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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME
(NICNAS)**

FULL PUBLIC REPORT

Polymer in Aclube 133

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**Director
Chemicals Notification and Assessment**

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FULL PUBLIC REPORT

Polymer in Aclube 133P

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

Plastral Fidene Pty Ltd (ABN 68 000 144 132) 11B Lachlan St WATERLOO NSW 2017.

NOTIFICATION CATEGORY

The notified polymer meets the PLC criteria.

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication: data items relevant to the chemical identity and molecular weight.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

No variation to the schedule of data requirements is claimed.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

No.

NOTIFICATION IN OTHER COUNTRIES

USA (1993).

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Aclube 133 contains the notified polymer (Aclube 133P) at a concentration of up to 45% weight in highly refined mineral oil.

MOLECULAR WEIGHT

Number Average Molecular Weight (Mn) > 10000

Weight Average Molecular Weight (Mw) >10000

% of Low MW Species < 1000 0.27

% of Low MW Species < 500 0.16

SPECTRAL DATA

Infrared (IR) and nuclear magnetic resonance (NMR) spectra were provided.

METHODS OF DETECTION AND DETERMINATION

ANALYTICAL METHOD IR and NMR spectroscopy.

3. COMPOSITION

DEGREE OF PURITY

> 99%

HAZARDOUS IMPURITIES

None.

NON HAZARDOUS IMPURITIES (> 1% by weight)
None.

ADDITIVES/ADJUVANTS
None.

RESIDUAL MONOMERS
All residual monomers are below the relevant cut-offs for classification of the notified polymer as a hazardous substance.

DEGRADATION PRODUCTS
The notified polymer is stated to be stable under the high temperatures in automotive engines and other equipment requiring oil based lubricants.

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
Aclube 133 will be imported in 180 kg iron drums.

MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

| <i>Year</i> | <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> |
|---------------|----------|----------|----------|----------|----------|
| <i>Tonnes</i> | 30 | 30 | 30 | 30 | 30 |

USE
Lubricant additive (pour point depressant).

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, Transport and Storage

PORT OF ENTRY
Not provided.

IDENTITY OF MANUFACTURER/RECIPIENTS
Not known.

TRANSPORTATION AND PACKAGING
The notified polymer will be imported in 180 kg iron drums, and the reformulated products will be packaged into 1000 L Intermediate Bulk Liquid containers, 200 L iron drums, 20 L iron pail, 5 L HDPE bottles and 1 L HDPE bottles.

5.2. Operation Description

The notified polymer will be imported as a component of the product, Aclube 133, comprising up to 45% of the product. It will be reformulated into lubricating oils. The final concentration of the notified polymer in the lubricants is less than 1%. The final products are used mainly as engine oils but to a lesser extent the notified polymer is used in hydraulic fluids and gear oils.

Operators pump the prewarmed polymer solution from the drums in which it is imported to a blend tank. Typically, base oils are pumped to the tank and, after slow mixing, the final lubricants are transferred to either holding tanks or directly to containers for transport to customers. Packaging into smaller containers will be automatic.

5.3. Occupational exposure

Number and Category of Workers

| <i>Category of Worker</i> | <i>Number</i> | <i>Exposure Duration</i> | <i>Exposure Frequency</i> |
|---|---------------|--------------------------|---------------------------|
| Operators, QC samplers, maintenance workers | 30 | up to 2 hours/day | up to 70 days/year |
| End users of lubricants | | up to 8 hours/day | up to 230 days/year |

Exposure Details

Exposure to workers during transport and storage operations is unlikely and is only possible through accidental rupture of containers.

During reformulation incidental loss may occur during drumming off and the connection/disconnection of transfer hoses, which may result in exposure to skin or eyes. Operators typically wear long sleeved clothing, goggles and gloves.

Exposure to engine oils and/or hydraulic fluids or gear oils can be high during addition or replacement but exposure to the notified polymer will be low given its low concentration (< 1%) in the oils or fluids). Workers will typically wear overalls but will not necessarily wear gloves or eye protection.

5.4. Release

RELEASE OF CHEMICAL AT SITE

At the customer's blending facility losses during the blending process are not expected. It is anticipated that the equipment used will be cleaned with oil and these washings will be used in the formulation of the next batch or another oil blend. In these situations release would only be through accidental spills. It is expected that less than 1% of the annual import volume or up to 300 kg per annum will be released during blending and repackaging. The notifier indicates that up to 400 kg of the notified polymer per annum remains in the empty import containers and will be incinerated as drums washings during drum recycling or disposed of with consumer containers in landfill.

RELEASE OF CHEMICAL FROM USE

Engine oils represent the largest end use of the lubricants containing the polymer. The notifier indicates that the release of lubricant to the environment during addition to equipment is expected to be low. Hence, given the low concentration of the polymer in the lubricants (< 1%) releases to the environment of the polymer are expected to be minimal even in the event of improper disposal (eg by do it yourself motorists).

5.5. Disposal

Material spilled during repackaging is either recycled or collected for incineration, while residues from the cleaning and drum recycling process are consigned to sewer under licence. Empty container residues of the lubricants are expected to be discarded with either industrial or domestic garbage and disposed of into landfill. Used lubricant remaining after oil changes may be recycled or disposed of inappropriately (buried, tipped into landfill, used for weed control, tipped into stormwater, stored). The MSDS recommends disposal in accordance with government regulations.

5.6. Public exposure

Automobile engine oils containing the notified polymer may be used to replace spent crankcase oil. Where the oil is changed by members of the public the potential for dermal exposure to the oil is high. However, the potential for exposure to the notified polymer is low given its low concentration (< 1%) in the oil and the fact that engine oil is changed infrequently.

6. PHYSICAL AND CHEMICAL PROPERTIES

Some properties are for Aclube 133 as described on the MSDS for this formulation.

| | |
|---|--|
| Appearance at 20°C and 101.3 kPa | Straw-coloured viscous liquid (polymer in mineral oil imported as Aclube 133). |
| Melting Point/Freezing Point | -13°C |
| Boiling Point | > 200°C (Aclube 133) |

Density 940 kg/m³ at 15°C (900 kg/m³ for Aclube 133).

Water Solubility < 1 mg/L at 20°C

Remarks Conducted according to the flask method of OECD Guideline for the testing of chemicals 105 water solubility. The amount dissolved into the water phase was determined by the difference in weight of the sample before and after exposure to water.

Flammability Not flammable.

Remarks Flash point and Autoignition temperature are both > 200°C. Flash point of Aclube 133 is > 170°C.

Explosive Properties None.

ADDITIONAL TESTS

Hydrolysis as a Function of pH Not Determined

Remarks The notified polymer contains ester groups that may undergo hydrolysis at extremes of temperature and pH, but this is not expected to occur under environmental conditions (pH 4-9).

Partition Coefficient (n-octanol/water) Not Determined

Remarks A partition coefficient was not determined for this notification due to the notified polymer's low water solubility. The polymer is expected to strongly partition to the organic phase.

Adsorption/Desorption Not Determined

Remarks The polymer is an acrylate which is known to absorb strongly, and combined with the high molecular weight and low water solubility the polymer is expected to associate strongly to soils and sediments.

Dissociation Constant Not Determined

Remarks The notified polymer does not contain any groups which are expected to dissociate in the environmental pH range of 4-9.

7. TOXICOLOGICAL INVESTIGATIONS

No Toxicological data were submitted.

8. ENVIRONMENT

No ecotoxicological data were submitted.

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

Lubricant oils in vehicles require changing after a specified time to ensure the oils work effectively. As such all of the imported polymer contained in the lubricant product could potentially be presented for disposal when the lubricant oil is changed or removed from vehicles. The amount of lubricant oil resurfacing as used oil will depend on the type of use, with some applications resulting in all of the used oil being generated as waste, and others resulting in all the oil being burned or lost through leakage (Macpherson, 1997).

The fate of used oils in Australia has been the subject of a number of surveys. An Australian Institute of Petroleum survey (AIP, 1995; 1998) indicated that at least 60% of all used oils generated are collected for recycling to be resold mainly as fuel oil. The fate of the remaining 40% of used oil could include a substantial portion being reused especially in the mining, agricultural and transport sectors. The AIP report indicated no evidence that bulk used oil was being dumped, but admitted there was some uncertainty as to the fate of 40% of used oil generated, but not collected for recycling.

Approximately 14% of oil is sold to the “do it yourself” (DIY) market or back yard operators. This oil could potentially be disposed of inappropriately. Snow (1997) traced the fate of used lubricant oils removed by DIY enthusiasts, and found that about 20% is collected for recycling, 25% is sent to landfill, 5% is disposed of into stormwater drains, and the remaining 50% is reused to treat wooden fence posts, kill grass and weeds, or suppress dust.

Hence, up to 2.7 tonnes of the notified polymer will be disposed of by DIY enthusiasts, which equates to 550 kg/annum collected for recycling, 680 kg/annum buried or disposed of in landfill, 135 kg/annum disposed of into stormwater drains and 1365 kg/annum used for treating fence posts, killing grass and weeds or disposed of in other ways.

Any notified polymer burned in the engine, recycled for fuel, or disposed of by incineration would result in the evolution of water vapour and oxides of carbon. Sludges from waste treatment plants or oil recycling facilities may also be incinerated. Any product sent to landfill or used for suppressing dust, treating fence posts, killing weed would eventually be absorbed into the soil and become associated with organic components and mineral particles in the soil matrix. The polymer is not expected to be mobile or to leach from landfill sites because of its poor water solubility.

Due to its low water solubility and high hydrocarbon content any notified polymer that enters the aquatic environment would be expected to become associated with suspended organic matter which would settle out into the sediments and eventually biodegrade.

Losses during blending are not expected because the process is highly automated and the equipment used will be cleaned with oil and these washings will be used in the formulation of the next batch or another oil blend. In these situations release would only be through accidental spills that would be recycled or collected for incineration.

The notified polymer is not expected to cross biological membranes due to its high molecular weight and is therefore not expected to bioaccumulate.

9.1.2. Environment – effects assessment

While no data is available ecotoxicity would not be expected due to the polymers very low solubility.

9.1.3. Environment – risk characterisation

The notified polymer will be a component of lubricants. The majority of which will be used in as engine oils. The fate of the notified polymer contained in lubricant could include any of the following: (1) combustion and loss through leakage during use; (2) recycling and reuse through a licensed dealer; (3) disposal by incineration or dumping either in stormwater drains or landfill;

and finally (4) reuse for a range of purposes for which the product is not intended.

Incineration of the polymer would result in the evolution of water vapour and oxides of carbon. Any product sent to landfill or used for suppressing dust, treating fence posts, killing weed would eventually be absorbed into the soil and become associated with organic components and mineral particles in the soil matrix. Similarly, polymer entering the aquatic environment would be expected to bind to sediments.

The notified polymer is not likely to present a risk to the environment when it is stored, transported and used in the proposed manner.

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

Dermal and ocular exposure can occur during certain formulation processes. However, exposure to significant amounts of the notified polymer is limited because of the engineering controls and personal protective equipment worn by workers.

During transport and storage, workers are unlikely to be exposed to the notified polymer except when packaging is accidentally breached.

9.2.2. Public health – exposure assessment

Users may come into contact with both fresh and “used oils” (containing < 1% of the notified polymer), and skin exposure is the main pathway. However, the notified polymer, as part of the finished lubricant, will be contained in essentially closed systems until such time as the lubricant is changed or removed.

9.2.3. Human health - effects assessment

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard.

9.2.4. Occupational health and safety – risk characterisation

The OHS risk presented by the notified polymer is expected to be low. The notified polymer may be present in formulations containing hazardous ingredients. If these formulations are classified as hazardous to health in accordance with the NOHSC Approved Criteria for Classifying Hazardous Substances, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

9.2.5. Public health – risk characterisation

The public will be exposed to the notified polymer in lubricants at a concentration of < 1%. As the polymer is of low hazard and the lubricants are used infrequently there should be negligible risk to the public from use of the lubricants.

10. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS

10.1. Hazard classification

Based on the available data the notified polymer is not classified as hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999).

10.2. Environmental risk assessment

On the basis of the available information, the overall environmental risk of the notified chemical is expected to be low.

10.3. Human health risk assessment

10.3.1. Occupational health and safety

There is Low Concern to occupational health and safety under the conditions of the occupational settings described.

10.3.2. Public health

There is Negligible Concern to public health when used in the manner described.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of the product to be imported containing the notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). It is published here as a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

11.2. Label

The label for the product to be imported containing the notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994b). The accuracy of the information on the label remains the responsibility of the applicant.

12. RECOMMENDATIONS

CONTROL MEASURES

Occupational Health and Safety

- No specific engineering controls, work practices or personal protective equipment are required for the safe use of the notified polymer itself, however, these should be selected on the basis of all ingredients in the formulation.

Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- A copy of the MSDS should be easily accessible to employees.
- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Disposal

- The notified chemical should be disposed of either by incineration, into landfill or recycled.

Emergency procedures

Spills/release of the notified chemical should be contained as described in the MSDS (contained by absorbent material) prior to disposal.

12.1. Secondary notification

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

- (1) Under Section 64(1) of the Act; if
 - the notified polymer is introduced in a chemical form that does not meet the PLC criteria.
- or
- (2) Under Section 64(2) of the Act:
 - if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

13. BIBLIOGRAPHY

AIP (1995). AIP Survey of Used Oils. Australian Institute of Petroleum Ltd.

AIP (1998). AIP Survey of Used Oils. Australian Institute of Petroleum Ltd.

Macpherson E. (1997) Oil and the Environment, Minimising the environmental Impacts of Oil. Paper presented at The Used Oil Management Conference; Brisbane, Queensland Dept. Environment.

National Occupational Health and Safety Commission (1994a) 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 (1994b) National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]. Australian Government Publishing Service, Canberra.

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

Snow R. (1997) "Used Oil Management", Keynote Address at Used Oil Management Conference, Brisbane, Department of Environment (Qld.).