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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Polymer in Plexol EF-171/Polymer in EAL 224H

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Under subsection 34(2) of the Act the Director of Chemicals Notification and Assessment is to publish this Report in the Chemical Gazette on 3 December 1996 .

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Polymer in Plexol EF-171/Polymer in EAL 224H

1. APPLICANT

RohMax (c/o Rohm and Haas Australia Pty Ltd) of 969 Burke Road CAMBERWELL VIC 3124 and Mobil Oil Australia Ltd of 417 St Kilda Road (c/o Pegasus Development Centre) Corner of Millers Road and Kororoit Creek Road ALTONA VIC 3004, have jointly submitted a notification statement accompanying their application for assessment of a synthetic polymer of low concern, Polymer in Plexol EF-171 and Polymer in EAL 224H respectively.

2. IDENTITY OF THE POLYMER

Based on the nature of the chemical and the data provided, Polymer in Plexol EF-171 and Polymer in EAL 224H, are not classified as hazardous. Therefore the chemical identity, composition,specific use, import volumes and certain physico-chemical information have been exempted from publication in the Full Public Report.

Trade Names : **Plexol EF-171** (Rohmax)
EAL 224H (Mobil Oil)

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa: the polymer exists only in formulation; the Rohmax formulation is a clear liquid; the Mobil formulation is a light yellow liquid with a slight odour

Water Solubility: not provided

Hydrolysis as a function of pH: not provided

Flammability Limits: not available but the polymer is considered non flammable

Autoignition Temperature: not available

Explosive Properties: this material will not exist in dry form and therefore is considered to have minimum explosive properties

Reactivity: under expected use and storage conditions the polymer is considered stable, at elevated temperatures the polymer will begin to thermally degrade possibly yielding methacrylate monomers

Particle Size Distribution: not applicable the polymer is never isolated from the liquid formulation

Comments on the Physico-Chemicals:

The water solubility of the notified polymer was not determined. However, the notifier presented a structurally related polymer with a water solubility of less than 2.1 ppm. The notifier contends it is likely that the notified polymer will be less soluble than the related polymer as it contains longer alkyl chain methacrylates and is estimated to have a larger NAMW. From these considerations the notifier believes that the notified polymer will have a water solubility of less than 1 ppm. The EPA excepts this argument.

Comments on the stability of the Polymer:

The polymer is expected to be stable under normal conditions of storage and use.

The data provided are acceptable as a polymer of low concern.

4. PURITY OF THE CHEMICAL

The notified polymer contains a range of monomers but these data have not been disclosed for reasons of confidentiality.

5. INDUSTRIAL USE

The notified polymer will not be manufactured in Australia. It will be imported by Rohmax as a product containing neutral oils. The polymer is the functional constituent of the product that will be used as a pour point depressant for crank case engine oils. Customers of Rohmax will blend the product into oils for final use as heavy industrial machinery lubricants in internal combustion engines. The import volumes will depend on market penetration. The product will be imported from the USA and sold to industry for reformulation.

Mobil Oil will import the product (EAL 224H) containing the notified polymer for use in industrial hydraulic fluids, marine and mobile service, including high pressure systems. The product will be sold directly to customers in this finished form.

6. OCCUPATIONAL EXPOSURE

The notified polymer will be imported by Rohmax as a polymer solution in oil, Plexol EF-171 oil additive, in 200 L drums which will be directly sold to customers. Mobil will import the notified polymer in the product, EAL224H in 19,60,113 and 208L steel drums and supply the product to their customers.

Transport and storage personnel involved with handling the products prior to reaching the customer site and after blending would not normally be expected to be exposed to the polymer as it is isolated by the packaging. Exposure will only occur in the unlikely event of an accident.

Plexol EF-171 (Rohmax) product containing the notified polymer will require further blending by customers. The product will be transferred via a closed system to a tank and blended in-line at a rate of less than 5% with base oil and other additives to produce the finished motor oil. The oils will then be packaged into 200 L drums and supplied to the end users. It is anticipated that up to three people will be exposed to the polymer during blending and repacking at the customer site.

The number of end-use operating sites will be approximately 10 with up to two workers exposed to the polymer at each site. The polymer will be present as a minor component of the oil lubricants and exposure will occur during engine maintenance and oil changing activities.

The main route of potential occupational exposure will be dermal for workers involved in blending operations. This is expected to occur only in connecting and disconnecting hoses during drumming of the finished motor oil when the duration of exposure is expected to be up to one hour per day for up to 10 days per year. Direct exposure of workers during application is expected to be infrequent, up to 0.25 hours per day for less than 10 days per year. The oil additive contains a high percentage of mineral oils to which there may be exposure during drumming and application.

Under normal conditions, worker exposure to the notified polymer in product Plexol EF-171 will be minimal. Operators will wear overalls, boots, protective gloves and glasses as a standard precaution and engineering controls will be used.

Mobil will be importing the notified polymer in a finished form (EAL 224H) which will be sold directly to the customers. No formulating will be required. It is anticipated that up to two end users may be exposed to the polymer as a minor component of a hydraulic fluid at any one site during installation and maintenance activities. The notifier does not know how many sites this will apply to.

The products (Plexol EF-171 and Mobil EAL 224H) containing the notified polymer also contain mineral oils. If the mists or if vapours are generated during heating or pressure discharge there is the potential for exposure to mineral oil mist. Although mineral oil mist is not listed on the Worksafe *List of Designated Hazardous Substances* (1) it has the potential to cause irritation of the mucous membrane and upper respiratory tract. The base oils are present at high concentrations in the final products but under the normal conditions of use it is unlikely that the exposure threshold of 5mg/m^3 Time-Weighted Average (TWA) (2) would be achieved. It would be prudent however to limit possible inhalation exposure by means of the appropriate engineering controls to personal protective equipment.

7. PUBLIC EXPOSURE

Products containing the polymer will be imported in robust steel drums. Rohmax will then blend the product with base oils to give a final concentration of less than 5%. Mobil will sell the product direct to its customers. The public will not be sold the products containing the notified polymer. In the event of a transport spill, the polymer should be contained with an absorbent material, liquid and solids transferred into containers and incinerated.

Waste polymer will be recycled whenever possible or transferred to disposal facilities.

The public will not be exposed to the polymer during its importation and use in industry. Given the pattern of use products containing the notified polymer, high molecular weight and stability, the notified polymer represents a low risk to public health.

8. ENVIRONMENTAL EXPOSURE

Release

The product Plexol EF-171 (RohMax) will require further blending by customers. To produce finished motor oils, the product will be transferred via a closed system to a tank and blended in at a rate of less than 5% with base oil and other additives. Drums and mixing vessels are left to thoroughly drain to remove any left over material. The finished oils will then be packaged into 200 L drums. The notifier estimates losses attributed to formulation to be less than 5% (less than 8 500 kg) per year.

The product EAL-224H (Mobil) does not require any further blending in Australia.

The major source of environmental release of products containing the notified polymer is in the unlikely event of an accident during transport and/or handling. The oils can be contained with inert materials and the mixture can be shovelled into a suitable container for disposal.

The finished products containing the notified polymer will be used by a limited number of customers. Oils containing Plexol EF-171 will be used by approximately 10 customers for use in engines of heavy industry. Oils containing EAL 224H will be used by up to two customers. Products will not be available to the general public.

The notifier believes that losses of the oils during use and changing should be less than 5% (less than 8 500 kg) per year. End-use products will be replaced on a yearly basis. The disposal of used products involves the collection of the material into a sump which is then disposed of or recycled by specialised companies. Environmental losses will be a result of leaking systems and minor cracks in collection sumps.

Fate

As the notified polymer is a component of crank case engine oils and hydraulic fluids, environmental exposure is unlikely. If there is leakage, the amount of notified polymer exposed to the terrestrial environment would be difficult to collect. The polymer is likely to bind to soils and is unlikely to become part of the aquatic compartment due to its low water solubility. It is expected to degrade very slowly in the environment due to free radical processes/ultra violet (UV) light.

The majority of notified polymer released to the environment would be due to spillage of the product oils at either the servicing or final use stages. The notifier claims that these and used engine/hydraulic oils will be collected and disposed of to a specialised company for disposal or recycling. Waste oil may also be used for fuel value.

Approximately 40% of engine oil sold in Australia is consumed by burning during use or lost from engine leaks. Much of the oil sold in Australia is bought by industry, garages or other service centres, where used oils are collected and disposed of correctly. Only 7% of oils sold in Australia is used by the do-it-yourself market, with 12.5% of these sales recovered for recycling or disposal, with the remainder being disposed of in a variety of ways *ie* dumping with household garbage, buried or stored (3). Sales to the general public of products containing the notified polymer will be limited as the notified polymer is intended for use mostly in products used as heavy industrial machinery lubricants.

ANZEC reported that in Australia, 96% of waste engine oil is correctly disposed of, either used as a fuel, incinerated or landfilled in secure sites, with very little being recycled (3). Based on these figures and the information above, approximately 68 tonnes of the notified polymer will be consumed, approximately 98 tonnes will be collected as waste oil with the remainder, approximately 4 tonnes, being disposed of in a variety of ways, as described above, in a dispersed manner.

Combustion of the notified polymer will produce water and oxides of carbon.

Bioaccumulation of the notified polymer is not expected as its large molecular size is likely to inhibit membrane permeability and prevent uptake during exposure (4).

9. Environmental Effects

No ecotoxicity data were provided which is acceptable for polymers of low concern with NAMW of greater than 1 000 according to the Act.

12. Environmental Hazard

The notified polymer is unlikely to present a hazard to the environment during the reformulation process of Plexol EF-171. Spills are expected to be minimal, due to the closed process, and contained and collected for disposal. EAL 224H is not reformulated.

Environmental exposure to the notified polymer may occur due to leaks and spillages during use. However, maintained machinery should have minimal leakage and significant release to the environment is not expected. Hazard to the environment is restricted by this limited release and the polymer's low water solubility.

11. ASSESSMENT OF OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY EFFECTS

No toxicological data were submitted for the notified polymer which is acceptable according to the Act for polymers of low concern with NAMW of greater than 1 000. The Material Safety Data Sheet (MSDS) lists acute toxicity details for a material with a similar composition and these data are as follows: oral LD_{50} > 5 000 mg/kg in rats, dermal LD_{50} > 5 000 mg/kg in rabbits, practically non irritant to rabbit skin and eye. The NAMW of greater than 1 000 should preclude transmission across biological membranes such as skin and the gastrointestinal tract, and is therefore not expected to lead to significant toxicity. The notified polymer contains less than 1% of species with a molecular weight of less than 500 and 1 000.

Two of the monomers, used in the polymer, have residual concentrations above 1%w/w but available toxicology data and the low percentages of the monomers present suggest they are unlikely to be of significant hazard (5,6). On the basis of available data the remaining residual low molecular weight species are not expected to be hazardous. In addition the polymer is considered stable under normal use and storage conditions.

The public will not be exposed to the polymer during its importation and use in industry. Given the use pattern of products containing the notified polymer, high molecular weight and stability, the notified polymer represents a low risk to public health.

The notified polymer is imported as products containing neutral base oils. There is an atmospheric exposure standard specified for mineral oil mists of 5mg/m^3 TWA in Worksafe Australia's *Exposure Standards for Atmospheric Contaminants in the Occupational Environment* (2). Although mineral oil mist is not listed on the Worksafe *List of Designated Hazardous Substances* (1) it has the potential to cause irritation of the mucous membrane and upper respiratory tract (1). The base oils are present at high concentrations in the product but under the normal conditions of use it is unlikely that the exposure threshold would be achieved. It would be prudent however to limit possible inhalation exposure by means of the appropriate engineering controls.

There is a low risk associated with the introduction of the notified polymer as indicated by the requirements of the Polymer of Low Concern category under which it is to be introduced.

12. RECOMMENDATIONS

To minimise occupational exposure to Polymer in Plexol EF-171/Polymer in EAL 224H, the following guidelines and precautions should be observed during the use of oil additive products and oil lubricants.

- Safe practices for handling any chemical formulation, should be adhered to and include:

  - minimising spills and splashes:
  - practising good personal hygiene; and
  - practising good house keeping and maintenance including bunding of large spills which should be cleaned up promptly with absorbents and put into continuers for disposal.

- It is expected that in the industrial environment, protective clothing conforming to and used in accordance with Australian Standard (AS)2919 (7) and protective footwear conforming to Australian/New Zealand Standard (AS/NZS) 2210 (8) should be worn as a matter of course. In addition it is advisable when handling additives and lubricants containing the polymer to wear chemical-type goggles (selected and fitted) according to AS 1336 (9) and meeting requirements of AS/NZS 1337 (10), impermeable gloves AS 2161-1978 (11) should be worn to protect against any unforseen circumstances.

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

13. MATERIAL SAFETY DATA SHEET

The attached MSDS for Polymer in Plexol EF-171 and Polymer in EAL 224H were provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (12).

MSDS were provided by Rohm and Haas on behalf of Rohmax (Plexol EF-171) and by Mobil (EAL 224H) 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 notifiers.

14. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act, secondary notification of Polymer in Plexol EF-171/Polymer EAL 224H shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

15. REFERENCES

1. National Occupational Health and Safety Commission 1994, *List of Designated Hazardous Substances* [NOHSC:10005(1994)], Australian Government Publishing Service Publ., Canberra.

2. National Occupational Health and Safety Commission 1995, 'Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment', [NOHSC: 1003(1995)], in *Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards*, Australian Government Publishing Service Publ., Canberra.

3. Australian and New Zealand Environment Council (ANZEC). Used Lubricating Oil: Generation, Recovery and Reuse in Australia. A Technisearch Ltd Report for the Waste and Resources Advisory Committee (WRAC), February 1991.

4. Gobas FAPC, Opperhuizen A & Hutzinger O. 1986. Bioconcentration of hydrophobic chemicals in fish: relationship with membrane permeation. *Environmental Toxicology and Chemistry* 5:637-646.

5. Sax, N.I. & Lewis, R.J. 1989, Dangerous Properties of Industrial Materials, Van Nostrand Reinhold, New York.

6. National Health and Safety Commission 1994, Approved Criteria [NOHSC:1008(1994)], Australian Government Publishing Service Publ., Canberra.

7. Standards Australia, 1987, *Australian Standard 2919 - 1987 Industrial Clothing,* Standards Association of Australia Publ., Sydney, Australia.

8. Standards Australia, Standards New Zealand 1994, *Australian/ New Zealand Standard 2210 - 1994 Occupational Protective Footwear, Part 1: Guide to Selection, Care and Use. Part 2: Specifications,* Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ. Wellington, New Zealand.

9. Australian Standard 1336-1982, *Recommended Practices for Eye Protection in the Industrial Environment*, Standards Association of Australia Publ., Sydney, 1982.

10. Australian Standard 1337-1984. *Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, 1984.

11. Australian Standard 2161-1978. *Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ., Sydney, 1978.

12. National Occupational Health and Safety Commission (1994). *National Code of Practice for the Completion of a Material Safety Data Sheets*, [NOHSC:2011(1994)], AGPS, Canberra.