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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**Methacrylate Copolymer in CP-169**

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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****Methacrylate Copolymer in CP-169****1. APPLICANT**

Lubrizol International, Inc. of 28 River Street SILVERWATER NSW 2141 has submitted a notification statement accompanying their application for assessment of a synthetic polymer of low concern, Methacrylate Copolymer in CP-169.

**2. IDENTITY OF THE POLYMER**

Based on the nature of the chemical and the data provided, Methacrylate Copolymer in CP-169, is not classified as hazardous. Therefore the chemical identity, means of identification, information on constituents, residual monomers and certain physico-chemical data have been exempted from publication.

**Chemical Abstracts Service**

**(CAS) Registry No.:** unknown

**Trade Name:** CP-169

**3. PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance at 20°C and 101.3 kPa:** the notified polymer is manufactured as a solution in mineral oil that appears as a clear viscous yellow liquid.

**Melting Point:** 110°C

**Specific Gravity/Density:** 0.9239

**Water Solubility:**  $<1.49 \times 10^{-3}$  g/L at 27°C

**Hydrolysis as a Function of pH:** not available

**Flammability Limits:** the notified polymer is expected to be non-flammable

**Autoignition Temperature:** unknown

**Explosive Properties:** the notified polymer does not contain any chemical groups associated with explosive properties

**Reactivity:** the notified polymer is not an oxidizing agent nor is it reactive towards water

**Particle Size Distribution:** not applicable as the notified polymer is manufactured as a liquid

**Comment on stability:** not expected to degrade rapidly; under normal conditions of storage and use the material is considered to be stable.

**Comments on Physico-Chemical Properties:**

The water solubility of the oil-free polymer, isolated as the dialysis residue, was determined using the shake-flask method. Fourier-Transfer Infra-Red (FTIR) analysis determined the water soluble hydrocarbons were below the quantitation limit of 1.49 ppm. The water solubility is likely to be significantly less than 1.49 ppm due to the very high molecular weight and long alkyl chains. While the polymer contains ester groups, these are unlikely to hydrolyse in the expected environmental pH range due to the very low water solubility.

The data provided are acceptable for 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 be used primarily as a pour point depressant/viscosity modifier in various fluids, particularly in automatic transmission fluids (ATF). The notifier expects to import the notified polymer in volumes of 10-15 tonnes per year as a blend in mineral oil. The neat substance will not be manufactured or sold in Australia.

## 6. OCCUPATIONAL EXPOSURE

The notified polymer is only imported as a blend in mineral oil which will be sold as part of a “viscosity modifier (VM)” package to an oil company. The oil company will then blend the substance with additional additives to produce the final ATF fluid. The notified polymer will be present in the VM package at approximately 60% by weight and at 4-8% in the final ATF fluid.

The notified polymer will be imported and transported by rail in tankers to the customer’s blending facility. The blend operation conducted by the customer is expected to be a highly automated process using dedicated tanks and transfer lines. Typically the material would be pumped directly from the tanker to the blend tank for immediate use. Diluent oil would be used to flush the tanker and the flushings added to the blend. The blend operation would typically last 8-10 hours and require minimal supervision by 1-2 workers. After blending, the ATF containing the notified polymer at approximately 4-8% would be pumped into a tanker and transported by rail to an automobile manufacturer for use in “factory fill” applications or possibly other smaller operations such as repair facilities. Details of this operation are not known to the notifier. It is assumed that the ATF will be pumped from the tanker to a storage container until the appropriate point of the automobile manufacture process requiring the fluid is reached. The process would be highly automated. At this time, it is expected that 100% of the blended substance will be used in this application.

As all of the processes described above are highly automated the potential for occupational exposure is likely to be very low during normal working conditions. Minimal dermal or ocular exposure may occur when connecting and disconnecting hoses during transfer operations, changing or adding ATF to automotive transmissions. Engineering controls are expected to be in place such as containment pans/walls, dedicated transfer lines and appropriate ventilation. Exposure to the notified substance would only occur in the event of an accident or mechanical failure.

Dermal exposure to the residual monomers may occur. Methyl methacrylate is classified as an irritant and a skin sensitiser according to the *Worksafe List of Designated Hazardous Substances* (1) but it is present at a concentration in the imported final product below the cut-off value requiring classification.

The notified polymer is imported as a product containing mineral oil. If the product is misted or if vapours are generated during heating or pressure discharge there is the potential for exposure to mineral oil mist to occur. 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 (2).

## **7. PUBLIC EXPOSURE**

There will be no packaging of the fluid for individual sale to the general public. Minor public exposure may result from disposal of unused ATF or accidental spillage of the polymer during transport and storage. Adequate measures are described in the Material Safety Data Sheet (MSDS) to minimise public exposure during disposal or in the event of accidental spillage. It is considered that the notified polymer will not pose a significant hazard to public health.

## **8. ENVIRONMENTAL EXPOSURE**

### **• Release**

Release to the environment during any transfer would only be significant in cases of spills. The MSDS and material handling instructions provide directions for the proper containment, collection and disposal of wastes in accordance with local regulations.

Environmental losses during blending are expected to be minimal. Engineering controls are expected to include such items as containment pans/walls, dedicated transfer lines and appropriate ventilation. Drums of the products containing the notified polymer are expected to be sent to a re-conditioning facility for re-use. Residues will be removed in this process.

Any environmental releases during normal use are expected to be minimal, estimated at 4-8%, as the transmission is a sealed unit. The recommended change interval for transmissions filled with the ATF containing the polymer will be according to automobile manufacturers' recommendations. This is expected to be approximately every 100 000 km. The majority of such changes would be expected to be carried out by professional repair organisations with trained staff. These centres have controlled handling techniques for the removal and disposal of waste ATF containing the polymer via approved reclaimers or waste processors. The likelihood of releases of the ATF from scrapped vehicle transmissions, motor vehicle accidents, leakage or disposal by "backyard" repairers is unknown although expected to be minimal.

### **• Fate**

As the notified polymer will be a component of ATF, 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 highly hydrophobic and will tend to adsorb to or be associated with soils. It is unlikely to become a part of the aquatic compartment due to its low water solubility.

The majority of notified polymer released to the environment would be due to spillage of the product fluids at either blending or final use stages. The notifier expects any used or waste ATF containing the notified polymer to be disposed of or recycled according to current practises in accordance with Australian Regulations.

It is envisaged that these fluids will be disposed of to a specialised company for disposal or recycling. Combustion of the notified polymer will produce water and oxides of carbon.

Biological membranes are not permeable to polymers of very large molecular size and therefore bioaccumulation of the notified polymer is not expected (3,4).

## **9. ASSESSMENT OF ENVIRONMENTAL EFFECTS**

No ecotoxicological data were provided which is acceptable for polymers of low concern with a number average molecular weight (NAMW) > 1 000, according to the Act.

## **10. ASSESSMENT OF ENVIRONMENTAL HAZARD**

The notified polymer is unlikely to present a hazard to the environment during the formulation process. Spills are expected to be minimal, due to the closed process, and any spills will be contained and collected for disposal.

Environmental exposure to the notified polymer may occur due to leaks and spillages during use. However, maintained equipment 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 toxicology data were submitted for the notified polymer which is acceptable for polymers of low concern with a NAMW > 1 000 according to the Act. However, data are provided in the MSDS for a similar chemical and indicate that the notified polymer is likely to have low oral and dermal toxicity. The notified polymer is considered unlikely to be an ocular and dermal irritant based on data from a similar chemical. The notified polymer has a NAMW of > 1 000, which should preclude transmission across biological membranes and is therefore not expected to lead to significant toxicity. The notified polymer does not contain species of a low molecular weight of less than 500 or any species less than 1 000. The notified polymer is considered stable and is not expected to breakdown by thermal degradation under normal temperatures (below 200°C) and storage conditions.

The public will not be exposed to the notified polymer during normal conditions of importation, transport, use and storage. Given the NAMW, water solubility and stability, the notified polymer represents minimal risk to public health.

The notified polymer contains a number of residual methacrylate monomers including methyl methacrylate. Methyl methacrylate is classified as an irritant and a skin sensitiser according to the Worksafe *List of Designated Hazardous Substances* (1) but it is present at a concentration in the imported final product below the cut-off value requiring classification. The remaining monomers are present at low concentrations (less than 1%) and a search of additional literature did not indicate any concern for occupational health at these concentrations (1,5,6). Methyl methacrylate has an atmospheric exposure standard specified in Worksafe Australia's *Exposure Standards for Atmospheric Contaminants in the Occupational Environment* (2) of 100ppm Time-Weighted Average (TWA). Methyl methacrylate is present in the notified polymer in low concentrations and it is therefore unlikely that this threshold value will be reached except in exceptional circumstances (e.g. zero ventilation, confined area, headspace of drums).

The notified polymer is imported as a product containing mineral oil. If the product is misted or if vapours are generated during heating or pressure discharge, exposure to mineral oil mist may occur. Mineral oil mist has an atmospheric exposure standard of 5mg/m<sup>3</sup>, TWA (2) with the potential to cause irritation of the mucous membrane and upper respiratory tract. It is unlikely that this threshold value will be reached under normal conditions of use except in exceptional circumstances (e.g. zero ventilation, confined area, headspace of drums) but it is recommended that the exposure standard is adhered to and if it is likely to be exceeded the appropriate engineering controls or personal protective equipment should be applied.

There is minimal risk associated with the introduction of the notified polymer as dictated by the requirement of the Polymer of Low Concern category under which it is to be introduced.

## **12. RECOMMENDATIONS**

To minimise occupational exposure to Methacrylate Copolymer in CP-169 the following guidelines and precautions should be observed:

- 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 containers 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 meeting the requirements of AS 2161 (11) should be worn to protect against unnecessary exposure to mineral oil present in the product.
- A copy of the MSDS should be easily accessible to employees.

### **13. MATERIAL SAFETY DATA SHEET**

The attached MSDS for the notified polymer was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (12)

This MSDS was provided 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.

### **14. REQUIREMENTS FOR SECONDARY NOTIFICATION**

Under the Act, secondary notification of the notified polymer, 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. Anliker R, Moser P & Poppinger D. 1988, "Bioaccumulation of dyestuffs and organic pigments in fish. Relationships to hydrophobicity and steric factors". *Chemosphere* 17(8):1631-1644.



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. Toxline Silver Platter 1995, *Toxline Silver Platter CD-ROM database, 1994-September 1995*, Silver Platter International N.V.
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.
10. Australian Standard 1337-1984. *Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney.
11. Australian Standard 2161-1978. *Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ., Sydney.
12. National Occupational Health and Safety Commission. *National Code of Practice for the Completion of a Material Safety Data Sheets*, [NOHSC:2011(1994)], AGPS, Canberra.