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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

LUBRITAN TG COPOLYMER

This Assessment has been compiled in accordance with the provisions of *the Industrial Chemicals (Nond Assessment) Act 1989, as amended 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 Department of the Arts, Sport, the Environment and Territories and the assessment of public health is conducted by the Department of Health, Housing, Local Government and Community Services.

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**LUBRITAN TG COPOLYMER****1. APPLICANT(S)**

Rohm and Haas Australia Pty Ltd., Hays Road, Point Henry,
Geelong, Victoria 3220

2. IDENTITY OF THE CHEMICAL

Based on the nature of the chemical and the data provided, Lubritan TG copolymer, is not considered to be hazardous. Therefore, the details of chemical name, molecular and structural formula, CAS number, spectral data, impurities, monomers, volume imported and specific use, have been exempted from publication in the Full Public Report and the Summary Report.

Trade name(s) : Lubritan TG Copolymer

Other name (s) : Acrylic Copolymer Emulsion

Number-average molecular weight: **5800**

3. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer will be imported as a emulsion known as Lubritan TG copolymer. All properties listed below are those of the emulsion unless otherwise specified.

Appearance at 20°C and 101.3 kPa: Milky white liquid

Odour: Acrylic odour

Boiling Point: Not determined

Glass-transition Temperature: 72°C +2. (polymer)

Density: 1073 kg/m³ (polymer)

Vapour Pressure:	Not applicable, assumed to be that of water in the emulsion
Water Solubility:	aqueous emulsion, polymer is insoluble in water, 6% (aqueous soluble fraction of the polymer)
Fat Solubility:	Not determined
Partition Co-efficient (n-octanol/water) log Po/w:	Not applicable, insoluble in both phases
Hydrolysis as a function of pH:	< 10% hydrolysis after 7 days at 25°C at pH 2.5 and pH 8.9
Adsorption/Desorption:	Not determined
Dissociation Constant pKa:	8.05
Viscosity:	500 cps
Flash Point:	Not determined
Flammability Limits:	Not flammable
Combustion Products:	Not determined
Pyrolysis Products:	Acrylic monomers
Decomposition Temperature:	Not determined
Decomposition Products:	Not determined
Autoignition Temperature:	Not determined; autoignition will not occur below 300°C
Explosive Properties:	Not explosive; polymer can splatter above 100°C and the polymer film can burn

Reactivity/Stability: Stable under ambient conditions; temperatures above 150°C may cause polymer decomposition

Particle size distribution: 70 - 100 nm. (polymer in solution)

4. PURITY OF THE CHEMICAL

Degree of purity of the notified polymer: 96.3% (Weight % of dried substance)

Maximum content of residual monomer(s): < 0.125%

Additive(s)/Adjuvant(s):

Chemical name:	Water
Synonym:	Dihydrogen oxide
CAS No.:	7732-18-5
Weight percentage	63-65%

5. INDUSTRIAL USE

Lubritan TG copolymer is for use in leather production. It is mixed with water and added to a rotating mill where 93% of the product is exhausted in the leather by reacting with chromium. The rotating mill remains closed during the treatment process. The wringer operators transfer the wet skins from the rotating mill to the wringer, while the dryer operators transfer the wringed skins to a conveyer which passes through an oven under controlled conditions of temperature (< 72°C) and humidity.

It is anticipated, by the notifier, that up to ten tanneries could become users of the polymer. These manufacturers are located in the suburbs of Sydney, Melbourne, Brisbane and Adelaide. The product is not expected to be used at any inland facilities.

The notified polymer will be imported as an emulsion in sealed 200 kg steel drums.

The notified polymer has been manufactured and used in the United States since 1990.

6. OCCUPATIONAL EXPOSURE

Occupational exposure to the notified polymer is possible as part of the following main activities:

- . importation, transport and storage of Lubritan TG copolymer if leaks or spills occur. Risk is minimised by importation of the notified polymer in sealed 200 kg drums;
- . transfer of the notified polymer from sealed drums either by pumping or gravity feed to the weighing vessels, and then to the rotating mill;
- . routine inspections of the rotating mill; and
- . transfer of wet skins from the rotating mill to the wringer and to the dryer.

Exposure of workers to the polymer during the tanning operation which is carried out in the rotating mill, in a closed system is expected to be negligible. However, the potential for worker exposure to the polymer is high during the transfer of the wet skins from the mill to the wringer and from the wringer to the conveyer.

The most likely routes of exposure are skin and eye contact during the manual transfer of skins containing the notified polymer.

7. PUBLIC EXPOSURE

Public exposure to Lubritan TG copolymer may occur during: (I) transport; (II) accidental spillages; and (III) manual handling of the finished leather product. Public exposure during storage and transport will be low. Accidental spillages are anticipated to be infrequent. Further washings of the treated leather during processing would essentially eliminate any residual unbound polymer on the surface of the finished leather. As a result,

public exposure to the notified polymer during handling of the finished leather products is anticipated to be low.

8. **ENVIRONMENTAL EXPOSURE**

. **Release**

Lubritan TG copolymer is shipped and used as an aqueous emulsion (63-65% water) and as such should not be considered as a potential atmospheric pollutant.

During transportation, risk of environmental exposure is limited to incidents involving an accident or leaking drum.

The submission claims that 93% of the applied product will react with the leather (binding with the chromium). It follows that 7% of the applied product should be released into the tannery waste stream. Correcting for polymer content in the emulsion (34.47% polymer) the amount of notified polymer released into the tannery treatment facilities will be 26 kg per 1000 kg of Lubritan TG copolymer (or 2.6%). Additional release may result from chance events such as accidental spillage and leakage from storage drums and the mill. Such chance events during processing would involve treatment of Lubritan TG copolymer with other tannery wastes, culminating in disposal in a secure landfill.

In a typical operation, liquid wastes generated during leather processing are treated with a coagulating agent. The residue particles are then agglomerated and removed by aeration and flotation or by settling. The resultant sludge is dewatered by filtration and then disposed of in a secure landfill. The notifier indicates that the following operational parameters are typical of those of a prospective user of the notified chemical :

- 500 kg of Lubritan TG copolymer used daily
- 4000 kg of treated leather produced
- 1% of treated leather designated waste
- 0.25 ML to 1.0 ML of waste water generated daily.

The submission indicates that no studies were conducted in relation to the amount of notified polymer removed by the tannery flocculation process. It may reasonably be assumed that the bulk of the notified substance (> 95%) will be partitioned to the

sludge for latter removal and disposal in a secure landfill. However, for calculations of the release of notified substance to the sewerage stream an extraction efficiency of 80% by the tannery flocculation process will be used.

Based on the usage patterns of a typical tannery, 12.95 kg per day of the notified chemical will be unreacted residue and released to the tannery waste stream for treatment (based on 500 kg/day Lubritan TG copolymer, 37% solids, 7 % unfixed polymer). Dilution by the tannery liquid wastes (typically 0.25 ML/day) yields a maximum concentration of 51.8 ppm. The waste stream is subsequently treated and residual solids (sludge) removed. Thus a final release rate from the tannery (after 80% extraction) of 10.4 ppm of notified chemical is expected.

The supplier indicates that 1% of treated leather is designated as waste and dumped to landfill.

. **Fate**

No data was presented on the bioaccumulation and biodegradation of Lubritan TG. This is acceptable considering the high molecular weight (NAMW >1000) and insolubility of the polymer. Given these factors Lubritan TG copolymer is not expected to cross biological membranes.

Traces entering the environment in sewage effluent would be expected to disperse and partition to sediment. The polymer is not expected to undergo biodegradation at significant rates.

9. **EVALUATION OF TOXICOLOGICAL DATA**

No toxicology data are required under the Industrial Chemicals (Notification and Assessment) Act 1989 (the Act) for polymers > 1000 molecular weight. However, the following studies were carried out on the product Lubritan TG emulsion containing the polymer and are reported here.

9.1 Acute Toxicity

Table 1 Summary of the acute toxicity of Lubritan TG emulsion

Test	Species	Outcome	Reference
Oral	rat	LD50: >2000 mg/kg	(1)
Dermal	rat	LD50: >2000 mg/kg	(2)

9.1.1 Oral Toxicity (1)

This study was carried out according to OECD Guidelines for Testing of Chemicals No: 401.

A single dose of 2000 mg/kg of Lubritan TG emulsion was administered by gavage to 12 Charles River rats (six males and six females). The animals were observed for 14 days. No deaths, mortalities, clinical signs or body weight effects were noted during the study and no gross changes were observed at necropsy.

The results of this study indicate an oral LD50 for Lubritan TG emulsion in male and female rats of >2000 mg/kg corresponding to approximately 700 mg/kg of the notified polymer.

9.1.2 Dermal Toxicity (2)

This study was carried out in accordance with OECD Guidelines for Testing of Chemicals No: 402.

A single dose of 2000 mg/kg of Lubritan TG emulsion was applied to the clipped intact skin between the flank and shoulder area of 12 Charles River rats (six male and six female) under an occlusive bandage for 24 hours. The animals were observed for 14 days. No deaths, mortalities, clinical signs or body weight effects were noted during the study and no gross changes were observed at necropsy.

The results of this study indicate a dermal LD50 for Lubritan TG emulsion in male and female rats of >2000 mg/kg corresponding to approximately 700 mg/kg of the notified polymer.

9.2 Overall Assessment of Toxicological Data

Lubritan TG emulsion has low acute oral and dermal toxicity (oral LD50 in rats: >2000 mg/kg; dermal LD50 in rats: >2000 mg/kg) corresponding to approximately 700 mg/kg of the notified polymer.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No aquatic data were provided, but none are required since the notified polymer has a NAMW > 1000. Due to its high NAMW the polymer is not expected to be absorbed by biological membranes. The literature suggests that polycarboxylic acid derivatives are moderately toxic to green algae, with polyacrylic acid itself appearing to be the most toxic form in its ability to chelate nutrient elements required for algal growth (3). This reference indicates that polyacrylic acid has a 96 hour, EC50 of 37.4 mg.L⁻¹ towards green algae.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The aquatic environment will be exposed to Lubritan TG copolymer residues which have not been bound to the leather or subsequently removed during on-site waste treatment. These residuals will be discharged with waste water. However, as indicated above, the estimated concentration of the notified chemical in the tannery waste water should not exceed 10.4 ppm and will be reduced further during subsequent sewage treatment. For example, the South Eastern Purification Plant (Vic.) has a sewage inflow in excess of 300 ML per day, if we assume no further Lubritan TG copolymer is removed during sewage treatment, mixing with the daily waste stream provides a dilution factor in excess of 1200, to yield 8.7 ppb (from 10.4 ppm).

To establish a worst case scenario a smaller scale sewerage treatment plant is used to estimate the dilution factor. Given an annual water usage rate of 57.8 GL from industrial and commercial facilities (not including domestic use) from the combined S.A. Gulf region (4) and that there are 18 provincial town sewerage schemes in S.A. (5); the throughput for an average sewage treatment facility, in Adelaide, may be estimated at 8.7 ML.day⁻¹. Therefore for a tannery based in Adelaide the minimum

dilution factor for the polymer waste would be 35, which equates to a maximum of 300 ppb of the notified substance being released in the sewerage effluent.

Using the most toxic of the polycarboxylic acid derivatives as a reference (i.e. polyacrylic acid; EC50 of 37.4 mg.L⁻¹ towards green algae), a safety margin in excess of 2 orders of magnitude with respect to green algae is expected.

The concentration of the notified polymer will be reduced even further as the sewage water is released to the rivers, oceans and lakes which act as receiving waters to nearly all sewage treatment plants in Australia.

Given the low levels of notified chemical to be released in the sewage waste stream and the additional nutrients found in sewage, the polymer is not expected to have a toxic effect upon green algae. The overall environmental hazard should be negligible.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The level of residual monomers in the notified polymer are at sufficiently low levels to not require classification as a hazardous substance. The residual monomers would not be expected to present an occupational hazard under normal use. However, the fact that the imported formulation is stated to have an acrylic odour suggests the possibility of vapour build-up in containers and this may represent a possible hazard.

The notified polymer is non flammable, non explosive and not reactive. Under normal use conditions it will not pose a flammable, explosive, or a reactive hazard during tanning.

The polymer is imported in sealed 200 kg steel drums. The greatest risk during import, transport or storage is from a leak or spill.

Under normal use conditions and correct handling procedures the notified polymer is not expected to pose a significant health and safety hazard to workers. Some degree of exposure could be expected in operations involving weighing. No data on skin and eye irritation was presented.

The potential for public exposure to the notified polymer is low. As a result there will be negligible risk to public health.

13. RECOMMENDATIONS

To minimise occupational exposure to Lubritan TG copolymer, the following guidelines and precautions should be observed:

- . if engineering controls and work practices are insufficient to reduce exposure to a safe level, the following personal protective equipment which complies with Australian Standards should be worn such as splash proof goggles (AS 1336-1982 (6), AS 1337-1984 (7)), gloves (AS 2161-1978) (8)), overalls (AS 3765.1-1990 (9), (AS 3765.2-1990 (10))), where vapour formation occurs respiratory protection devices (AS 1716-1991 (11), AS 1715-1992 (12));
- . good work practices should be implemented to avoid spillages;
- . good housekeeping and maintenance should be practiced. Spillages should be dealt with promptly; and
- . a copy of the Material Safety Data Sheet (MSDS) should be easily accessible to all employees.

14. MATERIAL SAFETY DATA SHEET

The Material Safety Data Sheet (MSDS) for Lubritan TG emulsion (Attachment 1) was provided in Worksafe Australia format (13). This MSDS was provided by Rohm and Haas Australia 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 Rohm and Haas Australia Pty Ltd (13).

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Industrial Chemicals (Notification and Assessment) Act 1989 (the Act), secondary notification of Lubritan TG copolymer shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. If the conditions of use are

varied, greater exposure to the public may occur. In such circumstances, further information may be required to assess the hazards to public health.

16. **REFERENCES**

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3. USEPA draft document "Discussion of US Regulatory Strategies for Certain New Chemical Polymers", revised 21 Sept, 1991.
4. Australian Bureau of Statistics "Australia's Environment - Issues and Facts" ABS Catalogue No: 4140.0. 1992.
5. CEPA internal document "Australian Sewage Profile" amended 17 August, 1988.
6. Australian Standard 1336-1982, "Recommended Practices for Eye Protection in the Industrial Environment", Standards Association of Australia Publ., Sydney, 1982.
7. Australian Standard 1337-1984, "Eye Protectors for Industrial Applications", Standards Association of Australia Publ., Sydney, 1984.
8. Australian Standard 2161-1978, "Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)", Standards Association of Australia Publ., Sydney, 1978.
9. Australian Standard 3765.1-1990, "Clothing for Protection Against Hazardous Chemicals, Part 1: Protection Against General or Specific Chemicals", Standards Association of Australia Publ., Sydney, 1990.

10. Australian Standard 3765.2-1990, "Clothing for Protection Against Hazardous Chemicals, Part 2: Limited Protection Against Specific Chemicals", Standards Association of Australia Publ., Sydney, 1990.
11. Australian Standard 1715-1991, "Selection, Use and Maintenance of Respiratory Protective Devices", Standards Association of Australia Publ. Sydney, 1991.
12. Australian Standard 1716-1991, "Respiratory Protective Devicesrd 1716-1991, "Respiratory Protective Devices", Standards Association of Australia Publ. Sydney, 1991.
13. National Occupational Health and Safety Commission, *Guidance Note for the Completion of a Material Safety Data Sheet*, 2nd. edition, AGPS, Canberra, 1990.