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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Polymer in Rheolate 300/310

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Polymer in Rheolate 300/310

1. APPLICANT

BASF Australia Ltd of 500 Princes Highway NOBLE PARK VIC 3174 and International Sales and Marketing Pty Ltd of 55 Halstead St, SOUTH HURSTVILLE NSW 2221 have submitted a Polymer of Low Concern notification statement in support of their application for an assessment certificate for Polymer in Rheolate 300/310.

2. IDENTITY OF THE CHEMICAL

The chemical name, CAS number, molecular and structural formulae, molecular weight, details of the polymer composition, and details of customers and end uses have been exempted from publication in the Full Public Report.

Marketing Name:	Rheolate 300, Rheolate 310
Method of Detection and Determination:	infrared (IR) spectroscopy
Spectral Data:	2870, 1470, 1375, 1360, 1350, 1325, 1280, 1250, 1125, 1040, 995, 950, 880, 845 cm^{-1}

Characterisation as a Synthetic Polymer of Low Concern

Number-Average Molecular Weight (NAMW):	> 1000
Maximum Percentage of Low Molecular Weight Species	
Molecular Weight < 500:	< 1
Molecular Weight < 1 000:	< 1
Polymer Stability	stable under normal environmental conditions
Reactivity	not reactive
Charge Density	not charged

The polymer meets the criteria for assessment as a synthetic polymer of low concern under Regulation 4A of the *Industrial Chemicals (Notification and Assessment) Act 1989*.

3. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is imported in a solution containing 32 % polymer (Rheolate 300 and Rheolate 310) in water with other additives to enhance solubility. The physical and chemical properties given below are variously those of the solution or the notified polymer itself, as stated.

Appearance at 20°C and 101.3 kPa:	opaque solid or paste; imported as a hazy or cloudy liquid
Boiling Point:	100 - 103°C for the solution
Specific Gravity:	1.046 – 1.06 for the solution
Water Solubility:	500 g/L
Particle Size:	not applicable as the polymer will only be used in solution form
Dissociation Constant:	no groups likely to dissociate are present
Autoignition Temperature:	product is not self-igniting
Explosive Properties:	not expected to be explosive
Reactivity/Stability:	stable below 48°C

Comments on Physico-Chemical Properties

No test reports were provided for any of the above physico-chemical properties.

The water solubility test report was not provided, however, based on the polyether structure of the notified chemical, high water solubility is expected.

There are no groups present which are generally considered to hydrolyse. The notifier has stated that, in general, polyether products are stable even at elevated temperatures (48°C) and do not thermally decompose until temperatures exceed 200°C. It is noted that all polyether products undergo oxidative degradation to form organic byproducts such as aldehydes and acids. This process is slow at room temperature but the rate increases with increasing temperature. The notifier has stated that, in general, at 48°C, approximately 100 ppm of aldehyde and organic acids may form. No indication of the rate of formation was provided.

The polymer is non-ionic and does not contain positively or negatively charged groups.

4. PURITY OF THE CHEMICAL

Degree of Purity:	99 %
Hazardous Impurities:	the notified polymer contains hazardous residual monomers at concentrations below the cut-off levels for classification of the polymer as a hazardous substance; the identity of the residual monomers has been claimed as exempt from publication in the Full Public Report
Non-hazardous Impurities (> 1% by weight):	none
Maximum Content of Residual Monomers:	< 1 %, see above

Additives/Adjuvants:

Chemical name:	2-(2-butoxyethoxy)ethanol
Synonym:	diethylene glycol monobutyl ether
CAS No.:	112-34-5
Weight percentage:	12.5 % in Rheolate 300
Hazardous Properties:	R36 Irritating to eyes (NOHSC, 1999a)
Chemical name:	butanedioic acid, sulfo-, 1,4-bis(2-ethylhexyl) ester, sodium salt
Synonym:	docusate sodium
CAS No.:	577-11-7
Weight percentage:	6.5 % in Rheolate 310
Hazardous Properties:	R22 Harmful if swallowed R36 Irritating to eyes (according to MSDS for Rheolate 310)

5. USE, VOLUME AND FORMULATION

The notified polymer will be used as a component of water based architectural paints.

The notified polymer will be imported in the form of Rheolate 300 or 310, each containing 32 % notified polymer, in 204 kg plastic drums. The Rheolate products will be reformulated at a number of paint manufacturing sites to produce the finished paints. The finished paints would generally contain less than 0.5 % notified polymer. The finished paints will be packaged into 500 mL, 1 L and 4 L cans and marketed to tradesmen and to members of the general public.

The anticipated import volume is 2500 kg per annum over the first five years of importation.

6. OCCUPATIONAL EXPOSURE

Transport and Storage
The notified polymer will be imported as part of the products Rheolate 300 and Rheolate 310. The products are liquid, and packed in 204 kg plastic drums. No exposure is expected during transport and storage, except in the case of an accident involving damage to the packaging.

Paint Manufacture
The notifier indicates that the notified polymer is expected to be handled by 30 factory workers and 2 paint chemists.

The products may be used at a large number of sites for reformulation into architectural paints. Reformulation will involve transfer of the liquid, containing 32 % notified polymer, into mixing pots, where it will be blended with water, polymer emulsions and other additives to produce paints. Transfer is likely to be by decanting, although drum pumps may also be used. Dermal exposure to drips and spills of the products is possible during the transfer.

The formulated product (< 0.5 % notified polymer) is filled into 500 mL, 1 L or 4 L steel cans. Dermal exposure to the < 0.5 % solution of notified polymer is possible during filling.

Warehouse workers will handle the drums of polymer solution and also the filled cans of finished paint, but no exposure is expected unless the packaging is ruptured.

Paint chemists would be expected to sample the raw materials and paints for quality control purposes, and may be dermally exposed to the paint during sampling and testing.

The notifier states that extraction systems are generally present at each work station. Workers in the paint reformulation sites generally wear overalls, safety glasses, gloves and safety boots.

Paint Sales and Application
The paints containing the notified polymer will be available to both professional painting contractors and do-it-yourself home painters. Paint application will generally be done by brush or roller, although spray painting may also occur. Occupational contact with the notified polymer can occur during the tinting of paints at point of sale by the store staff, and during the application of the paints by professional painting contractors. The exposure for these workers will be to the finished paint containing < 0.5 % notified polymer, and would normally be dermal. No details of the types of personal protective equipment used to prevent exposure for these workers was provided by the notifier.

After application of the paint, it will cure and crosslink, and the notified polymer will no longer be separately available for exposure.

Handling and application instructions will be provided on the end use product labels for use by contract and domestic do-it-yourself painters.

7. PUBLIC EXPOSURE

Dermal and possibly eye contact with the notified polymer may occur during application of

the paints containing the polymer by the general public, and dermal contact with surfaces coated with the notified polymer is likely. If contact occurs, exposure would be low, because of the low concentration (< 0.5 %) of notified polymer in the paints, the cured state of the polymer on the coated surface, and the high molecular weight of the notified polymer, which will preclude absorption across the skin or other biological membranes.

8. ENVIRONMENTAL EXPOSURE

Release

Release of the notified polymer is expected to occur at various stages of reformulation and application.

The notifier has not provided an estimate of release during decanting/transfer, mixing, equipment cleaning and repackaging as part of paint manufacturing operations, nor during disposal of containers used for the products containing the notified polymer or end use of the products. However it is reasonable to estimate that approximately 3 % will be released as spills, 1.5 % for equipment cleaning and 0.5 % for quality testing - a total of 5 % (125 kg per annum). The notifier has provided generic waste trapping technology information for one potential reformulation site. This site is designed so that all liquid waste is trapped in a series of trade waste traps. The solid components of the waste are disposed of via a commercial waste contractor and either destroyed by incineration or sent to landfill. Liquid waste components are analysed by the relevant water authority before receiving approval for discharge to the sewer.

On the basis of experience with similar products, it is possible to estimate that approximately 3 % (w/w) of the notified polymer will remain in both the empty import drums and the wholesale/retail cans which will then be disposed of to land fill. Approximately 75 kg of notified polymer will be released annually via this pathway.

It is possible to estimate that residues of the notified polymer remaining in or on paint application equipment or as drips and spills will be approximately 0.5 % of import volume (w/w). This represents approximately 12.5 kg of notified polymer per year. Depending on the solvent used to clean the equipment, it is assumed that much of this will be disposed of to sewer or to soil.

Release may arise through spillage in transport accidents which may release the polymer, in solution or in paints, to terrestrial or aquatic environments. Paint spills are expected to be limited due to the small tin sizes. Risk of release of the polymer solution will be greater than that of paints but still low.

The total release of polymer (assuming an annual import volume of 2.5 tonnes and the above release estimates) is expected to be approximately 212 kg per year.

Fate

Approximately 212 kg of the notified polymer is expected to be released per year as residues in containers and as a result of reformulation and equipment cleaning processes.

Approximately 0.5 % of the waste polymer is expected to be released as a result of cleaning brushes or drips and spills. It is assumed that much of this will be disposed of to sewer or to soil.

The majority of polymer waste (8 % of imports) is expected to be disposed of to landfill or incinerated. Incineration of the notified polymer will liberate water and oxides of carbon.

The majority of polymer waste disposed of to landfill will be as a liquid or solid paint and little is expected to migrate through the soil profile in this form. If released as a polymer solution, it is expected to be mobile in the soil profile due to its high water solubility. If released to water, the polymer solution is expected to readily disperse.

It is difficult to predict the course of degradation of the notified polymer in the environment, particularly in the absence of polymer specific physico-chemical data. It is anticipated that the polymer will slowly degrade via aerobic, anaerobic and abiotic processes. Degradation products are expected to ultimately be carbon dioxide and water. The moderately high molecular weight suggests that bioaccumulation is unlikely to occur (Connell, 1990).

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicology data were submitted.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were submitted.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

It is expected that approximately 212 kg per annum of the notified polymer will eventually be disposed of to landfill across several sites as a result of reformulation and equipment cleaning and as residues in containers. If disposed of as a component of solid or liquid paint, mobility and solubility are expected to be minimal and once in the solid form the notified polymer is considered to be of minimal hazard to the environment.

The main environmental hazard would arise through spillage in transport accidents which may release the polymer solution to the soil or to drains and waterways. The polymer solution is expected to be mobile in the soil profile due to its high water solubility. If the liquid polymer solution is accidentally released into an aquatic system, it is expected to readily disperse. In either a soil or aquatic environment, the polymer is expected to degrade via biotic and abiotic processes to its constituent monomers, although the rate of degradation is not known. The monomers may be toxic but are expected to degrade relatively quickly.

The product Material Safety Data Sheets (MSDS) appear to adequately address accidental release measures.

The polymer in the forms in which it will be used within Australia is likely to present a low

hazard to the environment.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

No toxicological information has been provided for the notified polymer and therefore the substance cannot be assessed against the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b). The overall toxicity of the notified polymer is expected to be low as it is not highly reactive and, having a high molecular weight would not readily cross biological membranes. The MSDS indicates that the solutions containing the notified polymer are skin and eye irritants, but not sensitisers. Polyethers in general have skin and eye irritant properties (Sax & Lewis, 1996).

The solutions contain ingredients (sodium docusate, diethylene glycol monobutyl ether) which are classified as eye irritants. Sodium docusate is also classified as harmful if swallowed. The residual monomer concentrations in the finished polymer are below the cutoff levels for classification as a hazardous substance. The imported products, Rheolate 300 and Rheolate 310, are not determined to be hazardous substances based on the information submitted by the notifier.

Occupational Health and Safety (OHS)
There is little potential for significant occupational exposure to the notified polymer in the transport and storage of the polymer solution or the paint component containing this polymer. There will be exposure during production of the paint, and in the use and disposal of the paints.

During the paint manufacture processes, the main exposure route for the notified polymer will be dermal. The paints will be viscous, and ready formation of aerosols is not expected. The polymer is not expected to be hazardous by dermal exposure as the high molecular weight will preclude absorption through the skin, however irritation may occur on dermal exposure to the products Rheolate 300 and Rheolate 310 as the adjuvants in the products are irritants. The engineering controls and personal protective equipment specified in the notification (impervious gloves, safety glasses, safety boots and coveralls) will provide a high level of protection against the notified polymer. No significant OHS risks are expected when control and protective measures are implemented.

Occupational exposure during the sale and professional use of the paints is likely to be widespread and often under poorly controlled conditions. Dermal contact during handling and application of the paints is likely. The occupational health and safety risk associated with dermal contact with the notified polymer in the form of uncured paints will be low, due to the low toxicological hazard of the polymer and the low concentration (< 0.5 %) in the finished paints.

Public Health
While dermal and possibly eye contact with the notified polymer may occur during application of the paints containing the polymer by the general public, and dermal contact with surfaces coated with the notified polymer is likely, based on the low potential for public exposure to the notified polymer and its expected low toxicity, the notified polymer is not expected to pose a significant hazard to public health when used in the proposed manner.

13. RECOMMENDATIONS

To minimise occupational exposure to Polymer in Rheolate 300/310 the following guidelines and precautions should be observed:

- Safety goggles should be selected and fitted in accordance with Australian Standard (AS) 1336 (Standards Australia, 1994) to comply with Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992); industrial clothing should conform to the specifications detailed in AS 2919 (Standards Australia, 1987) and AS 3765.2 (Standards Australia, 1990); impermeable gloves or mittens should conform to AS 2161 (Standards Australia/ Standards New Zealand, 1998); all occupational footwear should conform to AS/NZS 2210 (Standards Australia/ Standards New Zealand, 1994b);

- 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;

- Good personal hygiene should be practised to minimise the potential for ingestion;

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

14. MATERIAL SAFETY DATA SHEET

The MSDS for the notified chemical was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994).

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.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under subsection 64(1) of the Act, secondary notification may be required if the polymer characteristics cease to satisfy the criteria under which it has been accepted as a Synthetic Polymer of Low Concern. Secondary notification of the notified polymer 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

Connell DW (1990) General Characteristics of Organic Compounds Which Exhibit Bioaccumulation. In: D. W. Connell ed. Bioaccumulation of Xenobiotic Compounds. CRC Press, Boca Raton.

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 (1999a) List of Designated Hazardous Substances [NOHSC:10005(1999)]. Australian Government Publishing Service, Canberra.

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

Sax NI & Lewis RJ (1996) Dangerous Properties of Industrial Materials. Van Nostrand Reinhold, New York.

Standards Australia (1987) Australian Standard 2919-1987, Industrial Clothing. Standards Association of Australia, Sydney.

Standards Australia (1990) Australian Standard 3765.2-1990, Clothing for Protection against Hazardous Chemicals Part 2 Limited protection against specific chemicals. Standards Association of Australia.

Standards Australia (1994) Australian Standard 1336-1994, Eye protection in the Industrial Environment. Standards Association of Australia.

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

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