

File No LTD/1078

29 April 2004

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

FULL PUBLIC REPORT

Polymer in RX3128

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**Director
Chemicals Notification and Assessment**

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FULL PUBLIC REPORT**Polymer in RX3128****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)
BASF Akzo Nobel Automotive OEM Coatings Pty Ltd
McIntyre Road
SUNSHINE VIC 3020

and

Akzo Nobel Pty Ltd
51 McIntyre Road
SUNSHINE VIC 3020

NOTIFICATION CATEGORY

Limited: Polymer with NAMW ≥ 1000 (greater than 1 tonne per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed and accepted as exempt from publication:

- Chemical identity information
- Molecular weight data
- Purity and impurity information
- Composition of RX3128
- Manufacturing process

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed for a number of physicochemical properties.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

USA (1995)

2. IDENTITY OF CHEMICAL

OTHER NAME(S)
RX3128 Polymer

MARKETING NAME(S)
Not applicable.

METHODS OF DETECTION AND DETERMINATION

ANALYTICAL METHOD

GPC

Remarks

Other appropriate methods for the detection and determination of RX3128 polymer are the following:

- Infra-red spectroscopy
- Ultra-violet spectroscopy
- Nuclear magnetic resonance spectroscopy (NMR)

The exact nature of the assay would depend on the form of the polymer.

TEST FACILITY Not provided

3. COMPOSITION

DEGREE OF PURITY
> 99%

DEGRADATION PRODUCTS
None expected

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

4. INTRODUCTION AND USE INFORMATION

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

The notified polymer will be manufactured by Akzo Nobel at their Victorian plant in a closed reactor vessel. It will not exist other than as an aqueous emulsion. The emulsion is then blended with other ingredients into a final emulsion which is then supplied to the customer in bulk tanker or drums.

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>	10-100	100-1000	100-1000	100-1000	100-1000

USE

RX3128, the emulsion containing the notified polymer (at approximately 20%), will be supplied to a car manufacturer for use in an automotive primer for car bodies and parts. The concentration of notified polymer in the primer is less than 20%.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, Transport and Storage

TRANSPORTATION AND PACKAGING

RX3128 emulsion containing the notified polymer will be stored at Akzo Nobel in bulk. RX3128 will be transported by bulk tanker or drum to the customer's site where it will also be stored in bulk or drums prior to use.

5.2. Operation Description

The notified polymer in RX3128 is manufactured as an intermediate emulsion in a closed reactor and then blended with other additives in a largely automated process to produce the final RX3128 emulsion. Any transfer of emulsion will be carried out in a closed system via dedicated pumps and lines. Samples are taken for batch adjustment and quality control testing. The emulsion is stored on-site in bulk until transport to the paint customer's site. Local exhaust ventilation will be employed in the sampling, testing and bulk filling areas.

At the customer's site, RX3128 is transferred from either bulk storage or drums via sealed lines to the paint mixing vessel to be blended with other components. During the process, primer samples are taken to the laboratory for batch adjustment. The finished primer is then filtered and pumped into the application tank ready for coating of car bodies and parts. Application is by electrolytic deposition followed by curing and baking in an oven. If repairs to vessels or machinery are required, the affected areas are isolated and cleaned before and after maintenance.

5.3. Occupational exposure

Number and Category of Workers

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration</i> hrs/day	<i>Exposure Frequency</i> days/year
Polymer manufacture			
• reactor operators	25	12	80-100
• maintenance personnel	2	1-2	80-100
• QC personnel	5	12	80-100
• storage personnel	2	2-4	100-130
Primer formulation and application			
• electrocoat tank operators	10	2	210
• application/curing operators	10	1-2	20
• maintenance operators	2	1-2	20
• laboratory technicians/chemists	5	2	210
Other			
• external transporters	10	12	30-40

Exposure Details

Polymer Manufacture

Manufacture of the notified polymer takes place within a closed reactor; therefore reactor operators are not expected to come into contact with the notified polymer. The polymer is then blended with other additives to produce the RX3128 emulsion containing the notified polymer at approximately 20%. Reactor operators are also responsible for the collection of QC samples from purpose built taps during which skin contact with the notified polymer may occur. Local exhaust ventilation is employed during sampling and workers wear coveralls, gloves, goggles and respirators when sampling.

QC testing is carried out in a laboratory with local exhaust ventilation and staff normally wear laboratory coats, gloves and eye protection during testing.

Maintenance personnel performing repairs on the reaction vessel, transfer lines and pumps may be exposed dermally to small quantities of the notified polymer. The vessels are emptied before repair and lines and pumps are isolated prior to repair thereby limiting the volume of polymer emulsion to which maintenance staff may be exposed. Maintenance staff wear gloves and safety glasses during repairs.

Once manufactured, the polymer emulsion is stored in bulk prior to transport, and transported to users' sites in bulk. Incidental exposure to the polymer emulsion may occur during connection/disconnection of hoses during transfer of the polymer emulsion and filling of bulk tankers.

Formulation (Paint Manufacture)

At the customers' site, the polymer emulsion is transferred to a paint tank via a sealed pipe. Skin contact may occur during the opening of the drums and connection of the transfer pipes. Incidental skin contact with the polymer emulsion may also occur during batch adjustment and QC sampling and testing. Electrocoat tank operators will wear coveralls, gloves and goggles. QC personnel would be expected to wear laboratory coats, gloves and eye protection during sampling and testing.

Maintenance workers responsible for the repairs and maintenance on transfer lines and pumps may be exposed to the polymer emulsion in the event of repairs being required while a batch is in process.

Application

Once the primer containing the notified polymer is mixed, it is applied to the car bodies and parts by cathodic electrodeposition in an automated process. This is followed by curing of the paint by oven baking under exhaust ventilation. Consequently, incidental skin contact only would be anticipated during these processes. In some instances, internal transportation of drummed paint may be required prior to application, for example, by forklift. In these circumstances, incidental skin contact may occur during transfer.

After curing, paint containing the notified polymer is locked into the paint matrix and is unavailable for exposure.

5.4. Release

RELEASE OF CHEMICAL AT MANUFACTURING SITE

Environmental release of the notified polymer is unlikely during manufacture, storage and transportation to the one customer site, and spillage during a transport accident is the most likely reason for environmental release. However, container volume (205 L or engineered bunk transport containers), container type (steel drums), and established emergency procedures would limit the extent of release during transportation.

During manufacture, environmental controls such as enclosed reactors, automated blending, bunding and safety procedures will limit releases. Wastewaters containing the notified polymer that are generated during manufacture (eg. equipment cleaning, spills, leaks) are treated at an on-site WWTP, with a flocculant (caustic) added to precipitate the polymer with sludge. The treated effluent is released to sewer under Trade Waste Licence. No effluent monitoring data were provided to indicate the effluent concentration of notified polymer; however, the notifier indicates that the polymer will partition to sludge. Discharges to sewer will undergo further treatment within the sewerage system prior to eventual discharge to the aquatic environment, under Environment Protection Licence. The sludge is dried and landfilled. Off-specification batches of polymer emulsion will be collected and incinerated at a licensed incineration facility. Spill cleanup materials and residues will be disposed of to landfill (as solid). Filter residues and recovered polymer solution from accidental spills and leaks at the formulation facility are expected to be <180 kg of notified polymer/annum, with these wastes sent to landfill for disposal.

RELEASE OF CHEMICAL FROM COATING APPLICATION SITE

During coating of components via dipping in a large paint application tank, environmental controls such as contained facilities, automated processes, bunding and safety procedures, will limit releases. After dipping, excess paint is washed from components and collected for reuse. Oven baking results in the polymer being locked within a tightly cross-linked network. Volatile products generated during baking are extracted to an afterburner and incinerated (forming CO₂, NO_x and water). On an annual basis, the contents of the paint application tank are transferred to a storage tank to allow cleaning of the application tank. An estimated 1000 L of washwaters containing an estimated 50 kg of the notifier polymer is transferred to a wastewater collection pit. The washwater is treated by flocculation and settling, with the effluent and sludge collected by waste disposal contractor, for landfill disposal after drying and/or incineration. The expected quantity of waste generated from paint production and use is <2400 kg of notified polymer/annum. 205 L drums containing residues of the notified polymer and paint products will be sent to drum disposers/recyclers. Cleaning of drums will result in washwater containing the notified polymer that will be incinerated. Cleaning of bulk containers (transport) at the application site will result in washwaters containing the notified polymer that will be collected and added to the paint storage tank.

5.5. Disposal

Most wastes generated during manufacture and application processes will be sent to landfill for disposal, although a fraction may, depending on on-site wastewater treatment process effectiveness, be present in effluent discharged to sewer under licence. After the useful life of painted components and vehicles, most of the notified polymer will be recycled through metal recycling with a component sent to landfill. Recycling treatment is likely to heat and destroy the notified polymer. Within a landfill environment, the notified polymer is expected to break down at a very slow rate.

5.6. Public exposure

The notified polymer is not available to the public and will be used in industrial scenarios only. The public is likely, however, to make contact with the cured polymer as paintwork on finished motor vehicles and components.

6. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is never isolated, therefore, the physical and chemical properties below are for the RX3128 emulsion, unless otherwise stated.

Appearance at 20°C and 101.3 kPa	Milky liquid
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Melting Point/Freezing Point	Not Available
Density	1080 kg/m ³
METHOD	Not stated
Vapour Pressure	Vapour pressure of the intermediate emulsion is 0.07 kPa at 20°C based on the major solvent propylene glycol phenyl ether.
Water Solubility	Not tested. The emulsion is designed to be infinitely dispersible in water, but not strictly soluble in water. The polymer constituents are largely hydrolysable, which will result in low water solubility.
Hydrolysis as a Function of pH	Not determined. Not considered by the notifier as hydrolysable at pH 6-7 based on its chemical nature. Despite the presence of potentially hydrolysable groups, this should not occur in the environmental pH range of 4-9.
Partition Coefficient (n-octanol/water)	Not available. Will partition to octanol phase due to its low water solubility.
Adsorption/Desorption	Not available. May adsorb onto soil particles. Due to its molecular weight, its mobility is expected to be low.
Dissociation Constant	Not available. Based on chemical structure, dissociation in water is likely to be negligible as there are no dissociable groups.
Particle Size	Not applicable as the polymer is not isolated.
Flash Point	Not applicable. Polymer is a non-flammable aqueous emulsion.
Flammability Limits	Not available. Polymer is not flammable but it is combustible.
Autoignition Temperature	Not available.
Explosive Properties	Not applicable. The polymer does not exist as a powder, a dust of which could be expected to be combustible (in common with other fine organic dusts).
Reactivity	Known to be stable up to temperatures of 150-175 °C. It will thermally degrade at a temperature above this but the specific temperature is unknown. The notified polymer is incompatible with strong mineral acids, strong alkalis and strong oxidising agents.

7. TOXICOLOGICAL INVESTIGATIONS

No toxicological data were submitted. The MSDS for the site-limited intermediate containing the notified polymer may be irritating to the skin, eyes and respiratory system.

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 proposed use pattern and waste management indicate a low potential for environmental release of the notified polymer, which will not be isolated. The notified polymer will be manufactured and used under environmental controls within a limited number of industrial facilities and will not be available for general consumer use. Waste products containing up to several tonnes of the notified polymer will be collected and sent to various waste management facilities for landfilling and/or incineration where the notified polymer is unlikely to pose an adverse risk to the environment.

9.1.2. Environment – effects assessment

No ecotoxicological data were provided for the polymer. Following application and curing, the notified polymer is likely to be tightly cross-linked within an inert matrix and of very low bioavailability and thus toxicity. Nabholz et al. (1993) indicates that polymers of this type that have $NAMW \geq 1000$ are of low concern.

9.1.3. Environment – risk characterisation

The notified polymer will interact with other components to form a stable chemical matrix and, once dry, is expected to be immobile and pose little risk to the environment. 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

Manufacture of RX3128

As the notified polymer is manufactured in a closed system, worker exposure is likely to be confined to skin contact to drips and spills during the transfer of RX3128 emulsion from the mixer to storage or drums. Skin contact to small amounts of emulsion by laboratory personnel may occur when sampling the emulsion for quality control purposes. Similarly, maintenance workers may experience incidental skin contact during cleaning and repair work. Overall, worker exposure to the notified polymer during manufacturing operations is expected to be low.

Manufacture of primer containing the notified polymer

Incidental worker exposure to the notified polymer may occur when weighing and transferring the RX3128 emulsion to the paint formulation vessel. Worker exposure is not expected during mixing unless the blending vessel is open. Skin contact to small amounts of notified polymer by laboratory personnel may occur when sampling the primer for batch adjustment purposes. Similarly, maintenance workers may experience incidental skin contact during cleaning and repair work. Overall, worker exposure to the notified polymer during primer manufacture is expected to be low.

Application of primer

Incidental worker exposure to the notified polymer may occur when transferring the primer to the application tank. The electrolytic deposition process is largely enclosed, however, incidental skin contact with the notified polymer may occur during the dipping process. Once the primer is

baked onto the car body or part, the notified polymer is bound within the paint matrix and not available for exposure. Overall, worker exposure to the notified polymer during application is expected to be low.

Transport and storage

Incidental exposure may occur during transfer to storage vessels in the event of a spill or leak. However, under routine circumstances, worker exposure to the notified polymer during transport and storage is expected to be minimal.

9.2.2. Public health – exposure assessment

Members of the public are unlikely to come into contact with the notified polymer unless there is an accident during transport or storage. The public will be exposed to painted car body parts, however, at this stage, the notified polymer is bound within the paint matrix and not available for exposure.

9.2.3. Human health - effects assessment

No toxicological data were provided for the notified polymer or the form in which it is manufactured (the aqueous emulsion RX3128). The polymer has a high molecular weight, however, the MSDS for the intermediate emulsion indicates that it may have irritant properties. In addition the polymer contains a substantial amount of low molecular weight species (MW < 1000).

No MSDS is available for the RX3128 polymer, which contains the notified polymer at approximately 20%, as it is never isolated. The MSDS for the paint product containing the notified polymer states that it is not a hazardous substance according to the NOHSC Approved Criteria for Classifying Hazardous Substances (NOHSC, 1999).

The notified polymer has been produced and used in the USA for approximately five years without any adverse health effects being reported.

9.2.4. Occupational health and safety – risk characterisation

The notified polymer is manufactured and emulsified in closed vessels. The resulting polymer emulsion is then transferred to an emulsification tank where water and lactic acid are added to form the final polymer emulsion. After sampling for quality analysis, the principal emulsion is then stored prior to transport in 200 kg drums or bulk.

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 approximately 20% notified polymer. Given the engineering controls and personal protective equipment worn by the manufacturing workers, the low probability of exposure and likely low systemic toxicity of the notified polymer renders the overall health risk for workers involved in polymer manufacture low. However, given the possibility of irritation, precautions should be taken should exposure occur.

The notified polymer is transported in drums for end-use as the 20% aqueous based polymer emulsion. 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 bulk containers. Therefore, the health risk for transport workers would be assessed as low.

At the end-user's site the polymer emulsion is blended with other materials to form a primer that will be used to coat automotive bodies and parts by dipping and cathodic electrodeposition. 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, and the low concentration of the notified polymer in the paint mix, 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 essentially unavailable for absorption and thus the health risk to workers from the notified polymer after paint curing would be negligible.

9.2.5. Public health – risk characterisation

The notified polymer and the emulsion containing it are not freely available to the public. 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 risk to public health when used in the proposed manner.

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

10.1. Hazard classification

Based on the available data the notified polymer is not determined to be hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2002).

The classification of the notified polymer using the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS) (United Nations, 2003) was not possible as no ecotoxicity data were provided. This system is not mandated in Australia and carries no legal status.

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 intended manner.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of the product containing the polymer provided by the notifier were in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). 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 the notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994b). The accuracy of the information on the label remains the responsibility of the applicant.

12. RECOMMENDATIONS

REGULATORY CONTROLS

CONTROL MEASURES

Occupational Health and Safety

- Employers should implement the following engineering controls to minimise occupational exposure to the notified polymer in principal emulsion and the final cathodic electrodeposition primer:
 - Local exhaust ventilation
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer in principal emulsion and the final cathodic electrodeposition primer:
 - 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.

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* (NOHSC,1999b), workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Disposal

- The notified chemical should be disposed of in accordance with State/Territory waste disposal regulations through licensed waste contractors. Off-specification batches of polymer emulsion should be incinerated at a licensed incineration facility. Spill cleanup materials, container residues (solid), dried or baked polymer should be sent to landfill for disposal or incinerated. Aqueous wastes may potentially be sent to dedicated aqueous waste treatment plants (industrial) under licence for treatment and disposal.

Emergency procedures

- Spills/release of the notified chemical should be handled by containing the spilled material and adsorbing the spill using inert adsorbents (eg. sand, earth). Liquid should be prevented from entering watercourse and drains (ie. sewer). Wastes collected during spill/leak clean up should be placed in sealable labelled containers for disposal.

12.1. Secondary notification

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

- 1) Under Section 64(1) of the Act; if
 - If the notified polymer is manufactured in a form where the NAMW is less than 1000;or
- (2) Under Section 64(2) of the Act:
 - if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

No additional secondary notification conditions are stipulated.

13. BIBLIOGRAPHY

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