation), the notified polymer is expected to partition strongly to solids and sludge, which is disposed of to landfill. In a landfill environment, the notified polymer is expected to degrade by abiotic and biotic processes to water and oxides of carbon and phosphorus. Heating during metal recycling or incineration will destroy the notified polymer, releasing water and oxides of carbon and phosphorus. Once heated and cured, the notified polymer that is applied to metal packaging is not expected to be leached from the coating matrix.

9.1.2. Environment – effects assessment

Although no aquatic ecotoxicity data were available for the notified polymer, 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. Based on structural considerations it is unlikely that the highest toxicity to algae observed for anionic polymers would 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). Aquatic toxicity is expected to be low.

9.1.3. Environment – risk characterisation

Once heated and cured, the notified polymer that is applied to metal packaging is not expected to be leached from the coating matrix. Practically all of the notified polymer imported will eventually be disposed of to metal recycling or to landfill. Landfilled wastes will include wastes from spills, unused product, residues in emptied containers and coated products at the end of their useful life. Some coated products will be metal recycled, resulting in the destruction of the notifier polymer to form water and oxides of carbon and phosphorus. In landfill, the notified polymer is bound and not expected to be mobile. It will eventually degrade to give water vapour and oxides of carbon and phosphorus.

It is not possible to determine a realistic PEC value in order to assess the risk to aquatic organisms, as the use pattern of the notified polymer will result in limited exposure to the aquatic environment. Aquatic toxicity is expected to be low. Due to the limited release to water, it is unlikely that the polymer would exist at levels which could accumulate and pose a threat to aquatic organisms or to bioaccumulate. Abiotic or slow biotic processes are expected to be largely responsible for the eventual degradation of the notified polymer as it is not expected to be readily biodegradable.

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

Import, transport and distribution

During transport and storage, workers are unlikely to be exposed to the notified polymer except when packaging is accidentally breached.

Coating

Exposure to the notified polymer during the coating process is expected to be low due to dilute form of the notified polymer (<24%), the use of engineering controls, the wearing of PPE, and it's application using automated processes.

Once the coating has been cured the polymer is bound within an inert matrix and therefore will be unavailable for exposure.

9.2.2. Public health – exposure assessment

The public is only expected to come into contact with the cured form of the notified polymer and as such public exposure to the notified polymer is expected to be negligible.

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 polymer does not contain any moderate or high concern reactive functional groups but does contain terminal acidic functional groups which may infer irritancy. The notified polymer is of a high molecular weight (>1000 daltons), and is unlikely to cross biological membranes and thus it is expected to have a low order of toxicity. However, as low molecular weight species are present, the risk of irritancy cannot be discounted.

The results of the water solubility study indicated water absorption by the notified polymer. A polymer cannot be classified as low concern if it is capable of absorbing its own weight in water and has a NAMW $\geq$10000. This is based on rat inhalation data for a certain water absorbing polymer where lung tumours were observed. The lung damage observed in this inhalation study was thought to occur as the lungs were unable to clear the inhaled particles. The notified polymer is only supplied in solution, has a NAMW <10000 and (based on the water solubility study) is only capable of absorbing up to 25% of its weight in water. As such, it is not considered that the adverse health effects observed with certain water absorbing polymers are applicable to the notified polymer.

9.2.4. Occupational health and safety – risk characterisation

Exposure to the notified polymer is only expected for workers involved in the coating process. The risk to these workers is considered to be low due to the low predicted exposure and the expected low order of toxicity of the notified polymer. However, the risk of irritant effects cannot be discounted if dermal and ocular exposure occurs.

9.2.5. Public health – risk characterisation

Public exposure to the notified polymer is expected to be negligible and therefore the risk to public health is also expected to be negligible.

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

10.1. Hazard classification

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).

and

Classification of notified polymer using the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS) (United Nations 2003) cannot be undertaken as no toxicological or ecotoxicological data were available. 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 under the conditions of the occupational settings described.

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 for PPG2790-301A 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 were 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

CONTROL MEASURES

Occupational Health and Safety

- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer as introduced:
  - Avoid skin and eye contact

- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer as introduced:
  - Protective eyewear, chemical resistant industrial clothing and impermeable gloves.

  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.

Disposal

- The notified polymer should be disposed of to landfill in accordance with local waste management regulations.

Emergency procedures

- Spills/release of the notified polymer should be handled by containment. Prevent spill from entering drains, streams or waterways. Collect with non-combustible absorbent material (eg. sand, vermiculite) and place in clean, labelled, sealable containers for disposal. If contamination of sewers or waterways has occurred, notify the local emergency services.

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(2) of the Act:
- if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

No additional secondary notification conditions are stipulated.

13. BIBLIOGRAPHY

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