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

FULL PUBLIC REPORT

Polymer in RC3699

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**Director
NICNAS**

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Polymer in RC3699

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

BASF Coatings Australia Pty Ltd
51 McIntyre Rd Sunshine Vic 3020
ABN: 91 092 127 501

and

Akzo Nobel Pty Ltd
51 McIntyre Rd Sunshine Vic 3020
ABN: 91 000 017 354

NOTIFICATION CATEGORY

Limited: Polymer with NAMW ≥ 1000

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical identity
Identity of impurities
Spectral data
Detail of use
Introduction Volume
Formulation details
Identity of end-use sites

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed as follows:

Melting Point
Density
Vapour Pressure
Hydrolysis as a function of pH
Adsorption/Desorption
Particle Size
Flash Point
Flammability Limits
Autoignition Temperature
Explosive Properties

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

The notified polymer has been notified in Japan. It has a pre-manufacture notice under the Toxic Substances Control Act in the United States.

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

The polymer is introduced in a polymer solution named RC3699

METHODS OF DETECTION AND DETERMINATION

Remarks	<p>Comparison of FTIR trace to the standard provided will enable identification of the notified polymer.</p> <p>The identity and concentration of the impurities was determined by High Performance Liquid Chromatography.</p> <p>The molecular weight distribution was determined by Gel Permeation Chromatography (GPC)</p>
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3. COMPOSITION

DEGREE OF PURITY
>98%

HAZARDOUS IMPURITIES/RESIDUAL MONOMERS
All residual monomers and hazardous impurities are present below the relevant cut-offs for classification of the notified polymer as a hazardous substance.

DEGRADATION PRODUCTS
No detailed examination of degradation products has been carried out. Degradation, decomposition or depolymerisation of the notified polymer would only be expected in the event of a fire. Combustion products of pyrolysis (oxygen limited) are likely to include miscellaneous hydrocarbons, carbon monoxide, carbon dioxide and water.

As part of the thermosetting automotive coating the polymer will be fully crosslinked and no depolymerisation is expected.

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES
The notified polymer and coatings containing it are rarely exposed to the atmosphere, as production and formulation operations take place in closed systems and storage is in sealed vessels. Losses of monomers and impurities due to volatility are therefore likely to be minimal. The notified polymer contains low levels of residual monomers.

The notified polymer is a component of a mixture which will be cured to form a hard surface coating, and which will usually be covered by further layers of surface coatings. Losses due to volatility, exudation or leaching are not expected to occur after this time

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified polymer will not initially be manufactured in Australia, but will be imported as a polymer solution at a concentration of 70-75%. At a later date the notified polymer may be manufactured in Australia.

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>	30-60	30-60	30-60	30-60	30-60

USE
Component of OEM automotive coating

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, transport and storage

PORT OF ENTRY
Melbourne.

IDENTITY OF MANUFACTURER/RECIPIENTS

Formulation of the automotive coating and potential future manufacture of the notified polymer will be carried out at Akzo Nobel Pty Ltd, Sunshine, VIC. Application of the coating will occur at car manufacturing sites in Victoria.

TRANSPORTATION AND PACKAGING

The notified polymer at a concentration of 70 - 75% will be imported in steel drums to the Akzo Nobel Pty Plant. The formulated coating product containing 10-30% notified polymer will be stored and transported in 200 L steel drums. Transport by road will be carried out by licensed transport carriers.

5.2. Operation description

Although initially the notified polymer will only be imported into Australia, there is the potential for manufacture to occur in the future. As such an operation description for both polymer manufacture and coating formulation has been included below.

Import

The polymer solution will be imported in 200 L steel drums and transported to the Akzo Nobel Pty Ltd manufacturing plant in Sunshine VIC

Notified polymer manufacture

Alternatively, the polymer solution containing 70-75% notified polymer will be manufactured in closed reactors. Following manufacture a sample will be removed for quality control purposes. When approved the polymer will be filtered and filled through fixed transfer lines into drums. The drums are stored until the polymer solution is required for reprocessing.

Coating Formulation

During formulation, the polymer solution (containing 70-75% notified polymer) will be pumped from 200 L drums into the closed mixer. Following mixing with other ingredients, a sample of the coating formulation containing 10-30% notified polymer will be removed for quality control purposes. When approved, the formulated coating is filtered and filled into 200 L drums and stored in a warehouse prior to distribution to car manufacturing facilities by road.

Coating Application

The coating formulation containing 10-30% notified polymer will be pumped via a fixed line into the application tank and mixed with other ingredients. A sample may be removed for quality control purposes. The diluted coating containing 10-30% notified polymer will be sprayed onto car bodies by robots and operators in a dedicated ventilated, down draft spray area. Operators spray the coating onto specific areas of the car that are not coated by the robots. The coated cars travel through an oven where the coating is cured.

5.3. Occupational exposure

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration</i>	<i>Exposure Frequency</i>
Transport and warehousing (imported product)	12	2-4 hours/day	20-130 days/year
Manufacture and Formulation	32	1-8 hours/day	80-100 days/year
Transport and warehousing (formulated product)	10	1-2 hours/day	40-50 days/year
Coating Application	17	1-2 hours/day	20 days/year

Exposure Details

Transport and warehousing workers may come into dermal and ocular contact with the notified polymer through accidental leaks and spillages of the drums and containers of notified polymer or coating formulation.

During future local manufacture of the notified polymer and formulation of the coatings, raw materials (including the polymer solution) are automatically added to the mixing vats. Workers will wear

impermeable gloves, eye protection and coats. Exposure from the notified polymer to these workers can occur by either dermal or ocular routes, however significant exposure will be limited due to the engineering controls, workplace practices and personal protective equipment used.

Throughout end use, spray painters may come into contact with the notified polymer through dermal, inhalation and ocular routes. The risk of exposure, however, will be minimal as application is done in a well ventilated, down draft spray booth with workers using protective equipment including vapour masks.

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

Since initially the notified polymer will be manufactured overseas there will be no release in Australia due to its manufacture. Until it reaches the coating manufacturing site, release to the environment during shipping, transport and warehousing will only occur through accidental spills or leaks of the drums or steel packaged containers.

Potential polymer manufacture

When the notified polymer is manufactured in Australia, it would be expected that a maximum of 2% of the total volume produced per year would be released to the environment from the disposal of spilt material and equipment cleaning to landfill. The manufactured polymer solution would be stored in 200 L steel drums.

Coating Formulation

The notified polymer will undergo reformulation, where it is blended with other ingredients to form an automobile surface coating, and will be stored in 200 L steel drums. At the coating manufacturing site, the annual release of the notified polymer will be via the following points:

Spills	- less than 1%, up to 600 kg, to landfill
Import container residue	- less than 3%, up to 1800 kg, likely to waste contractor
Equipment cleaning	- up to 1%, up to 600 kg to interceptor pit onsite.

During the coating formulation operations, it is anticipated that there will be minimal release of the notified polymer during manual transfer from the storage containers to the mixers and during filling of coating into containers or during blending since it is undertaken in enclosed systems. Spills will be within bunded areas and collected with inert absorbent material (eg sand) and placed in a sealable container ready for disposal. All generated washing effluent from the process equipment, including blending tanks and mixers, will go to an interceptor pit where the polymer would be collected in the solids/sludge, possibly by flocculation/precipitation, and then sent to landfill. The treated effluent, containing no or only small amounts of notified polymer, will then enter the sewer under a Trade Waste Agreement.

RELEASE OF CHEMICAL FROM USE

Annual release of the notified polymer to the environment as a result of its use in the automotive industry will include:

Spills	- less than 1%, up to 600 kg, to landfill
Container residue	- less than 1%, up to 600 kg, to waste contractor
Overspray and	
Equipment cleaning	- up to 20%, up to 12000 kg

All spills will be contained, collected with inert absorbent material (eg sand) and placed in a sealable container ready for disposal. The coating will be applied within specialised spray booths, generally by robots, therefore transfer efficiency will be quite high (approximately 80%). All overspray will be contained, collected and allowed to harden ready for disposal. Application equipment will generally be cleaned with solvent. This effluent will be collected and allowed to harden before disposal.

Any coating residue in empty coating containers will be allowed to dry and then disposed of with the container to a licensed drum recycler.

5.5. Disposal

Any spilt material will be disposed of to landfill in sealed labelled containers.

Any solids wastes (containing up to 2400 kg of notified polymer) produced during the coating and potential polymer manufacture, will be disposed of to landfill or possibly by incineration. Incineration of the notified polymer will produce water and oxides of carbon.

Import and coating containers will be disposed of via a licensed drum recycler offsite, who will either incinerate any residues present or send them to landfill.

Any resultant overspray and cleaning effluent (up to 12000 kg of notified polymer annually) from coating application will be allowed to harden and will then be disposed of to landfill along with any spilt material (up to 600 kg annually).

It is estimated that annually the proposed use pattern will produce up to 17400 kg of solid wastes containing the notified polymer, which will be collected and sent to landfill or, possibly, incineration

5.6. Public exposure

The notified polymer will not be available to the public. Members of the public will come into contact with the notified polymer once it is dried and cured, and not available for exposure.

6. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa		Colourless liquid (Product RC3699)
Melting Point/Freezing Point		Not determined
Remarks	Polymer is not isolated from solution.	
Boiling Point	Not determined.	
Remarks	Polymer solution boils at around 165°C (From the MSDS, test report not seen by NICNAS)	
Density		Not determined.
Remarks	Density of polymer solution is 1060 kg/cm ³ at 20°C (From the MSDS, test report not seen by NICNAS)	
Vapour Pressure		Not determined.
Remarks	Polymer not isolated from solution. Based on high molecular weight, it is not expected to vaporise significantly.	
Water Solubility		< 0.1 g/L
METHOD	In house method	
Remarks	1000 mg and 100 mg of dried notified polymer were added to 1 L of distilled water and pH 4.01, pH 6.86 and pH 9.18 buffer solutions. The flasks were shaken and left for 48 hours and then the solutions decanted. Based on the weights recorded for the dried polymer pre and post this test and the margin of uncertainty, the notified polymer was determined to be insoluble in water at a range of pH levels down to 0.1 g/L. The low water solubility would be expected based on the notified polymers structure.	
Hydrolysis as a Function of pH		Not determined.
Remarks	The notified polymer does contain functionalities that could potentially hydrolyse	

but due to its low water solubility this is unlikely to occur in the environmental pH range of 4-9.

Partition Coefficient (n-octanol/water) Not determined.

Remarks Due to the notified polymer's water solubility, it was not possible to determine this parameter. However, it is expected to favour the organic phase.

Adsorption/Desorption Not determined.

Remarks The notified polymer contains hydrophobic functional groups and is expected to adsorb onto soil and not be mobile.

Dissociation Constant Not applicable

Remarks While some dissociation is possible, it is expected to be limited by the low water solubility.

Particle Size Not determined

Remarks Polymer not isolated from solution.

Flash Point Not determined

Remarks Polymer not isolated from solution.

Flammability Limits Not determined

Remarks Polymer not isolated from solution.

Autoignition Temperature Not determined

Remarks Polymer not isolated from solution.

Explosive Properties Not determined

Remarks Polymer not isolated from solution. There have been no reported observations of explosive properties through use of notified polymer overseas.

Reactivity Notified polymer is expected to be stable under normal conditions of use. Although the polymer contains a reactive functional group and slight reaction in the coating solution may occur, this does not impact the stability of the final coating.

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

Initially, exposure will only occur due to use of the notified polymer, as it will not be manufactured in Australia. It will be reformulated into coatings that will be used by specialist technicians in the automotive industry, i.e. will not be available for general consumer use. The proposed use pattern and waste management indicate that solid wastes (containing up to 17.4 tonnes annually of the notified polymer) resulting from the coating and potential polymer manufacture and coating use will be collected and sent to landfill or incineration. A small amount of the notified polymer may be present in the final effluent from the effluent treatment plant, which will be either returned to the sludge tank or released to sewer.

The notified polymer will interact with other coating components to form a stable chemical matrix and, once dry, is expected to be immobile and pose little risk to the environment. After the useful life of the coated article, the notified polymer will suffer the same fate as the article. If the article is recycled then the notified polymer will be destroyed during the heating process to release water vapour and oxides of carbon.

9.1.2. Environment – effects assessment

No ecotoxicological data were provided for the notified polymer. The notified polymer is a non-ionic polymer, which the literature indicates are of low concern to the aquatic environment. (Boethling and Nabholz 1997).

Following application and curing, the notified polymer will be within an inert matrix and be unavailable to organisms. Due to its large molecular weight and water insolubility, the potential for bioaccumulation is very low.

9.1.3. Environment – risk characterisation

The notified polymer contains functional groups which have the potential to hydrolyse in extreme pH conditions. However, in the environmental pH range 4-9 it is expected that it will be hydrolytically stable. The notified polymer is not expected to be readily biodegradable. Due to its water solubility, it is expected that the notified polymer will adsorb to soil and sediments. Over time the polymer will slowly degrade to water and simple carbon compounds via abiotic and biotic means. During automobile recycling the polymer will be destroyed.

Within a landfill environment, the notified polymer contained in waste from coating manufacture and coating application, including cured coating, will be immobile and is expected to breakdown at a very slow rate due to biotic and abiotic processes over time.

Adverse ecotoxicological effects to aquatic organisms are not expected. The notified polymer is not likely to present a risk to the environment when it is stored, transported, used, recycled and disposed of in the proposed manner.

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

Polymer manufacture/coating formulation

The majority of the polymer manufacture/coating formulation process, including filling, is automated and hence exposure is expected to be negligible. In situations where contact to the notified polymer (concentration < 75%) could occur, exposure is expected to be low due to the use of engineering controls and PPE.

Coating Application

Dermal exposure to the notified polymer at a concentration of 10-30% could occur from contact with coating residues during transfer and cleaning operations. However, exposure is expected to be low due to the use of PPE. The majority of the spray application is automatic (by robots) and

hence exposure to the notified polymer is not expected. Although there is potential for inhalation exposure where manual spray coating occurs, this is considered to be negligible due to the use of engineering controls (ventilated downdraft spray area) and respiratory PPE (vapour masks).

9.2.2. Public health – exposure assessment

Public exposure to the notified polymer is expected to be negligible as the notified polymer will not be directly available to the public. Although the public will come into contact with the exterior of car bodies coated with notified polymer, the notified polymer will be bound within an inert matrix and hence unavailable for exposure.

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 one type of high concern reactive functional group. The health concern for this type of functionality 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, 2005). The notified polymer contains only a minority of species with a molecular weight < 1000, reducing the likelihood of health effects attributed to this functional group.

9.2.4. Occupational health and safety – risk characterisation

The major route of exposure to workers involved in polymer and coating formulation and coating application is expected to be dermal. Dermal exposure may occur during transfer of the notified polymer and formulated coating product, cleaning of the tanks and general maintenance. Dermal exposure is limited by the use of engineering controls and PPE. In addition, for dermal exposure, the health effects of the notified polymer are expected to be confined to species with a molecular weight < 500, which are only present at low concentrations. Therefore, the risk to workers is expected to be low under the stated conditions of use.

The polymer contains starting chemicals that are not listed on the Australian Inventory of Chemical Substances (AICS). This assessment report does not cover the risk from the handling of these or the other polymer constituents during polymer manufacture. If the notified polymer is manufactured in the future, any polymer constituents not listed on AICS will need to be notified to NICNAS.

Significant inhalation exposure to the notified polymer during spray application of the coating is not expected due to the use of engineering controls (ventilated downdraft spray area) and respiratory PPE (vapour masks). With these controls in place, the risk to workers involved in spray application is expected to be low.

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.

10.2. Environmental risk assessment

The polymer 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 of RC3699 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 RC3699 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

- If future manufacture of the notified polymer occurs in Australia, any polymer constituents not listed on the Australian Inventory of Chemical Substances will need to be notified to NICNAS.

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 generation of aerosols during handling and formulation
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer as introduced and in formulated coating products:
 - Impermeable gloves;
 - Overalls;
 - Chemical goggles/face shields for industrial spray painters;
 - Vapour respirators if required.

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

- A copy of the MSDS should be easily accessible to employees.

- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Environment

- The following control measures should be implemented by coating formulator to minimise environmental exposure during use of the notified polymer:
 - All process equipment and storage areas should be banded with process drains going to an on-site effluent treatment plant or collection tank.

Disposal

- The notified polymer should be disposed of to landfill or by incineration, where available.

Emergency procedures

- Spills of the notified polymer should be handled by containment and collection by absorbent material, then storage of absorbent material in sealable labelled container ready for disposal to landfill.

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

Boethling, S.B. and Nabholz, J.V. (1997). Environmental assessment of polymers under the US Toxic Substances Control Act. In: Hamilton, J.D. and Sutcliffe, R. (eds.), *Ecological Assessment of Polymers*, p 211. Van Nostrand Reinhold, USA.

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 (2004) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(2004)]. 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, 2nd edn [NOHSC:2011(2003)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

US EPA (2005) Chemical Categories Report. US Environmental Protection Agency, Washington < <http://www.epa.gov/oppt/newchems/chemcat.htm> >, Accessed September 2005.