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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

RW0910 Polymer

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Director
Chemicals Notification and Assessment

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RW0910 Polymer

1. APPLICANT

Akzo Nobel Pty Limited of 51 McIntyre Road, SUNSHINE, VICTORIA, 3020 (ACN 000 119 424) has submitted a limited notification statement in support of their application for an assessment certificate for RW0910 Polymer.

2. IDENTITY OF THE CHEMICAL

The chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data, details of the polymer composition and details of exact import volume and customers have been exempted from publication in the Full Public Report and the Summary Report.

3. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is never isolated as a defined entity so most physicochemical data are for the polymer emulsion.

Appearance at 20°C & 101.3 kPa:	Hazy yellow non-viscous liquid
Melting/Boiling Point:	Not determined.
Density:	1030 kg/m^3 (emulsion).
Vapour Pressure:	Not determined.
Water Solubility:	Not determined. The polymer is claimed to be insoluble but infinitely dispersible in water. The polymer molecules dispersed in water are stabilised by the ionisation of amine groups.
Partition Co-efficient (n-octanol/water):	Not determined due to expected low water solubility. The polymer would be expected to partition into *n*-octanol rather than water and bind readily to basic soils and sediments.
Hydrolysis as a Function of pH:	Not determined. The polymer contains no linkages that could be expected to undergo hydrolysis even under

	extreme pH.
Adsorption/Desorption:	Not determined due to expected low water solubility. The polymer is expected to be more mobile in acid soils but this mobility will rapidly decrease as the polymer emulsion is reported to flocculate when exposed to salt ions (eg. Ca and Mg) present in soils and natural water.
Dissociation Constant:	The pKa is not determined but at pH <7 the emulsion is reported to be stable but flocculates at pH >7.
Particle Size:	Not applicable as polymer is in emulsion form.
Flash Point:	Not applicable as the polymer is in a non-flammable aqueous emulsion.
Flammability Limits:	Not determined. The polymer is combustible but not flammable.
Autoignition Temperature:	Not determined.
Explosive Properties:	Not explosive.
Reactivity/Stability:	The polymer degrades above 150-175°C and is incompatible with strong mineral acids, strong alkalis and strong oxidising agents.

3.1 Comments on Physico-Chemical Properties

No further comments are warranted.

4. PURITY OF THE CHEMICAL

Degree of Purity:	>99%
Hazardous Impurities:	None
Non-hazardous Impurities (> 1% by weight):	None
Maximum Content of Residual Monomers:	All residual monomers are expected to be below their detection limits.

5. USE, VOLUME AND FORMULATION

RW0910 polymer emulsion is manufactured in Australia (<20% notified polymer) and is incorporated into a locally manufactured resin electrocoat emulsion to be used as a

component of automotive primer paints. RW0910 polymer will be present in the electrocoat emulsion at <10% and in automotive paints at <5%.

RW0910 polymer will be manufactured at the rate of <50 tonnes/year for 5 years.

6. OCCUPATIONAL EXPOSURE

Manufacture of Polymer Solution and Final Paint Additive

RW0910 polymer is manufactured locally in a closed reactor and emulsification tank as an aqueous emulsion. The emulsion containing RW0910 polymer is then decanted and stored in steel drums before being transferred via enclosed lines to a closed blend tank where additional components are added to form the final paint additive electrocoat emulsion. The emulsion is then stored prior to transport in bulk containers.

Although RW0910 polymer and final paint additive emulsion are manufactured in closed vessels, several groups of workers may receive transient dermal and/or ocular exposure to the notified polymer during routine operations. Twenty-five reactor operators working 12 hours/day for 40-50 days/year may be exposed by skin contact to the polymer during quality analysis sampling of RW0910 polymer emulsion (containing <20% polymer) and electrocoat emulsion (containing <10% polymer). Exposure may also occur from inadvertent leaks and during transfer of RW0910 polymer emulsion to and from steel drums or electrocoat emulsion to bulk storage tanks. Decanting and quality sampling are conducted under exhaust ventilation and so inhalation exposure is unlikely. One to 2 maintenance personnel working up to 2 hours/day for 40-50 days/year may be exposed also via the skin and eyes during routine equipment upkeep.

Up to 4 on-site storage/transport personnel working 2-4 hours/day for 50-65 days/year may be exposed to the polymer during storage prior to bulk transport. Ten transport personnel working 1-2 hours/day for 40-50 days/year will be responsible for transport of the bulk emulsion in 20-25 kL lots to the end-user. Bulk filling will be conducted under exhaust ventilation. Again, exposure to the final electrocoat emulsion containing <10% polymer is likely to be limited to splashes to skin and eyes as a result of manipulation of transfer lines.

In addition to the use of enclosed vessels and transfer lines and local exhaust ventilation to control exposure during the manufacture process, plant personnel will also wear chemical resistant gloves, coveralls and goggles. Organic vapour respirators may also be used if required. This personal protective equipment will be required to control exposure not only to the notified polymer but also to other components such a 2-butoxyethanol in the paint additive emulsion.

Laboratory Analysis – Emulsion

Five laboratory technicians/chemists working 12 hours/day for 40-50 days/year may be also exposed to the notified polymer during sample analysis. Exposure to the notified polymer and other emulsion 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.

Storage and Transport

The notified polymer is transported for end-use in the form of an emulsion to be added to automotive primer paint. The emulsion will be transported in bulk tanker. 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.

End Use (Paint Mixing and Application)

At end-user site, the electrocoat emulsion will be transferred by up to 10 tank operators working 1-2 hours/day for 20 days/year from bulk transport containers through enclosed transfer lines to an electrocoat tank where the emulsion 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 an 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 similarly. Details of personal protective equipment to be worn by these workers involved in end-use have not been provided.

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 <5%) 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.

7. PUBLIC EXPOSURE

The electrocoat emulsion containing <10% notified polymer will not be sold to the public and the application will be restricted to car manufacturers. The public will be exposed to the notified polymer only in the event of spills or leaks during transportation of the electrocoat emulsion or as part of a cured paint. The notified polymer cross-links to form a hard film during curing and this film is usually coated with at least one more layer of paint. Therefore, the potential for public exposure is low.

8. ENVIRONMENTAL EXPOSURE

8.1 Release

The notifier anticipates that up to 130 kg of the RW0910 emulsion containing the notified polymer at < 20% (<30 kg/annum of the polymer) will be released annually as a result of

manufacturing activities. Of this up to 30 kg is expected from spills and leaks, up to 25 kg from filter residues, up to 25 kg as residues remaining in the drums after 'emptying', while the remaining 50 kg will result from cleaning of the manufacturing equipment. Spillage and leaks of material will be contained within bunded areas at the site of manufacture. It is expected that all polymer waste will be disposed of into landfill or, in the unexpected case of any rejected product batches (up to 2000 kg/batch), incinerated. The notifier indicates that disposal of such residues will be in accordance with State legislation.

The paint is applied to automotive surfaces by a highly efficient dipping process. The car bodies and parts are coated in a dip tank and excess paint is washed from the car and allowed to run back into the tank with little waste produced. Cleaning of the tank will occur once/annum, resulting in a release of up to 1000 L of primer or <10 kg of the polymer. This waste will be washed into the "trade waste pit" on site where it will flocculate and settle before being disposed of by licensed trade waste disposal, most likely to landfill. Spills are estimated to be up to 2 kg/annum and will be disposed in the same way.

8.2 Fate

The waste polymer produced during manufacture and application should be disposed of into landfill where it may be mobile under some soil conditions (acidic) until it combines with the salt ions present in the natural sediments and waters and flocculates to form an extremely large combined molecule that will bind to the soil. If sent to landfill in basic soils, it will remain bound to the soils until it is slowly degraded through biological and abiotic processes.

Any polymer emulsion accidentally released to water would remain mobile until it flocculates and settles due to the salts present in the natural waters. It will then become associated with the sediments present on the beds of the waterways and be slowly broken down by natural processes. Similarly, it is likely that any particles of cured material released would be immobile due to its very high molecular weight and inert characteristics.

Any polymer waste such as rejected batches of product that is disposed of by incineration will be destroyed producing water, carbon dioxide and nitrogen oxides.

Once applied to the metal panels of motor vehicles, the notified polymer will be incorporated in a hard, durable, inert film and will not present a significant hazard. Any fragments, chips and flakes of the lacquer will be of little concern as they are expected to be inert. The metal panels coated with the polymer are likely to be either recycled for steel reclamation or placed into landfill at the end of their useful life. When metal panels are recycled the polymer would be incinerated in the blast furnaces and converted to water vapour and oxides of carbon and nitrogen.

The notified polymer is not expected to cross biological membranes, due to the expected low solubility and high molecular weight, and should not bioaccumulate (Connell, 1990).

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicological data were provided for the notified polymer. However, the high molecular weight of the polymer indicates that it would be unlikely to cross biological membranes readily. Therefore, the toxicity of the polymer is anticipated to be low.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicology data were provided.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The polymer cross-links with other paint components to form a stable, very high molecular weight film that adheres firmly to the car body to which it is applied. The polymer, as part of this surface coating will, therefore, share the fate of the vehicle panel. The paint will slowly deteriorate under the action of UV light, but deterioration is negligible over the life of the motor vehicle. When the vehicle panel is recycled, the polymer would be destroyed through incineration.

The notifier estimates that a total of <30 kg/annum of the notified polymer will be released to the environment due to the manufacturing process and <10 kg/annum from the application process. The primer will contain the notified polymer as part of a crosslinked polymer matrix. The notified polymer will share the final fate of the vehicle, that is either to landfill or metal recycling where the polymer will be incinerated to water vapour and oxides of carbon.

In the event of an accidental spillage of the polymer dispersion into the waterways, the polymer will remain suspended in the water fraction until such time as the salts present in the water cause the polymer to flocculate into a very large combined form which gradually becomes insoluble and drops out of solution due to its high molecular weight. The polymer will eventually become associated with the sediments in the rivers and creek beds or ocean floor.

Polymer spilt on land during usage or transport is expected to immobilise in the soil layer. Contaminated soil can then be collected and disposed to landfill.

Given the above, environmental exposure and the overall environmental hazard is expected to be low.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

Hazard 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 (National Occupational Health and Safety Commission, 1999b). However, the systemic toxicity of the notified polymer is likely to be low, given its high molecular weight and consequent low bioavailability. The Material Safety Data Sheet (MSDS) for RW0910 emulsion indicates that the emulsion may be irritating to skin, eyes and respiratory tract. The MSDS also warns of central nervous system effects from exposure to

solvents.

Occupational Health and Safety

RW0910 polymer is manufactured and emulsified in closed vessels and then the emulsion is decanted and stored in steel drums. The polymer emulsion is then transferred to a closed blend tank where additional components are added to form the final paint additive emulsion. After sampling for quality analysis, the emulsion is then stored prior to transport in bulk containers.

The notified polymer is never isolated and therefore exposure to the polymer for process, maintenance and laboratory workers would only occur from contact with diluted polymer emulsion or final paint additive containing <10% notified polymer. Contact may result in skin and eye irritation. In addition, the MSDS for RW0910 polymer emulsion warns of neurological effects from long term contact with solvents such as 2-butoxyethanol also present (below the cutoff for hazardous classification). 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 renders the overall health risk for workers involved in polymer manufacture low.

The notified polymer is transported in bulk containers for end-use in the form of an emulsion 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 bulk containers. Therefore the health risk for transport workers would be assessed as low.

The paint additive containing the notified polymer will be mixed in an electrocoat tank which will be used to coat automotive bodies by dipping. At this point, exposure to diluted notified polymer (<5%) 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 these 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.

Public Health

The public is likely to contact the notified polymer only after it has been applied and become an integral part of a hard paint film covered by additional layers of paint on motor vehicles. The notified polymer should not pose a significant risk to public health when used in the proposed manner.

13. RECOMMENDATIONS

To minimise occupational exposure to RW0910 Polymer, the following guidelines and precautions should be observed:

- Protective eyewear, chemical resistant industrial clothing and footwear and impermeable gloves should be used during occupational use of the products containing the notified polymer. Where engineering controls and work practices do not reduce vapour and particulate exposure to safe levels, an organic vapour respirator should also be used;

- Spillage of the notified chemical should be avoided. Spillages should be cleaned up promptly with absorbents which should then be put into containers for disposal;

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

If products containing the notified chemical are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (National Occupational Health and Safety Commission (1999b), workplace practices and control procedures consistent with State and territory hazardous substances regulations must be in operation.

Guidance in selection of protective eyewear may be obtained from Australian Standard (AS) 1336 (Standards Australia, 1994) and Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992); for industrial clothing, guidance may be found in AS 3765.2 (Standards Australia, 1990); for impermeable gloves or mittens, in AS 2161.2 (Standards Australia/ Standards New Zealand, 1998); for occupational footwear, in AS/NZS 2210 (Standards Australia/ Standards New Zealand, 1994a); for respirators, in AS/NZS 1715 (Standards Australia/ Standards New Zealand, 1994b) and AS/NZS 1716 (Standards Australia/ Standards New Zealand, 1994c); or other internationally acceptable standards.

14. MATERIAL SAFETY DATA SHEET

The MSDS for the polymer emulsions were provided in a format consistent with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (National Occupational Health and Safety Commission, 1994a).

The MSDS were 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.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act, secondary notification of the notified chemical may be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

16. REFERENCES

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Standards Australia/Standards New Zealand (1994a) Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994b) Australian/New Zealand Standard 1715-1994, Use and Maintenance of Respiratory Protective Devices. Standards Association of Australia/Standards Association of New Zealand.

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