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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in RW3656

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Polymer in RW3656

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 recipients

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

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
The notified polymer is introduced in a polymer solution named RW3656

CAS NUMBER
None allocated

METHODS OF DETECTION AND DETERMINATION

ANALYTICAL METHOD	Infrared (FTIR) Spectroscopy
Remarks	Comparison of FTIR trace to the standard provided will enable identification of the notified polymer. The molecular weight distribution was determined by Gel Permeation Chromatography

(GPC)

3. COMPOSITION

DEGREE OF PURITY
> 99%

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 if of a fire. Combustion products of pyrolysis (oxygen limited) are likely to include miscellaneous hydrocarbons, carbon monoxide, carbon dioxide, nitrogen oxide and water.

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. In addition, the level of residual monomers of the notified polymer is very low.

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 polymer will be manufactured as part of a polymer solution containing 10-30**%** notified polymer.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	100-1000	100-1000	100-1000	< 5000	< 5000

USE
Component of OEM automotive coating

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, transport and storage

PORT OF ENTRY
Not applicable, notified polymer manufactured in Australia.

IDENTITY OF MANUFACTURER/RECIPIENTS
Manufacture of the notified polymer and formulation of the automotive coating will be carried out at Akzo Nobel Pty Ltd, Sunshine, Victoria. Application of the coating will occur at car manufacturing sites in Victoria and South Australia.

TRANSPORTATION AND PACKAGING
The formulated coating product containing 10-30**%** notified polymer will be transported in bulk by road tanker. The size of the load will be from 20 – 25 kL but smaller volumes may occasionally be transported.

5.2. Operation description

Notified polymer manufacture

The polymer solution containing 10-30% 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 bulk tanks. The drums are stored until the polymer solution is required for reprocessing.

Coating Formulation

During formulation, the polymer solution (containing 10-30% 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 bulk tanks 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 vacuum pump into the application tank and mixed with other ingredients. A sample may be removed for quality control purposes. The coating containing < 10% notified polymer is then automatically applied to car bodies in a process isolated from workers. The coating will be cured on the car bodies by baking.

5.3. Occupational exposure

Number and Category of Workers

Category of Worker	*Number*	*Exposure Duration*	*Exposure Frequency*
Transport and warehousing	12	4 hours/day	20-50 days/year
Manufacture	32	2-8 hours/day	80-100 days/year
Formulation	150	2-8 hours/day	30 days/year
End use	60	2-8 hours/day	200 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.

During manufacture and formulation, raw materials (including the polymer solution) are automatically added to the mixing vats. Mixing is an enclosed process and fixed lines are used to transport substances. 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. Inhalation exposure is unlikely as the notified polymer has low vapour pressure, is present in aqueous solution, and aerosols are unlikely to be generated.

During preparation and application of the final coating, there is the potential for dermal, oral and ocular exposure from spills and splashes. Exposure will be limited during application and cleaning using exhaust ventilation and impermeable gloves, eye protection and coats.

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

Polymer Manufacture

Manufacturing occurs at one site in Victoria. Release of the notified polymer to the environment during manufacturing is expected to be minimal owing to the automated nature of the manufacturing processes. Spills occurring during manufacturing will be contained in a bunded area and collected for disposal. Waste water streams derived from the manufacturing process are passed through an interceptor pit and are contained in the pit for treatment prior to discharge to the sewer as trade waste.
Based on release estimations provided in the European Technical Guidance Document (EC, 2003),

with a manufacturing volume of 5000 tonnes per annum 15 tonnes per annum would be released to water (0.3%) and 500 kg p.a. to soil. Assuming manufacture occurs on 300 days per year (when the maximum expected volume is being produced), release to sewer would be in the order of 50 kg per day.

However, details provided in the submission indicate actual release to sewer will be non-existent. While the notified polymer is solubilised due to acidified functional groups, at high pH, this is reversed. Prior to release from the interceptor pit, a caustic agent is added to the waste water which flocculates the chemical. The flocculated solids are removed and taken to an appropriate land fill. Releases to air are expected to be negligible.

Coating Formulation

At the coating manufacturing site, the annual release of the notified polymer will be via the following points:

Spills	- less than 1%, up to 50 tonnes
Import container residue	- less than 3%, up to 150 tonnes to waste contractor
Equipment cleaning	- up to 1%, up to 50 tonnes to onsite treatment plant.

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. The process equipment, including blending tanks and mixers, with all generated washing effluent going 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:

Container residue	- less than 0.1%, up to 5 tonnes
Spills, application losses and Equipment cleaning	- up to 15%, up to 750 tonnes

All spills will be contained, collected with inert absorbent material (eg sand) and placed in a sealable container ready for disposal. The application process is fully contained and automated. All application losses will be contained, collected and treated ready for disposal. Application equipment will generally be cleaned with solvent. This effluent will be collected and treated 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 (containing approximately 1020 tonnes of notified polymer) produced during polymer and coating manufacturing and use will be disposed of via landfilling or possibly by incineration at installations with scrubbers and atmospheric emission treatments. Incineration of the notified polymer will produce water and oxides of carbon and nitrogen.

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.

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 Milky coloured liquid (Product RW3656)

Melting Point/Freezing Point Not determined

Remarks Polymer is not isolated from solution.

Boiling Point Not determined

Remarks Polymer is not isolated from solution.

Density Not determined

Remarks Density of polymer solution is 1050 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

Water Solubility Not determined.

Remarks The notified polymer contains some hydrophilic groups, however the majority are hydrophobic, thus indicating that the notified polymer is likely to have a low water solubility.

Hydrolysis as a Function of pH Not determined.

Remarks Due to the functional groups present the notified polymer may undergo some hydrolysis in the environmental pH range 4-9.

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

Remarks The expected lack of water solubility of the notified polymer would indicate a high partition coefficient. Hence, the notified polymer is likely to partition out of the water compartment and bind strongly to soils and sediments.

Adsorption/Desorption Not determined.

Remarks Due to the functional groups present and its insolubility in water the notified polymer will adsorb to soil and sediment.

Dissociation Constant Not determined.

Remarks The notified polymer contains functional groups that will remain cationic throughout the environmental pH range (4-9).

Particle Size Not relevant.

Remarks Polymer not isolated from solution.

Flash Point Not determined.

Remarks Polymer not isolated from aqueous solution.

Flammability Limits	Not expected to be flammable.
Remarks	Polymer not isolated from aqueous solution.
Autoignition Temperature	Not determined.
Remarks	Polymer not isolated from aqueous solution.
Explosive Properties	Not predicted to be explosive.
Remarks	Polymer not isolated from aqueous solution. From examination of the structure, there are no chemical groups that would infer explosive properties, therefore the result has been predicted negative.
Reactivity	No decomposition occurs below 180°C. Incompatible with strong acids, alkalis and oxidising agents.

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

When the polymer is incorporated into the coating product and used to coat motor vehicles, negligible environmental exposure of the notified polymer is expected. The polymer will be cured to form a hard, inert surface coating. Subsequent layers of surface coating will also cover this coating. At the end of their useful life, the coated metal panels are likely to be either recycled for steel reclamation or placed into landfill.

Section 5.4 details likely releases of the chemical during manufacture and end use of the notified polymer. Waste associated with water generated at both the production and application sites is passed through interceptor pits and contained for treatment prior to discharge to the sewer as trade waste.

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 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, oxides of carbon and nitrogen.

9.1.2. Environment – effects assessment

No ecotoxicity data were provided.

The notified polymer is polycationic. Polycationic polymers that are soluble are known to display toxicity to aquatic organisms (Boethling and Nabholz 1997). However, the expected low water solubility and minimal exposure to the aquatic compartment resulting from the proposed use pattern indicate that the overall environmental hazard should be low.

Following application and curing, the notified polymer will be within an inert matrix and be unavailable to organisms. Due to its large molecular weight, 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 the environmental pH range 4-9, however it is expected to occur at a very slow rate. The notified polymer is not expected to be readily biodegradable. Due to its expected water insolubility, it is expected that the notified polymer will partition to soil and sediments where it will be immobile. Over time the polymer will slowly degrade 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 due to the low aquatic exposure. 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 could occur, exposure is expected to be low due to the concentration of the

notified polymer (<30%) and the use of PPE.

Coating Application

Although exposure to the notified polymer could occur during preparation of the final coating and cleaning of equipment, this is expected to be low due to the concentration of the notified polymer (<30%) and the use of PPE. The coating is automatically applied to car bodies in a process isolated from workers and as such negligible exposure to the notified polymer is expected.

Once the coating surface has dried, the notified polymer is bound within an inert matrix and as such exposure is expected to be negligible.

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 and 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 polymer has a high molecular weight and is therefore unlikely to be absorbed across biological membranes, however, as the notified polymer is polycationic it may have irritant properties.

9.2.4. Occupational health and safety – risk characterisation

Due to the largely automated nature of the polymer manufacture, coating formulation and coating application processes, minimal exposure to the notified polymer is expected and hence the risk to workers is expected to be low. Where contact with the notified polymer could occur, the use of PPE (impermeable gloves, eye protection and coats) and the concentration of the notified polymer (<30%) would limit exposure and thus the risk of adverse irritant effects.

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).

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 RW3656 containing the notified polymer 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 RW3656 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

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 and in formulated coating products:
  - 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 and in formulated coating products:
  - Impermeable gloves;
  - Overalls;
  - Chemical goggles/face shields

  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.

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 bunded 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

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