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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Polymer in RE3200

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act* 1989 (the Act) and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the National Occupational Health and Safety Commission which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment and the assessment of public health is conducted by the Department of Health and Ageing.

For the purposes of subsection 78(1) of the Act, copies of this full public report may be inspected by the public at the Library, National Occupational Health and Safety Commission, Plaza level, Alan Woods Building, 25 Constitution Avenue, Canberra ACT 2600 between 9 AM and 5 PM Monday to Friday.

Copies of this full public report may also be requested, free of charge, by contacting the Administration Coordinator on the fax number below.

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Director
Chemicals Notification and Assessment

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1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
BASF Akzo Nobel Automotive OEC Coatings Pty Ltd

NOTIFICATION CATEGORY
Limited: Chemical other than polymer

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication:

Chemical Name
Molecular and Structural formulae
Molecular Weight
Spectral Data
Purity
Hazardous/non-hazardous impurities
Additives/adjuvants
Import/manufacture volume
Manufacturing process and site
Composition of Polymer
Degradation products

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)
Polymer in RE3200

METHODS OF DETECTION AND DETERMINATION

ANALYTICAL METHOD	Infra red.
Remarks	A copy of the infra red spectra was provided by the notifier.
TEST FACILITY	

3. COMPOSITION

Details of the polymer composition have been exempted from publication in the Full Public Report.

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The polymer will be manufactured and reformulated at one site.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	**<20**	**<20**	**<20**	**<20**	**<20**

USE

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The notified polymer is a component in an automotive pigment paste. The pigment paste will be supplied to a car manufacturer as part of a primer for application onto car bodies and parts.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, Transport and Storage

PORT OF ENTRY
Not applicable – manufactured in Australia

IDENTITY OF MANUFACTURER/RECIPIENTS

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The notified polymer will be manufactured and reformulated at one site, Akzo Nobel, Sunshine, Victoria, and will be applied as a surface coating to cars at one site in Victoria

TRANSPORTATION AND PACKAGEING
The blended polymer is transported in 200 kg drums by road from the manufacturing site to the customer site.

5.2. Operation Description

During manufacturing, the raw materials are charged into closed vessels for reaction. All processing takes place in the manufacturing facilities in enclosed and controlled environments. After manufacture, the polymer is blended with additional components to form a primer, which is placed into sealed 200 L drums for storage and transport to the customer. At customer facilities, the primer is pumped into an application tank via a vacuum pump, mixed with finished emulsion and water. The primer is applied to cars and car parts by a dipping process, then cured by oven baking.

5.3. Release

RELEASE OF CHEMICAL AT SITE
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. Treatment involves adding a caustic agent to waste water, which flocculates the notified polymer into solid waste suitable for disposal. The notifier estimates that up to 80 kg of polymer waste may be generated for disposal each year during the formulation process. Under normal circumstances there will be no rejected product, however, in a rare event up to 2000 kg of rejected product may be present for disposal. This product is normally incinerated.

RELEASE OF CHEMICAL FROM USE
At the customer site, the application process is fully contained. Cars are coated in a dip tank, and excess paint is washed from the car after exiting the tank. These washings cascade back into the application tank which is cleaned every year. Cleaning involves transferring the contents of the tank to storage, and then washing up to 1000 litres of bath paint to the trade waste pit. Spills and leaks occurring during normal operations are also washed into the trade waste pit. The notifier

estimate that up to 130 kg per year of notified polymer may end up in the trade waste pit as a result of tank cleaning and operational spills and leaks. The waste is processed by flocculation and settling of the polymer. The polymer is not volatile and hence no release to the atmosphere is expected. Up to 100 kg of polymer may remain as residues in drums.

No release of the polymer into the environment is expected once the primer is used to coat motor vehicles. The notified polymer will be incorporated into the primer matrix, which upon curing, will become inert.

5.4. Disposal

Solid wastes generated during manufacturing and formulation of the polymer product are removed from the interceptor pit and taken to an appropriate landfill site for disposal. The remaining waste water is released to the sewer in accordance with the statutory license requirements for the site.

Waste generated at customer sites during paint application will be disposed of by a licensed waste management company. It is expected that the company will separate the solids and liquids for disposal into landfill and by incineration respectively. Drum residues are also disposed of through a waste disposal contractor, who normally incinerates any residues.

6. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20°C AND 101.3 kPa	The polymer solution RE3200 is a clear, yellow, viscous liquid
MELTING POINT/FREEZING POINT	melting point is not determinable

Remarks The polymer does not have a defined melting point. It is an amorphous solid at room temperature.

BOILING POINT	The polymer decomposes before boiling
DENSITY	1050 kg/m^3 (polymer solution RE3200)
VAPOUR PRESSURE	

Remarks Not determined. The polymer is a solid and is not volatile.

WATER SOLUBILITY	<200g/L at 20°C (estimate for polymer in solution) 84 mg/L at 21°C for the dried polymer

Remarks The dry polymer is soluble in water, but solubility of the polymer solution is enhanced in water by the presence of co-solvents. The notified polymer is solubilised due to cationic sulphur groups

TEST FACILITY Akzo Nobel Sunshine Analytical R&D Laboratory (2002)

HYDROLYSIS AS A FUNCTION OF pH

Remarks Not determined. The polymer contains ester and carbamate groups but appears to be stable in water.

PARTITION COEFFICIENT (n-octanol/water)

Remarks Not determined. The partition coefficient is expected to be low given the polymer's high water solubility.

ADSORPTION/DESORPTION

Remarks Not determined. The polymer has the potential to leach to ground water given its high water solubility. However, given its high molecular weight, the mobility is expected to be low.

DISSOCIATION CONSTANT

Remarks Not determined. The polymer is a fully dissociated cationic salt.

PARTICLE SIZE

Remarks Not applicable, as the polymer is an amorphous solid, and is never isolated during its lifecycle.

FLASH POINT	Not applicable as manufactured as part of an aqueous solution.
FLAMMABILITY LIMITS	Not Provided
AUTOIGNITION TEMPERATURE	Not provided
EXPLOSIVE PROPERTIES	None expected.

REACTIVITY

Remarks No decomposition occurs up to 150ºC. Thermal degradation occurs above this but the specific temperature is unknown. Incompatible with strong mineral acids, strong alkalis and strong oxidising agents.

7. TOXICOLOGICAL INVESTIGATIONS

None Provided.

8. ENVIRONMENTAL EFFECTS

8.1. Ecotoxicological investigations

No ecotoxicological data were provided.

8.2. Environmental fate

No environmental fate data were provided.

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

When the polymer is incorporated into the primer product and used to coat motor vehicles, no environmental exposure of the notified polymer is expected. The polymer will be cured to form a hard, inert surface coating. The primer will also be covered by subsequent layers of surface coating. At the end of their useful life, the metal panels coated with the primer are likely to be either recycled for steel reclamation or placed into landfill.

Up to 200 kg of the notified polymer may be generated as waste each year during manufacturing, formulation, or application of the end coating product. Waste 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 is water soluble due to the presence of cationic sulphur groups. Its solubility is enhanced in water by the presence of co-solvents. However, in the interceptor pits, which are treated with caustic agents, the polymer is not expected to remain in the water compartment, but rather is expected to flocculate and form solids. These can be removed for disposal in landfill, where the polymer will occur in a dried out and polymerised form and hence is not expected to be mobile and leach from the soil. While the polymer is not expected to be readily degradable, it will undergo slow degradation through both biotic and abiotic processes.

Some of the notified polymer may be destroyed by incineration. For example, on rare occasions, up to 2000 kg of rejected product may be present for disposal, normally by incineration. Container residues, disposed of through a licensed waste disposal contractor, are also expected to be incinerated. Recycled car panels containing the polymer are likely to be destroyed in blast furnaces thereby incinerating the polymer in the primer. Incineration of the polymer is expected to destroy the polymer, producing water vapour and oxides of carbon, nitrogen and sulphur.

Given its high molecular weight, the polymer is not expected to cross biological membranes and bioaccumulate (Connell, 1990).

9.1.2. Environment – effects assessment

No ecotoxicological data were provided. However, under normal usage, the polymer is not expected to enter the aquatic compartment or pose a threat to aquatic organisms.

9.1.3. Environment – risk characterisation

The notified polymer is not expected to pose a significant hazard to the environment. The usage patterns indicate that the levels of release of the polymer to the environment will be low. Under normal usage there will be no release into the aquatic environment.

9.2. Human health – Exposure Assessment

9.2.1. Occupational Health and Safety

Manufacture of Polymer Solution and Final Paint Pigment

Although the notified polymer and final pigment paste are manufactured in closed vessels, several groups of workers may receive transient dermal and/or ocular exposure to the notified polymer during routine operations. Ten reactor operators working 8 hours/day for 25-35 days/year may be exposed by skin contact to the polymer during quality control sampling of the RE3200 emulsion (containing <50% notified polymer) and pigment paste (containing <10% polymer). Exposure may also occur from inadvertent leaks and during the transfer of the pigment paste to 200 kg drums. Quality control sampling is conducted under exhaust ventilation so inhalation exposure is unlikely. Two maintenance personnel working 1 hour/day for 5 days/year may be exposed via skin and eyes during routine equipment upkeep.

Four on-site storage/transport personnel working 2-4 hours/day for 25-35 days/year may be exposed to the polymer during storage prior to transport. Drum filling will be conducted under exhaust ventilation. Again, exposure to the pigment paste containing <10% polymer is likely to be limited to splashes to skin and eyes as a result of manipulation of transfer lines. Enclosed vessels, transfer lines and local exhaust ventilation will control exposure during the manufacture process, and plant personnel will wear chemical resistant gloves, coveralls and goggles. Organic vapour respirators may be used if required. This personal protective equipment will be worn to minimise exposure to the notified polymer and other components of the paint additive emulsion.

Laboratory Analysis – Emulsion and Pigment Paste

Seven laboratory technicians/chemists working 2-4 hours/day for 10 days/year may be exposed to the notified polymer during sample analysis. Exposure to the notified polymer and other ingredients in the laboratory environment will be controlled through the use of ventilated fume cupboards and personal protective equipment consisting of coveralls/laboratory coats, gloves and safety glasses conforming to recognised standards.

Transport to End-user

Ten transport personnel working 1-2 hours/day for 25-35 days/year will be responsible for transporting the pigment paste to the end-user. The notified polymer is transported for end-use in the form of a pigment paste to be added to automotive primer paint. The pigment paste will be transported in drums. Exposure to the notified polymer during and transport would be considered low and would only be envisaged following accidental puncture of the containers.

End Use (Paint Mixing and Application)

At the car manufacturing facility, the pigment paste will be unloaded by up to 10 tank operators working 1-2 hours/day for 20 days/year. The pigment paste is transferred from 200 kg drums through enclosed transfer lines to a tank where it is mixed with other paint components prior to application to automotive bodies. At this point, the polymer is present at <10%. Skin contact with the notified polymer may occur during transfer and mixing operations. Ten application/curing operators working 1-2 hours/day for 20 days/year may be exposed to the notified polymer during application of the final paint to automotive bodies and parts by dipping. Subsequent curing of the paint by oven baking will occur under exhaust ventilation. Although this is a totally enclosed automated process, dermal and ocular exposure of these workers may occur as a result of accidental splashes. Two maintenance personnel working 1-2 hours/day for 15 days/year who will conduct routine equipment upkeep may be exposed. Tank operators, application/curing operators and maintenance personnel will wear chemical resistant gloves, coveralls, and goggles. Organic vapour respirators may also be used.

After curing, the notified polymer will be locked in a paint matrix and so worker exposure at this stage is not possible.

Laboratory Analysis – Final Paint

Five laboratory technicians/chemists working 1-2 hours/day for 50 days/year may be exposed to the notified polymer (at <10%) during sampling of final paint. Exposure to the polymer and other paint ingredients will be controlled through the use of ventilated fume hoods and personal protective equipment consisting of coveralls/laboratory coats, gloves and safety glasses conforming to recognised standards.

9.2.2. Public health

The notified polymer does not exist in a pure form and is manufactured as part of an aqueous solution. It is not isolated at any point in its life cycle. Members of the public may be exposed to the pigment paste containing the notified polymer following transport accidents en route from the manufacturing to the user facilities. Such accidents are unlikely. The manufacture and application of the paint containing the notified polymer is conducted only in enclosed and controlled environments. These well engineered processes and the regulated disposal of any waste containing the notified polymer mean that public contact with substances in the environment containing the notified polymer is also unlikely. The products containing the notified polymer are not available to the public. In its end use, the notified polymer becomes an integral part of a hard durable coating on motor vehicles and is not accessible to human contact. The potential for public exposure to the notified polymer is assessed as negligible.

9.3. Human health -Hazard Assessment

No toxicological data have been provided for the notified polymer. However, given its high molecular weight, low proportion of reactive functional groups (carboxylic acid and hydroxyl groups) and low concentration of residual monomers, the notified polymer is unlikely to be a hazardous substance in accordance with the NOHSC Approved Criteria for Classifying Hazardous Substances (NOHSC 1999). The systemic toxicity of the notified polymer is likely to be low, given its high molecular weight and consequent low bioavailability.

Two Material Safety Data Sheets (MSDS) are supplied, one for "Grind Vehicle" and one for "E/Coat Grey Paste". The first product is the aqueous formulation of the notified polymer (RE3200) used to make the pigment paste. It is not considered hazardous according to the criteria of NOHSC (1999). The second product, the paint pigment, is considered hazardous. Each of these products containing the notified polymer has hazardous properties (the first mild and the second significant), which are attributable to other ingredients such as organic co-solvents. The MSDS for RE3200 emulsion indicates that the emulsion may be irritating to skin and eyes and may cause kidney and liver damage if swallowed; these effects are based on the effects of organic solvents present in RE3200.

9.4. Human health – Risk Characterisation

9.4.1 OCCUPATIONAL HEALTH AND SAFETY

The notified polymer is manufactured and emulsified in closed vessels. The resulting polymer emulsion is then transferred to a closed blend tank where additional components are added to form the final pigment paste. After sampling for quality analysis, the paint pigment is then stored prior to transport in 200 kg drums.

The notified polymer is never isolated and therefore exposure to the polymer for process, maintenance and laboratory workers would only occur from contact with polymer emulsion (containing <50% notified polymer) or final paint pigment containing <10% notified polymer. For example, exposure may occur when drumming off the emulsion and pigment paste. Contact may result in slight skin and eye irritation. However, given the engineering controls and personal protective equipment worn by these workers, the low probability of exposure and likely low systemic toxicity of the notified polymer, the overall health risk for workers involved in polymer manufacture is low.

The notified polymer is transported in drums for end-use in the form of a paste to be added to automotive primer paint. The potential for exposure to the notified polymer during storage and transport would be considered low and would only be envisaged following accidental puncture of the containers. Therefore the health risk for transport workers would be assessed as low.

The pigment paste containing the notified polymer will be mixed in an electrocoat tank, which will be used to coat automotive bodies and parts by dipping. At this point, exposure to diluted notified polymer would only occur as a result of contact with the final paint. As this process is automated, the possibility of exposure is low and would be envisaged only following accidental spillage during routine operations, maintenance or laboratory analysis. Given the likely low toxicity of the notified polymer, the health risk to workers involved in end use would be assessed as low.

Following curing of the paint, the polymer will be cross-linked with other paint components to form a high molecular weight stable film. In this form, the polymer is unavailable for absorption and thus the health risk to workers from the notified polymer after paint curing would be negligible.

9.4.2 PUBLIC HEALTH

The low likelihood of exposure to the notified polymer and the low toxicity of the notified polymer suggest that the notified polymer will not pose a significant hazard to public health when used in the proposed manner.

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

10.1. Health hazard

Based on the available data the notified polymer is not classified as hazardous under the NOHSC Approved Criteria for Classifying Hazardous Substances.

10.2. Environment

On the basis of the PEC/PNEC ratio:

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. RECOMMENDATIONS

CONTROL MEASURES

Occupational Health and Safety

- Employers should implement the following engineering controls to minimise occupational exposure to the notified polymer in the product RE3200:
  - Good ventilation;

- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer [as introduced, as diluted for use, in the product RE3200]:
  - Protective eyewear, impermeable gloves and chemical resistant industrial clothing and footwear.

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.

Environment
Disposal

- The notified polymer should be disposed of according to methods outlined in the MSDS

Emergency procedures

- Spills/release of the notified polymer should be handled according to methods outlined in the MSDS

. Secondary notification

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

Under subsection 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.

12. MATERIAL SAFETY DATA SHEET

The MSDS for the RE3200 was provided in a format consistent with the *National Code of Practice for the Preparation of Material Safety Data Sheets*.

This MSDS was provided by the applicant as part of the notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of the applicant.

13. BIBLIOGRAPHY

Akzo Nobel (2002) *Analytical Report* Sunshine Analytical R&D Laboratory Unpublished report provided by notifier.

Connell DW (1990). "General characteristics of organic compounds which exhibit bioaccumulation". In Connell DW, (Ed) *Bioaccumulation of Xenobiotic Compounds*. CRC Press, Boca Raton, USA.

National Occupational Health and Safety Commission (1994) *National Code of Practice for the Preparation of Material Safety Data Sheets* [NOHSC:2011(1994)]. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1999) *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008]. Australian Government Publishing Service, Canberra.