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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Polymer in Diamond LC-316

This Assessment has been compiled in accordance with the provisions of *the Industrial Chemicals (Notification and Assessment) Act 1989,* and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by Worksafe Australia which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Commonwealth Environment Protection Agency and the assessment of public health is conducted by the Department of Health, Housing, Local Government and Community Services.

For the purposes of subsection 78(1) of the Act, copies of this full public report may be inspected by the public at the Library, Worksafe Australia, 92-94 Parramatta Road, Camperdown NSW 2050, between the hours of 10.00 a.m. and 12.00 noon and 2.00 p.m. and 4.00 p.m. each week day except on public holidays.

Under subsection 34(2) of the Act the Director of Chemicals Notification and Assessment is to publish this Report in the Chemical Gazette on March 5 1996].

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Polymer in Diamond LC-316

1. APPLICANTS

Plastral Pty Ltd of 11b Lachlan Street WATERLOO NSW 2017 and B.P. Australia Ltd of 431 Douglas Parade SPOTSWOOD Victoria 3015 have submitted a notification statement accompanying their application for assessment of a synthetic polymer of low concern, Polymer in Diamond LC-316.

2. IDENTITY OF THE POLYMER

Based on the nature of the chemical and the data provided, Polymer in Diamond LC-316, is not considered to be hazardous. Therefore, the chemical name, CAS number, chemical formula, chemical structure and other information describing the chemical composition of the polymer have been exempted from publication in the Full Public Report.

Other name: Higher alkyl methacrylate

Trade name: Polymer in Diamond LC-316

Means of identification (List of spectral data available): infrared spectrum provided for the identity of the notified substance

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	viscous liquid rubber-like polymer with light yellow colour
Melting Point	not applicable as polymer is prepared in a liquid
Density:	0.92 g mL^{-1} at 20°C
Water Solubility:	<0.2 mg L^{-1}
Hydrolysis as a function of pH:	the polymer contains no reactive functional groups
Flammability Limits:	not determined
Autoignition Temperature:	not determined
Explosive Properties:	not determined
Reactivity:	not determined

Particle size distribution: not applicable as the polymer is manufactured in solution

- **Comments on physico-chemical properties**

The polymer is stable unless heated to >300°C when depolymerisation begins and hazardous monomers are released. The low water solubility results from the long chain fatty acid esters on the polymer. It is neutral and not polycationic with nearly all monomers containing neutral aliphatic side chains. Only one monomer has a slight basic property due to an amino group in the side chain, however, the company claims this group is buried in the polymer environment with the nonpolar groups of other monomer moieties. Therefore the polymer will not be ionic at the pH range likely to be encountered in the environment. There will also likely be low exposure of the polymer to the environment.

Flammability limits were not determined but the notifier indicates that they are likely to be above 300°C as is the autoignition temperature.

4. PURITY OF THE CHEMICAL

All of the designated hazardous monomers present as residuals in the notified polymer are well below the threshold concentrations that would require that the polymer be classified as hazardous (1).

5. INDUSTRIAL USE

The notified polymer will be manufactured overseas and only imported as part of an additive package (56% notified polymer), Diamond LC-316 for local blending. The quantity imported will be 50 tonnes/annum for the next five years.

The notified polymer will be used as part of an additive package for use in automotive automatic transmission fluid (ATF). The final ATF will be blended with the additive package containing the notified polymer. The ATF will contain approximately 5% of the notified polymer.
The additive package containing the notified polymer has been used overseas, (Europe, Japan and USA) for at least six years.

6. OCCUPATIONAL EXPOSURE

The notified polymer will be manufactured overseas and only imported as a component of an additive package. The concentration of the notified polymer will be 56 % of the additive package.

The additive package is blended with mineral oils to formulate automatic transmission fluid. Safety procedures used in the blending process are required because of the solvent mineral oil used. These include the use of protective clothing such as PVC gloves and goggles for eye protection. Approximately 10 staff will potentially come into contact with the polymer in Diamond LC-316 during the blending process. These staff are plant operators, filling staff and technical staff. These staff will be exposed to the notified polymer at concentrations ranging from 56% in the additive package to approximateley 5% in ATF. An unspecified number

of workers will be exposed to the ATF in the following areas, motor vehicle manufacture, transmission manufacture, transmission repair and oil reselling.

7. PUBLIC EXPOSURE

The notified polymer will be imported in sealed containers at a rate of 50 tonnes per year for the first five years, as a component of Diamond LC-316 in the proportion of 56%. In the case of accidental spillage during transport, the public may be exposed to the notified polymer. However, any exposure will be minimised by containment and clean-up of the site via the recommended practices outlined in the Material Safety Data Sheet (MSDS) for Diamond LC-316.

Diamond LC 316 will be blended in Australia with base oils to make automotive transmission fluids. Public exposure from blending the additive with oils is expected to be negligible. Dermal exposure is the most likely exposure route. The final concentration of the notified polymer in ATF is approximately 5%. ATF containing the notified polymer will be supplied to vehicle manufacturers, repairers and retail outlets. Public exposure may occur when changing the ATF. However, given that the polymer has a high number average molecular weight, dermal absorption is expected to be low.

Waste ATF will be disposed of or recycled at waste processors or reclaimers. Some waste oil may be disposed of in landfill as a result of home vehicle maintenance. Disposal of the notified polymer is not expected to result in significant public exposure.

8. ENVIRONMENTAL EXPOSURE

. Volume and Use

The notified polymer will not be manufactured in Australia. It will be imported at approximately 50 tonnes per year for the first five years as a component of Diamond LC-316. Once imported, Diamond LC-316 is transported to the B.P. refinery, Spotswood, where it will be incorporated into automatic transmission fluid (ATF) at a concentration of approximately 5%. The concentration of the notified polymer in the ATF will be approximately 5%. Transfer, handling and blending in the formulation of the ATF will be done in closed systems. The blended ATF is transported from the oil blending plant to the transmission/vehicle manufacturer or oil reseller.

. 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.

Any environmental releases during normal use are expected to be minimal. The recommended change interval for transmissions filled with the ATF containing the polymer is 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

The polymer is highly hydrophobic and will tend to adsorb to or be associated with soil or sediment and partition out of the aqueous phase.

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) > 1000 according to the Act. Bioaccummulation of the polymer is not expected as its large molecular size is likely to inhibit membrane permeability and prevent uptake during exposure (2,3).

10. ASSESSMENT OF ENVIRONMENTAL HAZARD

The intended use pattern of the polymer in the automatic transmission fluid additive is not expected to result in a significant release to the environment under normal operating conditions. The hazard to the environment is restricted by this expected limited release and low solubility in water. In the event of spills, the MSDS of the additive package containing the polymer contains information on procedures to reduce release to the environment.

11. ASSESSMENT OF OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY EFFECTS

Synthetic polymers of NAMW > 1000 as a rule tend to not be biologically active, for this reason toxicological data is not normally required as specified in the Act. The notified polymer meets all the requirements of a polymer of low concern (PLC) (4), such as NAMW >1000, low charge density and not water soluble. These requirements mean that toxicological effects through occupational exposure to PLCs are unlikely. The polymer is used as part of an additive package which is blended with mineral oils blended to make ATF. The mineral oil would be the primary concern associated with the use of ATF. The following acute toxicology information on Diamond LC-316 was provided in the MSDS: oral LD_{50} in rats >5000 mg/kg, slight skin irritant in rabbits and non-irritating in rabbit eyes. The notified polymer has a number average molecular weight of 54,200, which should preclude transmission across biological membranes such as skin and the gastrointestinal tract, and therefore is not expected to lead to significant toxicity. The polymer contains no reactive functional groups. In addition, the polymer is considered stable and is not expected to decompose under normal or extreme operating temperatures.

The notified polymer will be manufactured overseas and imported at a concentration of 56% of the additive package, Diamond LC-316. During blending and

reformulation of the notified chemical occupational exposure will be reduced due to the safety procedures associated with mineral oil blending. Under these conditions the polymer in Diamond LC-316 presents a low risk to those working with the chemical.

The public will not be exposed to the polymer in Diamond LC-316 during its importation and blending with base oils. The public will come into contact with ATF containing the notified polymer. Dermal exposure would be the most likely route of exposure, this could be minimised by wearing gloves. Since the notified polymer has a high molecular weight, has low potential for dermal absorption and is in low concentration in ATF, the notified polymer is unlikely to constitute a hazard to public health.

On the basis of an assessment of the information provided by the notifier the polymer in Diamond LC-316 would be not be classified as hazardous according to the criteria of Worksafe Australia.

12. RECOMMENDATIONS

To minimise occupational exposure to the polymer in Diamond LC-316 the following guidelines and precautions should be observed:

If engineering controls and work practices are not sufficient to reduce exposure to the polymer in Diamond LC-316 the following personal protective equipment should be used:

- The appropriate respiratory device should be selected and used in accordance to Australian Standard/ New Zealand Standard (AS/ NZS) 1715 (5) and should conform to AS/NZS 1716 (6).

- Eye protection (chemical goggles or face shields) should be selected and fitted in accordance to AS 1336 (7) and used in accordance to AS/NZS 1716 (8).

- Industrial clothing must conform to the specifications detailed in AS2919 (9).

- Impervious industrial gloves should conform to the standards detailed in AS 2161 (10).

- a copy of the Material Safety Data Sheet should be easily accessible to employees.

- Implement good work practices to avoid spillage.

- Products containing the notified polymer are labelled in the following manner:
  - Avoid contact with skin
  - Wash hands after use

13. MATERIAL SAFETY DATA SHEET

The attached Material Safety Data Sheet for the polymer in Diamond LC-316 was provided in Worksafe Australia format (11).

This MSDS was provided by Plastral Pty. Ltd. as part of their notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of Plastral Pty. Ltd.

14. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act secondary notification of the polymer in Diamond LC-316 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,* AGPS, Canberra.

2. 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.

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

4. National Occupational Health and Safety Commission, 1990 (Latest issue date 30/6/1995). *Handbook for notifiers,* AGPS, Canberra.

5. Standards Australia, 1994, *Australian Standard 1336-1994, Recommended Practices for Eye Protection in the Industrial Environment*, Standards Association of Australia Publ., Sydney, Australia.

6. Standards Australia, Standards New Zealand 1992, *Australian/ New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ. Wellington, New Zealand.

7. Standards Australia, Standards New Zealand, 1994. *Australian/New Zealand Standard 1715 - 1994 Selection, Use and Maintenance of Respiratory Protective Devices.* Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ., Wellington, New Zealand.

8. Standards Australia/ Standards New Zealand, 1991. *Australian/New Zealand Standard 1716 - 1991 Respiratory Protective Devices.* Standards Association of Australia Publ., Sydney, Australia.

9. Standards Australia, 1990 Australian Standard 3765 - 1990. *Clothing for Protection Against Chemical Hazards*, Part 1, *Protection against General or Specific Chemicals*; Part 2, *Limited Protection Against Specific Chemicals*, Standards Australia Publ., Sydney, Australia.

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

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