

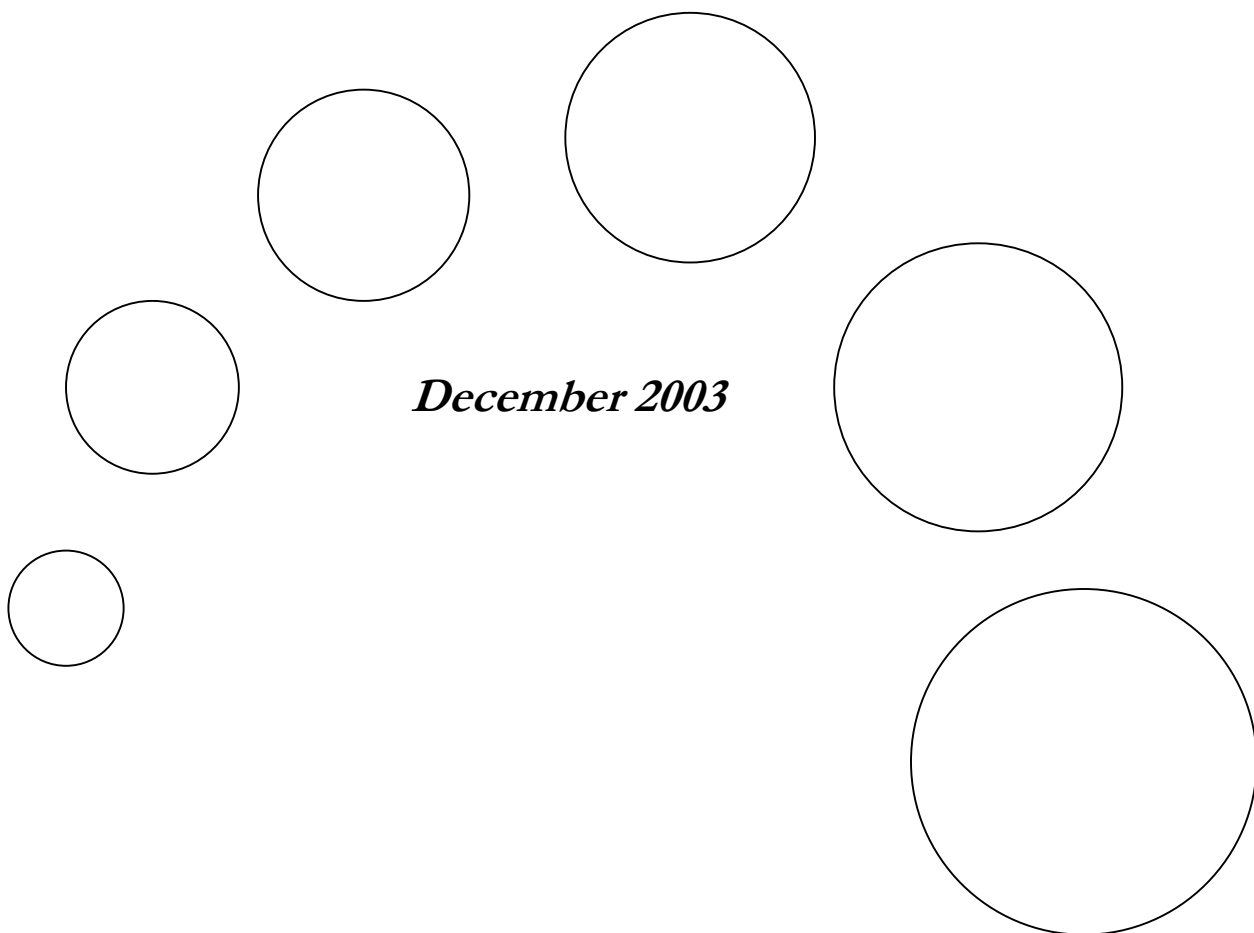


***Z-28***

---

***Existing Chemical  
Secondary Notification  
Assessment NA/418s***

***December 2003***



© Commonwealth of Australia 2003

ISBN 0-9751221-1-8

This work is copyright. You may download, display, print and reproduce this material in unaltered form only (retaining this notice) for your personal, non-commercial use or use within your organisation. Apart from any use as permitted under the Copyright Act 1968, all other rights are reserved. Requests for further authorisation should be directed to the Commonwealth Copyright Administration, Intellectual Property Branch, Department of Communications, Information Technology and the Arts, GPO Box 2154, Canberra ACT 2601 or posted at <http://www.dcita.gov.au/cca>.

# Preface

This assessment was carried out under the National Industrial Chemicals Notification and Assessment Scheme (NICNAS). This Scheme was established by the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act), which came into operation on 17 July 1990.

The principal aim of NICNAS is to aid in the protection of people at work, the public and the environment from the harmful effects of industrial chemicals.

NICNAS assessments are conducted in conjunction with Department of Environment and Heritage, which carries out the environmental assessment.

NICNAS has two major programs: the assessment of the health and environmental effects of new industrial chemicals prior to importation or manufacture; and the other focussing on the assessment of chemicals already in use in Australia in response to specific concerns about their health and/or environmental effects.

Chemicals that have been assessed as new or existing chemicals may require a reassessment of the hazards of the chemical under the secondary notification provisions of the Act.

This assessment report has been prepared by the Director (National Industrial Chemicals Notification and Assessment Scheme) in accordance with the Act. Under the Act manufacturers and importers of the chemical are required to apply for assessment. Applicants for assessment are given a draft copy of the report and 28 days to advise the Director of any errors. Following the correction of any errors, the Director provides applicants and other interested parties with a copy of the draft assessment report for consideration. This is a period of public comment lasting for 28 days during which requests for variation of the report may be made. Where variations are requested the Director's decision concerning each request is made available to each respondent and to other interested parties (for a further period of 28 days). Notices in relation to public comment and decisions made appear in the *Commonwealth Chemical Gazette*.

In accordance with the Act, publication of this report revokes the declaration of this chemical for secondary assessment, therefore manufacturers and importers wishing to introduce this chemical in the future need not apply for assessment. However, manufacturers and importers need to be aware of their duty to provide any new information to NICNAS, as required under section 64 of the Act.

For the purposes of Section 78(1) of the Act, copies of Assessment Reports for New and Existing Chemical assessments may be inspected by the public at the library of the National Occupational Health and Safety Commission (NOHSC). Summary Reports are published in the *Commonwealth Chemical Gazette*, which are also available to the public at the NOHSC library.

Copies of this and other assessment reports are available on the NICNAS website ([www.nicnas.gov.au](http://www.nicnas.gov.au)). Hardcopies are available from NICNAS either by using the prescribed application form at the back of this report or directly from the following address:

**GPO Box 58**

**Sydney**

**NSW 2001**

**AUSTRALIA**

**Tel: +61 (02) 9577 9437**

**Fax: +61 (02) 9577 9465 or +61 (02) 9577 9465 9244**

Other information about NICNAS (also available on request) includes:

- NICNAS Service Charter;
- information sheets on NICNAS Company Registration;
- information sheets on PEC and New Chemical assessment programs;
- safety information sheets on chemicals that have been assessed as PECs;
- subscription details for the NICNAS Handbook for Notifiers; and
- subscription details for the *Commonwealth Chemical Gazette*.

More information on NICNAS can be found at the NICNAS Web site:

<http://www.nicnas.gov.au>

Other information on the management of workplace chemicals can be found at the website of the National Occupational Health and Safety Commission:

<http://www.nohsc.gov.au>

# Overview

Z-28 was assessed as NA/418 under the NICNAS New Chemicals program in 1996 under the Standard category of notification. As a result of new data becoming available, Z-28 has now been reassessed under the secondary notification provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act) relevant to existing chemicals, as more than 5 years has elapsed since the original assessment.

This assessment has evaluated new environmental studies including acute toxicity studies to rainbow trout and zebra fish, acute and chronic toxicity of the water accommodated fraction to *Daphnia magna*, acute toxicity of the water accommodated fraction to green algae and biodegradation report (activated sludge and respiration inhibition test). Updated use and exposure information has been considered.

Z-28 has not been imported into Australia since its notification as a new chemical. Z-28 was intended for use as a lubricant additive.

For this assessment the physico-chemical properties of Z-28 have been summarised from the New Chemicals assessment report. Toxicological data from the original report has not been summarised here as the New Chemicals report is publicly available and interested parties can access that analysis in the original report on the NICNAS web site at <http://www.nicnas.gov.au/publications/CAR/new/NA/NAFULLR/NA0400FR/NA418FR.pdf>.

This report concentrates on the environmental aspects of Z-28.

No new occupational health and safety information was submitted for the secondary notification and the conclusions from the original New Chemicals assessment remain unchanged. The classification as a skin irritant is also unchanged.

Release of Z-28 into the environment can occur during the manufacture of products containing it or during the use of such products and their disposal. The compound has low water solubility and low volatility and because of its low log Pow and high molecular weight it is thought unlikely that Z-28 will bioaccumulate. It is unclear whether the compound is inherently biodegradable.

As a result of the new studies it is determined that Z-28 has no acutely toxic effect on fish and *Daphnia* and no acute effect on *Daphnia* reproduction up to the limit of its water solubility. The chemical is not considered chronically toxic to *Daphnia*.

Given that the product has never been used in Australia the recommendation from the original assessment has been repeated here. A further recommendation to update the MSDS has also been made.

# Contents

PREFACE	iii
OVERVIEW	v
CONTENTS	vi
1. INTRODUCTION	1
1.1 Declaration and secondary notification	1
1.2 Objectives	2
1.3 Peer review	2
2. APPLICANTS	3
3. CHEMICAL IDENTITY AND COMPOSITION	4
4. PHYSICAL AND CHEMICAL PROPERTIES	5
4.1 Physical state	5
5. MANUFACTURE, IMPORTATION AND USE	6
5.1 Manufacture and importation	6
5.2 Repackaging, storage and transport	6
5.3 Use	6
6. ENVIRONMENTAL EXPOSURE	7
6.1 Environmental exposure	7
6.1.1 Release	7
6.1.2 Fate	7
7. EVALUATION OF ANIMAL TOXICOLOGICAL DATA	9
8. ENVIRONMENTAL EFFECTS ASSESSMENT	10
8.1 Original assessment environmental effects summary	10
8.2 Secondary notification environmental effects assessment	11
8.2.1 Acute toxicity to fish	11
8.2.2 Acute toxicity to daphnia	13
8.2.3 Chronic toxicity to daphnia	14

8.2.4	Algal growth inhibition test	16
8.2.5	Sludge respiration inhibition	17
9.	ENVIRONMENTAL RISK CHARACTERISATION	20
10.	DISCUSSION AND CONCLUSIONS	21
10.1	Health hazards	21
10.2	Environment	21
11.	RECOMMENDATIONS	22
12.	SECONDARY NOTIFICATION	24
	APPENDIX 1 CLASSIFICATION UNDER THE GLOBALLY HARMONISED SYSTEM FOR HAZARD CLASSIFICATION AND COMMUNICATION	25
	APPENDIX 2 MATERIAL SAFETY DATA SHEET FROM LUBRIZOL INTERNATIONAL, INC. FOR Z-28	26
	REFERENCES	40

# Abbreviations

ADG Code	Australian Dangerous Goods Code
AS	Australian Standard
bw	bodyweight
CAS	Chemical Abstracts Service
CNS	central nervous system
conc.	concentration
DEH	Australian Government Department of Environment and Heritage
EU	European Union
EbC50	concentration at which biomass is reduced by 50%
ErC50	concentration at which growth rate is reduced by 50%
GHS	Globally Harmonised System for Hazard Classification and Communication
IC50	concentration at which a given function is inhibited by 50% compared to control.
LC50	median lethal concentration
LD50	median lethal dose
LOAEL	lowest-observed-adverse-effect level
LOEC	lowest-observed-effect concentration
LOEL	lowest-observed-effect level
log Pow	octanol/water partition co-efficient
MATC	maximum acceptable toxicant concentration
mg/kg bw/d	milligram per kilogram bodyweight per day
mg/L	milligram per litre
MSDS	material safety data sheet
NOAEL	no-observed-adverse-effect level
NOEC	no-observed-effect concentration
NOEL	no-observed-effect level
OECD	Organisation for Economic Cooperation and Development

pKa	dissociation constant
ppm	parts per million
ppb	parts per billion
PEC	predicted environmental concentration
PNEC	predicted-no-effect concentration
PPE	personal protective equipment
STEL	short-term exposure limit
v/v	volume per volume
w/v	weight per volume
w/w	weight per weight
WAF	water accommodated fraction
WSF	water soluble fraction



# 1. Introduction

The chemical Z-28 (CAS Number not assigned) was assessed as a new chemical under section 23 of the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act) under the Standard notification category.

The New Chemicals Assessment Report (NA/418) was published in November 1996. This report concluded that Z-28 was hazardous according to the National Occupational Health and Safety Commission's *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999) in relation to skin irritant effects based on submitted analogue data. Recommendations were made relating to engineering controls during reformulation and transferral, the use of personal protective equipment, safety practices when handling the substance, and Material Safety Data Sheets (MSDS). These recommendations were based on the intended use of Z-28 as a component of oil lubricants. Overall the environmental hazard was rated to be low. However, the assessment did indicate that Z-28 is highly toxic to fish and daphnia following acute exposure, very highly toxic to daphnia reproduction and non-toxic to algae up to the limit of its water solubility, based on the species tested. The effect of the notified chemical on algae appeared to be algistatic. Apart from a catastrophic event occurring, such as a ship sinking, the expected environmental release through blending and transferring was expected to be minimal.

New data were supplied on Z-28 in 2002. As five years has elapsed since the original assessment, this chemical now falls under the area of Existing Chemicals. The new data warranted reassessment which has been carried out under Section 68A of the Act, covering secondary notifications of existing chemicals.

Z-28 has never been imported or used in Australia.

## 1.1 Declaration and secondary notification

Declaration as a secondary notification was initiated when NICNAS received new environmental studies conducted on Z-28 that were not available during its assessment as a new chemical. The studies are:

- acute toxicity to rainbow trout,
- acute toxicity to zebra fish,
- acute toxicity of the water accommodated fraction to *Daphnia magna*,
- chronic toxicity of the water accommodated fraction to *Daphnia magna*,
- acute toxicity of the water accommodated fraction to green algae
- biodegradation report (activated sludge and respiration inhibition test)

A notice was published in the *Chemical Gazette* of 3 December 2002 requiring all persons who introduce Z-28 into Australia either by manufacture or import to apply for secondary notification.

## **1.2 Objectives**

The objectives of this assessment were to review the new data made available since the publication of the 1996 new chemical assessment and where appropriate revise the original assessment to:

- characterise the hazards of Z-28 to the environment;
- characterise potential environmental exposure to Z-28;
- characterise the risks of adverse effects resulting from exposure to the environment; and
- make appropriate recommendations to control exposures and/or reduce environmental risks.

## **1.3 Peer review**

During all stages of preparation, this report has been subject to internal peer review by NICNAS and the Australian Government Department of Environment and Heritage (DEH).

## 2. Applicants

One company applied for secondary notification assessment of this chemical. The applicant supplied information on environmental toxicity and use data. Under section 36 of the Act, the applicant was provided with a draft copy of the report for correction of errors and variation of content.

Applicant details are:

Lubrizol International, Inc  
28 River Street  
SILVERWATER NSW 2128

### 3. Chemical Identity and Composition

<b>Generic Chemical Name:</b>	Calcium alkaryl substituted ethanoate
<b>Trade Names:</b>	Z-28
<b>Calculated molecular weight:</b>	1200
<b>CAS Number:</b>	Not assigned
<b>Degree of purity:</b>	75 - 85%
<b>Toxic or hazardous impurities:</b>	None reported
<b>Non-hazardous impurities:</b>	Tetrapropylene phenol      25 - 15%

## 4. Physical and Chemical Properties

### 4.1 Physical state

Dark red/brown liquid at 20 ° C and 101.3 kPa.

Information on physical and chemical properties is provided below.

<b>Physical / Chemical property</b>	<b>Value</b>
<b>Melting point:</b>	27.5 ° C
<b>Boiling point:</b>	113° C (at 760 mm Hg)
<b>Relative density:</b>	1.09 at 20 ° C
<b>Specific gravity:</b>	1.01 (15.6 ° C)
<b>Vapour pressure:</b>	4.1 x 10 <sup>-13</sup> kPa at 25 ° C
<b>Water solubility:</b>	3.23 mg/L
<b>Partition co-efficient (n-octanol/water):</b>	log P <sub>ow</sub> 1.06 at 21° C
<b>Surface tension:</b>	71.6 mN/m at 25 ° C
<b>Dissociation constant:</b>	Not determined
<b>Hydrolysis as a function of pH:</b>	Not determined
<b>Flash point (open cup):</b>	205° C
<b>Autoignition temperature:</b>	Not determined
<b>Flammability:</b>	Not flammable
<b>Explosive properties:</b>	Not explosive
<b>Reactivity/ stability:</b>	Not reactive

# 5. Manufacture, Importation and Use

## 5.1 Manufacture and importation

Z-28 is not manufactured or reformulated in Australia. The chemical has not been imported into or used in Australia since its notification as a new chemical in 1996. The estimated import volume reported at the time of the initial notification was greater than one tonne per year.

## 5.2 Repackaging, storage and transport

Z-28 was to be imported as a component (30%) of an oil additive package in 205 L steel drums. Typically, a performance additive package which contains Z-28, contains dispersants, detergents, anti-foam agents, rust and oxidation inhibitors and demulsifiers.

Following transport by road or rail to the blend facilities of the oil industry, the drums are stored prior to lubricant manufacture. Typically, lubricant manufacture involves first charging the blending vessel with an oil blend, additional diluent oil is then pumped into the blend vessel. The lubricating oil would then be transferred to a storage tank or directly into the sump of a ship. The concentration of the notified chemical in the final product will vary between 5 and 7% (w/v).

The blend size could be expected to range from 15 000 to 20 000 kg.

## 5.3 Use

Z-28 is intended to be used as a lubricant additive. It has a specialised use in ships and might be used in large power generating plants. Z-28 will be added at the rate of 5-7% to the lubricating oil, blended to achieve homogeneity and fed into storage tanks or the oil sump of a ship. It is expected that a maximum of four ships a year would be serviced (topped up), with a typical ship needing 11 340 to 18 900 L of oil.

# 6. Environmental Exposure

## 6.1 Environmental exposure

### 6.1.1 Release

No new data on environmental release has been provided as use of the chemical in Australia has not commenced. The following discussion relates to the original notification.

Release to the environment during transport and handling would only occur in the event of an accident.

Losses through the blending/transferring process is not expected. Residual material remaining in blend tank or transfer lines will remain for the next blend. If the equipment is cleaned, a mineral oil would be used, which would be allowed to remain until next blend.

Release of Z-28 could occur through accidental spillage. The applicant stated that catchment pans and personal safety equipment will be employed in such a case.

The release of the chemical will occur through the partial combustion of the oil of which it is a component. The applicant has estimated that a typical ship's engine will consume about 37 800 L of oil in one year. This equates to approximately 2650 L (at concentration of 7%) of the notified substance. This oil is burnt in the piston combustion area.

It is not expected that used oil generated after regular oil changes will be disposed of in Australia. The applicant has stated that the ships using the notified substance are not expected to be based in Australia, and therefore will not have their regular maintenance conducted at Australian dry dock facilities. In the event that a ship does need to be dry docked for maintenance, any oil removed from the vessel will be recycled, incinerated or disposed of according to local laws.

A similar environmental exposure profile could be expected in the event that the chemical is used as an additive in oil used in large power generating plant.

### 6.1.2 Fate

No new data on environmental fate has been provided. The following discussion relates to the original notification.

The major release of the chemical into the environment will be through combustion in the engine. Combustion of the chemical will produce oxides of carbon, calcium salts and water.

Disposal of used engine oil will be through re-use as a fuel or incineration. The products of combustion of the notified chemical will be the same as those stated above.

A ready biodegradation test was submitted which showed that Z-28 is not readily biodegradable. The modified Sturm test (OECD test guideline 301B) did show some degradation (3.5% over 28 days) which is so low that it is unclear whether the compound is inherently biodegradable.

Bioaccumulation was not determined as the applicant believes the chemical will undergo very limited environmental exposure, because of its particular use. On account of the chemical's low log  $P_{ow}$  and large molecular weight, it is unlikely Z-28 will bioaccumulate (Connell, 1990).

## 7. Evaluation of Animal Toxicological Data

No new toxicity data was submitted for assessment in the secondary notification.

Data provided for the original assessment was on the sodium analogue of the notified chemical. Overall assessment of toxicological data showed the notified chemical may exhibit low acute oral toxicity in rats, low acute dermal toxicity in rabbits, moderate skin and slight eye irritation in rabbits and is unlikely to cause skin sensitisation in guinea pigs. A 28-day oral repeated dose toxicity study suggested that there may be some reversible liver toxicity in rats, primarily at the highest dose (800 mg/kg) used.

The classification as a skin irritant, based on the sodium analogue data submitted with the original assessment, is unchanged by this assessment.

## 8. Environmental Effects Assessment

The results of the studies submitted for the original New Chemical assessment are summarised below. The new studies provided for the secondary notification are detailed later in this section

### 8.1 Original assessment environmental effects summary

The environmental effects reported in the original assessment of the notified chemical are provided in Table 8.1.

**Table 8.1: Environmental effects of Z-28**

Species	Test	Result
Fathead minnow, <i>Pimephales promelas</i>	96 hour acute, OECD Test Guidelines 203 (actual concentration)	NOEC = 0.76 mg/L LC50 = 1.0 mg/L
<i>Daphnia magna</i>	48 hour immobilisation OECD TG 202 (actual concentration)	NOEC = 0.17 mg/L, EC50 = 0.37 mg/L
<i>Daphnia magna</i>	21 day Life-Cycle Toxicity, OECD TG 202 (actual concentration)	NOEC = 0.014 mg/L LOEC = 0.031 mg/L EC50 = 0.08 mg/L
Algae, <i>Selenastrum capricornutum</i>	96 hour, cell growth OECD TG 201 (nominal concentrations)	NOEC = 250 mg/L EC50 = >247 mg/L

The above results indicate that Z-28 is highly acutely toxic to fish and daphnia, very highly toxic to daphnia reproduction and non-toxic to algae up to the limit of its water solubility, based on the species tested.

No precipitates or other irregularities were noted in these tests. Excepting the algae 96-hour toxicity test, each of the toxicity test reports were based on actual values. There was a large variation between the nominal and actual values (fish - 104% to 121%, daphnia 48-hour - 54% to 84% and daphnia life-cycle - 44% to 77%). Algae 96-hour toxicity test used nominal values.

The cumulative mortality and treatment related data indicated that the 48-hour acute toxicity test had a non-monotonic dose-response curve, i.e. there was a non-graded increase in effects to *Daphnia* with increased dosage.

The concentrations tested in the algae toxicity test used water-accommodated fractions (WAF). This means sufficient chemical was added to the test solution to achieve the desired concentration e.g. 500 mg/L.

However, the amount that actually dissolves into solution will be limited to the chemical's water solubility (<3.23 mg/L). Therefore, test results will only be representative at test concentrations less than or equal to that of the chemical's water solubility.

The effect of the notified chemical on algae appeared to be algistatic, since the growth rates in the 9 day recovery period were comparable to that of the control.

## **8.2 Secondary notification environmental effects assessment**

New studies for the three aquatic trophic levels have been provided as part of the secondary notification package following more recent protocol development for testing mixtures and substances of low water solubility. The studies provided with the new chemical notification were conducted according to OECD Test Guidelines but used a solvent to dissolve the test substance. As the chemical will not be used in a solvent based system the applicability of the earlier results is therefore questionable.

The new studies provided are considered below.

### **8.2.1 Acute toxicity to fish**

Two new acute fish toxicity test reports were provided for assessment as part of this secondary notification assessment:

<i>TEST SUBSTANCE:</i>	Z-28
<i>METHOD:</i>	Dispersion Method Test – Based on OECD guideline 203 and US EPA guidelines.
<i>Species:</i>	<i>Oncorhynchus mykiss</i> (Rainbow trout)
<i>Exposure Period:</i>	96 hours
<i>Auxiliary Solvent:</i>	None
<i>Water Hardness:</i>	160-180 mg CaCO <sub>3</sub> /L
<i>Analytical Monitoring:</i>	pH, dissolved oxygen, temperature.

Following a range finding test, 20 fish per concentration (2 replicates of 10 fish each) were exposed for 96 hours to the test substance. The concentrations were formulated by the addition of test substance directly to the dilution water without the use of a solvent. The test was conducted under static conditions. The test substance was added to the test vessel through a cylinder containing a mixer while the mixer was operating. The mixer was continuously operated throughout the test. The results of this study are provided in Table 8.2.

**Table 8.2: Acute toxicity of Z-28 to rainbow trout**

Nominal Concentration mg/L	Number of Fish	Mortality	
		24 h	96 h
0	20	0	1
660	20	0	1
1100	20	0	2
1800	20	0	2
3000	20	0	1
5000	20	0	2

LC50 >5000 mg/L at 96 hours; NOEC = 5000 mg/L

All non-control test vessels were brown in colour and cloudy with insoluble material floating on the surface and on the bottom of the test vessels throughout the test. Due to this, survival or sublethal effects could not be verified.

*CONCLUSION* The test substance is not toxic to fish up to its level of solubility.

*TEST FACILITY* TR Wilbury Laboratories, Inc., 1997(a)

<i>TEST SUBSTANCE</i>	Z-28
<i>METHOD</i>	Dispersion Method Test – Based on OECD guideline 203 and US EPA guidelines.
<i>Species</i>	<i>Brachydanio rerio</i> (Zebra fish)
<i>Exposure Period</i>	96 hours
<i>Auxiliary Solvent</i>	None
<i>Water Hardness</i>	180 mg CaCO <sub>3</sub> /L
<i>Analytical Monitoring</i>	pH, dissolved oxygen, temperature.

Following a range finding test, 20 fish per concentration (2 replicates of 10 fish each) were exposed for 96 hours to the test substance. The concentrations were formulated by the addition of test substance directly to the dilution water without the use of a solvent. The test was conducted under static conditions. The test substance was added to the test vessel through a cylinder containing a mixer while the mixer was operating. The mixer was continuously operated throughout the test. The results of this study are provided in Table 8.3.

**Table 8.3: Acute toxicity of Z-28 to zebra fish**

Nominal Concentration mg/L	Number of Fish	Mortality	
		24 h	96 h
0	20	0	0
660	20	0	0
1100	20	0	0
1800	20	0	0
3000	20	0	0
5000	20	0	0

LC50 >5000 mg/L at 96 hours; NOEC = 5000 mg/L

Test material was noted floating on the surface and settling to the bottom of all non-control test solutions throughout the test. At 0, 24, 48 and 72 hours, globules of test material were noted floating in non-control test solutions, and at 48, 72 and 96 hours, non-control test solutions were cloudy. Water quality was within acceptable limits during the test.

*CONCLUSION* The test substance is not toxic to fish up to its level of solubility.

*TEST FACILITY* TR Wilbury Laboratories, Inc., 1997(b)

## 8.2.2 Acute toxicity to daphnia

<i>TEST SUBSTANCE</i>	Z-28
<i>METHOD</i>	Based on OECD guideline 202 and US EPA guidelines.
<i>Species</i>	<i>Daphnia magna</i>
<i>Exposure Period</i>	48 hours
<i>Auxiliary Solvent</i>	None
<i>Water Hardness</i>	180 mg CaCO <sub>3</sub> /L
<i>Analytical Monitoring</i>	pH, dissolved oxygen, temperature.

Following a range finding test, 20 daphnids per concentration (2 replicates of 10 daphnids each) were exposed for 48 hours to the test substance. The concentrations were formulated by the addition of test substance directly to the dilution water without the use of a solvent. This was stirred for 20 hours, allowed to settle and the water phase siphoned off to allow testing of the water accommodated fraction. This water phase does not appear to have been filtered. If filtering was not carried out, the possibility of micelles and suspended test material being included in the WAF exists. The test was conducted under static conditions. The results of this study are provided in Table 8.4.

**Table 8.4: Acute toxicity of Z-28 to daphnia**

Concentration mg/L	Number of daphnids	Number alive	Number affected <sup>1</sup>
Nominal		48 h	48 h
0	20	20	0
130	20	20	0
220	20	20	0
360	20	20	0
600	20	16	7
1000	20	8	6

1) Affected daphnids were immobilised.

EC50 = 620 mg/L; NOEC = 360 mg/L

Insoluble material was observed throughout the test in vessels containing 600 and 1000 mg/L. It is not clear from the test report whether the supernatant was filtered at the point of siphoning the test solution. At 0 hours, these test solutions were noted to be slightly cloudy with some insoluble material settled to the bottom by 24 and 48 hours. It is possible that this insoluble material contributed to the results. Given the limited solubility of the test substance, if the effects were due to the toxicity of the chemical, the adverse effects could be expected at all WAFs tested, as dose levels were all much higher than the solubility of the chemical. Further, in the range finding test (concentrations of 1, 10, 100 and 1000 mg/L), survival of 90% and 70% were observed in the two highest concentrations. The range finding test does not appear to have been performed on the WAF, and at the highest rate tested, all surviving daphnids were immobilised.

*CONCLUSION* The test substance is not toxic to daphnids up to its level of solubility though the presence of insoluble material does lead to some effects, probably physical.

*TEST FACILITY* TR Wilbury Laboratories, Inc., 1997c

### 8.2.3 Chronic toxicity to daphnia

<i>TEST SUBSTANCE</i>	Z-28
<i>METHOD</i>	Based on OECD guideline 202 and US EPA guidelines.
<i>Species</i>	<i>Daphnia magna</i>
<i>Exposure Period</i>	21 days
<i>Auxiliary Solvent</i>	None
<i>Water Hardness</i>	160-180 mg CaCO <sub>3</sub> /L
<i>Analytical Monitoring</i>	pH, dissolved oxygen, temperature.
<i>Biological Monitoring</i>	Measured biological parameters were the survival of first generation daphnids, the time to first brood, production of young by the first generation daphnids, the dry weight of first-generation daphnids at the conclusion of the test, and sublethal effects (immobilisation).

A range finding test using a control and four concentrations of the WAF (1, 10, 100 and 1000 mg/L) was conducted. Survival in the control and at these concentrations were 100%, 90%, 90%, 0% and 0% respectively with offspring totalling 82, 65 and 61 in the control, 1 mg/L and 10 mg/L concentrations respectively.

The definitive toxicity test was conducted with 5 concentrations of test substance and a dilution water control. The WAFs were prepared by combining the appropriate amount of test substance to the dilution water, stirring for 20 hours, settling for 4 hours and siphoning the water phase containing the WAF. This water phase does not appear to have been filtered. If filtering was not carried out, the possibility of micelles and suspended test material being included in the WAF exists.

The WAF concentrations tested were 0.5, 5, 50, 500 and 5000 mg/L. Test organisms were transferred to freshly prepared media every Monday, Wednesday and Friday during the study. Forty daphnids were equally distributed among four replicates of each treatment. The number of surviving adult daphnids and the occurrence of sublethal effects were determined every day during the test. The results of this study are provided in Table 8.5.

**Table 8.5: Chronic toxicity of Z-28 to daphnia**

Biological Endpoint	Nominal concentration of WAF (mg/L)					
	Control	0.50	5.0	50	500	5000
% survival at day 21	95	90	85	70*	7.5*	0**
Mean day of first brood	9.0	9.0	9.3	9.0	13.3*	--**
Immobilisation at day 21	none	none	none	none	none	none
Mean young per surviving daphnid	51.9	60.9	59.3	55.0	8.9*	0.0**
Mean dry weight of surviving adults (mg)	0.3	0.3	0.3	0.34	0.13*	0.0**

\* - statistically different from the controls; \*\* – assumed to be significantly different from the controls.

No-observed-effect concentrations (NOECs), lowest-observed-effect concentrations (LOECs) and maximum acceptable toxicant concentrations (MATCs) from the chronic toxicity test with *Daphnia magna* are presented in Table 8.6.

**Table 8.6: Biological endpoints following chronic toxicity testing with daphnia**

Biological Endpoint	NOEC mg/L	LOEC mg/L	MATC mg/L
First generation survival at day 21	5.0	50	16
Mean day of first brood	50	500	160
Number of young produced	50	500	160
Mean dry weight of first generation	50	500	160

NB: MATC is calculated as the geometric mean of the NOEC and LOEC.

Insoluble material was observed in the 500 and 5000 mg/L test vessels but not in any of the other vessels. Nominal concentrations are used for the calculation of all biological endpoints. Water quality parameters were within acceptable limits throughout the test.

The survival of first generation daphnids was significantly reduced at 50, 500 and 5000 mg/L WAF after 21 days. The mean day of first brood, the average number of young per surviving daphnid and the mean dry weight of surviving daphnids were significantly reduced at the two highest exposure levels after 21 days. First generation daphnids exhibiting pale colouration were observed at 500 mg/L WAF from day 13 until the end of the test. Immobilised first generation daphnids were observed at 500 mg/L on days 4, 11 and 12 of exposure and at 5000 mg/L WAF on days 1 and 3 with complete mortality occurring at this concentration on day 3. No immobilised young or dead eggs were observed during the test. No other sublethal effects, excluding size and reproductive differences were observed at any time during the test.

The most sensitive biological endpoint is the survival of first generation adults. The 7 day median effective concentration (EC50) based on survival and sublethal effects is 200 mg/L WAF (95% CI 50-500 mg/L) and the 21 day EC50 is 83 mg/L WAF (95% CI 50-500 mg/L).

*CONCLUSION* Because the chemical is poorly soluble and no acute toxicity was observed up to the water solubility, and in addition, the chronic NOEC from this study is >1 mg WAF/L, the test substance is not considered chronically toxic to daphnids. However, it is apparent that there was sufficient chemical in the water at 50 mg WAF/L to cause effects which were not of a physical nature. As there was no analytical monitoring, no firm conclusion can be drawn. There is no information on the actual amount of chemical the daphnids were exposed to.

*TEST FACILITY* TR Wilbury Laboratories, Inc., 1997(d)

#### 8.2.4 Algal growth inhibition test

<i>TEST SUBSTANCE</i>	Z-28
<i>METHOD</i>	Based on OECD TG 201 Alga, Growth Inhibition Test and US EPA guidelines
<i>Species</i>	<i>Selenastrum capricornutum</i>
<i>Exposure Period</i>	96 hours
<i>Concentration Range Nominal</i>	0, 670, 1100, 1800, 3000 and 5000 mg/L (WAF)
<i>Concentration Range Measured</i>	Not measured.
<i>Auxiliary Solvent</i>	None
<i>Analytical Monitoring</i>	Temperature, pH

A range finding test using four concentrations of 10, 100, 1000 and 10 000 mg/L resulted in cell growth at all concentrations being greater than the control. It is not clear whether the range finding test was conducted on the WAF or not.

In the definitive test, the WAFs were prepared by combining the appropriate amount of test substance and dilution water and stirring with a magnetic mixer for 20 hours, settling the mixtures for approximately four hours, and siphoning the water phase. This does not appear to have been filtered.

Algae were distributed among six replicates of the control and three replicates of each treatment at the rate of approximately 10 000 cells per mL. The number of algal cells/mL in each test vessel and the occurrence of relative size differences, unusual cell shapes, colours, flocculations, adherence of cells to test containers, or aggregation of cells was determined visually by means of direct microscopic examination. Cell counts were made and recorded daily.

Results: 96 h ErC50 >5000 mg/L; 96 h EbC50 >5000 mg/L; NOEC (or LOEC) 5000 mg/L. No insoluble material was noted during the test and water quality was within acceptable limits. pH rose markedly throughout the test in all concentrations and the control from a starting level of around 7.5 to a final pH of around 10.4. This does not appear to have impacted on the results. Cell growth at all five concentrations was equal to at least 95% of the control growth and no effects were noted.

*CONCLUSION* The test substance is not toxic to algae up to its level of water solubility.

*TEST FACILITY* TR Wilbury Laboratories, Inc, 1997 (e)

### 8.2.5 Sludge respiration inhibition

<i>TEST SUBSTANCE</i>	Z-28
<i>METHOD</i>	OECD TG 209 Activated Sludge, Respiration Inhibition
<i>Inoculum</i>	Activated sludge from a domestic wastewater treatment plant.
<i>Exposure Period</i>	3 hours
<i>Concentration Range Nominal</i>	1, 10, 100, 1000 and 10 000 mg/L

3,5-dichlorophenol was used as the reference substance which is a known inhibitor. The activity of the sludge was checked against this substance and a blank control.

Results: IC50 >10 000 mg/L . The test substance did not display any significant inhibitory effect toward microbial respiration throughout the entire range of test concentrations. The test is considered valid with the two control respiration rates within 15% of each other, and the IC50 of the reference substance in the accepted range of 5-30 ppm.

*CONCLUSION* The test substance is non-inhibitory to microbial populations at concentrations less than or equal to 10 000 mg/L.

*TEST FACILITY* Ricerca (1997).

#### Comments on new test results compared to previously submitted data

The new studies provided by the applicant were done on the premise that the original studies were invalid due to the use of a solvent and tested at concentrations above the water solubility. The solubility of Z-28 has only been presented as a threshold value (<3.23 mg/L), so true solubility is unknown. However, the original tested concentrations of between 0.25 to 4 mg/L for fish and daphnia is considered appropriate given the threshold solubility limit.

It is difficult to directly compare the originally submitted results with the newer data. The initial fish and daphnia tests used a solvent and analytically measured the concentration of the test substance. Use of a solvent is appropriate for insoluble substances, however, because of the potential for interaction with the test substance resulting in an altered response in the test, their use should be restricted to situations where no other acceptable method of media preparation is available. High toxicity was observed in these tests, and it should be noted that the solvent controls were negative.

The new data submitted for fish and daphnia did not use a solvent. The fish tests employed a method of direct addition of the test substance to the test water with mixing throughout the test. While this may be more “real world” there are questions over the use of this method. OECD guidance recommends that direct addition should be limited to cases when the concentrations to be reached are lower than 50% of the water solubility. Additionally, mixing may need to be undertaken for prolonged periods of time (up to six weeks) to achieve water solubility (OECD, 2002a).

The new acute daphnia study tested the WAF. Mixing was for 20 hours prior to settling and siphoning off the supernatant (without filtering). Undissolved material was observed. Generally in these tests, any non-dissolved test material which has sedimented or precipitated out in the test vessels should be removed. This was not the case here and is a probable cause of the effects seen at the higher concentrations.

The chronic daphnia study also tested the WAF, and like the acute study, noted insoluble material floating on the surface at the higher concentrations. However, in this study, some effects were noted which could not be attributed to physical effects due to insoluble material. Impacts on the survival of first generation adults were found at a nominal concentration (50 mg WAF/L) where the test solution was clear. A possible explanation is that there was sufficient bioavailability of the chemical to cause effects. This may not be the case in acute studies as exposure is for a much shorter period. No conclusion can be drawn on the actual amount of chemical that daphnia were exposed to, as there were no measurements of concentration in the test solution.

Despite some shortcomings, these tests are accepted as valid. Z-28 is not going to be used in a formulation with a solvent, so the newer studies may be considered more realistic. The conflicting conclusions between these and the earlier studies where a solvent was used are to be expected. The claim that no acute effects are expected up to the water solubility limit is considered appropriate although it should be noted the actual solubility is unknown. It is expected to be less than 3.23 mg/L.

Regarding the algae studies, both the new and old studies tested the WAF, although different concentrations were used. In the old study, an EC50 was determined to lie between the two highest tested concentrations of 500 and 1000 mg WAF/L whereas the newer test noted no effects at >5000 mg WAF/L. A probable explanation is that the two highest test concentrations in the original study contained undissolved material, and the solutions remained cloudy throughout the test. This could lead to reductions in growth rate whereas the solutions in the new study remained clear throughout. Further evidence that the cloudiness lead to the observed effects is that the growth rates in the two highest tested concentrations

(original study) returned to the same levels as controls during the recovery period indicating effects were algistatic and not algicidal.

**Predicted-no-effect concentration (PNEC) derivation:**

In the more recent ecotoxicity tests provided above, it is clear that Z-28 is not acutely toxic to aquatic organisms up to its level of solubility. At some of the exposure levels, effects were seen on fish and daphnids. However, these are most likely to have been through physical effects due to insoluble material observed in the test vessels and not through toxic interaction of the chemical.

Nonetheless, this does demonstrate that effects can occur, and it is unknown at what dose level physical effects would be seen as the WAFs tested had been siphoned from the prepared test solution following a settling period.

For the purposes of this assessment, the PNEC will be set at the threshold level of water solubility, i.e. 3.23 mg/L.

## 9. Environmental Risk Characterisation

The environmental releases through blending and transferring are expected to be minimal, and should be cleaned up according to the procedures outlined in the MSDS.

With the exception of a spill situation, direct exposure to the aquatic environment is expected to be minimal. Consequently, a predicted concentration in water has not been derived as calculations would be fairly meaningless. The PNEC was determined to be 3.23 mg/L, but a direct comparison of the PEC/PNEC is not possible. However, it is considered highly unlikely that exposure to aquatic areas would be at levels high enough to approach the PNEC, and the risk to these areas is expected to be low.

Conflicting ecotoxicity results have been obtained through the use of different testing methodologies. Results indicate that if the chemical is bioavailable (e.g. through being formulated with a solvent), it may provide a hazard to the aquatic environment. In an unformulated state, the data indicate the chemical is unlikely to exert acute effects up to its limit of water solubility.

There are no data available to determine effects on animals exposed through the gas phase, or terrestrial organisms, so direct risk characterisation for the atmosphere and soil compartments are not possible. However, again based on exposure arguments, the risk to these areas would be expected to be low.

# 10. Discussion and Conclusions

## 10.1 Health hazards

The compound has been determined to be hazardous according to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC 1999) at the time of initial assessment because of the skin irritant properties of its sodium analogue. This current assessment does not change that classification.

## 10.2 Environment

The original assessment found Z-28 to be highly acutely toxic to fish and daphnia, very highly toxic to daphnia reproduction and non-toxic to algae. Because of its limited water solubility, the chemical was tested in these studies using a solvent which can result in interactions which could lead to an altered response to the test substance.

In the more recent ecotoxicity tests considered in this report Z-28 was added to water and mixed throughout the test. A solvent was not used, and the different results are a consequence of the two different test methods employed. In the later studies the test substance was shown not to be acutely toxic to aquatic organisms up to the level of its water solubility. Effects were however seen at some exposure levels on fish and daphnids and although these were likely due to physical effects rather than toxic interaction with the compound, it does show that environmental effects can occur. If the compound is bioavailable through, for example, formulation with a solvent, then it could be hazardous to the aquatic environment. In its unformulated state, however, it is unlikely to exert any acute effects.

No data is available for other environmental compartments but again risk to these areas is expected to be low.

# 11. Recommendations

## **Recommendation 1: Occupational controls**

The risk of adverse health effects during occupational use of Z-28 is low. This assessment supports the control measures recommended in the original new chemical assessment report NA/418. The recommendations of the New Chemicals assessment are reproduced below, as they would apply in the event of the chemical being used in Australia.

- If engineering controls and work practices are insufficient to reduce exposure to the notified chemical to a safe level, then the following personal protective equipment should be worn. Australian Standards (AS) or Australian/New Zealand Standards (AS/NZS) provide guidance.

Safety goggles: AS 1336 and AS/NZS 1337 provide guidance

Industrial clothing: AS 2919 provides guidance

Impermeable gloves: AS 2161 provides guidance

Occupational footwear: AS/NZS 2210 provides guidance

- Spillage of the notified chemical should be avoided, spillages should be cleaned up promptly and then be put into containers for disposal;
- Good personal hygiene should be practised to minimise the potential for ingestion; and
- A copy of the MSDS should be easily accessible to employees.

## **Recommendation 2: Material Safety Data Sheets**

The applicant provided the current MSDS for the product (see Appendix 2). The MSDS was in a 16 header format generally consistent with NOHSC's *National Code of Practice for the Preparation of Material Safety Data Sheets* 2nd Edition (the MSDS Code) (NOHSC, 2003) but there were slight deviations from the MSDS Code for sections 1 to 3. The requirement of a 16 header format will come into effect from April 2006.

- The MSDS gave regulatory information applicable to a number of countries. The entry for Australia states "...This product may be imported only by Lubrizol Australia...". There is no regulatory prohibition as far as NICNAS is concerned on any other company importing the product into Australia, provided they comply with all the requirements of NICNAS.
- The results of the additional environmental toxicity studies should be included in the updated MSDS.
- It is recommended that all references to "Worksafe Australia" in the MSDS be removed and replaced with "NOHSC".

- The MSDS contains entries against the Hazchem Code but no Dangerous Goods Class is identified. Consequently no Hazchem code should be published in the MSDS. It is recommended that the Hazchem code entries state “Not applicable”. Any additional information about fire fighting and spill management can be given in other sections of the MSDS.
- It is expected that information presented in this report be used to update the MSDS.

## 12. Secondary Notification

Under Section 65 of the Act, further secondary notification of Z-28 may be required where an applicant or other introducer (importer) or new manufacturer of Z-28, becomes aware of any circumstances that may warrant a reassessment of its hazards and risks. Specific circumstances include:

- a. The use of Z-28 has changed, or is likely to change, significantly;
- b. Manufacture of Z-28 has begun in Australia, or is likely to begin;
- c. Additional information has become available on the adverse health and/or environmental effects of Z-28.

The Director must be notified within 28 days of the introducer becoming aware of any of the above circumstances.

# Appendix 1

## Classification under the Globally Harmonised System for Hazard Classification and Communication

In this report, Z-28 has been classified for health effects against the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999) (the Approved Criteria). As a comparison only, the classification of Z-28 for health effects using the Globally Harmonised System for Hazard Classification and Labelling of Chemicals (GHS) (OECD, 2002b) is presented in Table 1. Environmental and physical hazards are also classified under the GHS but are not currently required in Australia hence no comparison is made, however the environmental hazard classification under the GHS is discussed below. The GHS system is not mandated in Australia and carries no legal status but is presented for information purposes. GHS classification and information documentation is available at:

<http://www.unece.org/trans/main/dgdb/dgsubc4/c4age.html>

**Table 1: GHS classification for health effects of Z-28**

Hazards	Classification	Hazard communication
<b>Skin irritation</b>	Mild irritant  Category 3:  (mean value $\geq 1.5$ to $< 2.3$ for erythema)	<b>Symbol:</b> none required  <b>Signal word:</b> Warning  <b>Hazard Statement:</b> Causes mild skin irritation

For environmental effects, the substance cannot be classified under the GHS. It is poorly water soluble and no acute effects were observed up to the level of water solubility. This and its persistence could allow a classification of Chronic IV. However, the bioaccumulation potential of the substance is considered small based on the log Kow so classification would appear to be unnecessary.

# Appendix 2

## Material Safety Data Sheet from Lubrizol International, Inc. for Z-28

This MSDS was provided by the applicant. It is reproduced here as a matter of public record. It should be noted that no assessment of the MSDS was undertaken. Therefore the accuracy of this information remains the responsibility of the applicant and the reproduction of the MSDS in this report is not to be taken as an endorsement by NICNAS as to the accuracy or adequacy of that MSDS or the information contained within it.

The format of this MSDS, with some minor amendments to section 1 to 3, is acceptable under the NOHSC's *National Code of Practice for the Preparation of Material Safety Data Sheets* 2nd Edition (NOHSC, 2003). However the contents require updating as outlined in Recommendation 2.

### Material Safety Data Sheet Z-28

1	<b>Chemical Product and Company Identification</b>
---	--

**Lubrizol International, Inc. ARBN 002 747 944**  
**28 River Street**  
**Silverwater, New South Wales 2128**  
**Australia**  
**(02) 9648-5122**

<b>Product Trade Name</b>	Z-28
<b>CAS Number</b>	Confidential.
<b>Synonyms</b>	None.
<b>Generic Chemical Name</b>	Calcium alkaryl substituted ethanoate
<b>Product Type</b>	Not applicable.
<b>Preparation/Revision Date</b>	05 October 2002

**Date**

**UN Number** Not applicable.

**Dangerous Goods Class and Subsidiary Risk** Not applicable.

**HAZCHEM Code** 3 [Z]

**Transportation Emergency Phone No.** ACOHS (Australia) 1800 638 556, ACOHS (New Zealand) 0800 154 666

**Statement of Hazardous Nature** Hazardous according to criteria of Worksafe Australia.

**Poisons Schedule Number** None Allocated

**MSDS No.** 21664953-1601240-513220-811103

<b>2</b>	<b>Composition/Information on Ingredients</b>
----------	---

**Hazardous Ingredients**

<b>Comp</b>	<b>Percentage (by wt.)</b>	<b>Symbol(s)</b>	<b>Risk Phrase(s)</b>	<b>CAS No.</b>
Calcium alkaryl substituted ethanoate	From 50 to 59.9 percent	Xi	R38	Confidential.

<b>3</b>	<b>Hazards Identification</b>
----------	-------------------------------

**Principal Hazards**

**CAUTION.**

- **MAY CAUSE SKIN IRRITATION.**

*See Section 11 for complete health hazard information.*

<b>4</b>	<b>First Aid Measures</b>
----------	---------------------------

<b>Oral</b>	DO NOT INDUCE VOMITING. If conscious, give 2 glasses of water. Get immediate medical attention.
<b>Eyes</b>	Flush with water at least 15 minutes. Get medical attention if eye irritation develops or persists.
<b>Skin</b>	Wash with soap and water. Remove contaminated clothing. Get medical attention if irritation develops. Launder contaminated clothing before reuse.
<b>Inhalation</b>	Remove exposed person to fresh air if adverse effects are observed.
<b>Additional Information</b>	Note to physician: Treat symptomatically.

<b>5</b>	<b>Fire Fighting Measures</b>
----------	-------------------------------

<b>Flash Point</b>	> 165 Deg C, 329 Deg F PMCC (Minimum)
<b>Extinguishing Media</b>	CO2, dry chemical, or foam. Water can be used to cool and protect exposed material.
<b>Firefighting Procedures</b>	Recommend wearing self-contained breathing apparatus. Water may cause splattering.
<b>Unusual Fire &amp; Explosion</b>	Toxic fumes, gases or vapors may evolve on burning.

## Hazards

<b>6</b>	<b>Accidental Release Measures</b>
----------	------------------------------------

### **Spill Procedures**

Personal Protective Equipment must be worn, see Personal Protection Section for PPE recommendations. Ventilate area if spilled in confined space or other poorly ventilated areas. Prevent entry into sewers and waterways. Pick up free liquid for recycle and/or disposal. Residual liquid can be absorbed on inert material. Check under Transportation and Labeling (DOT/CERCLA) and Other Regulatory Information Section (SARA) for hazardous substances to determine regulatory reporting requirements for spills.

<b>7</b>	<b>Handling and Storage</b>
----------	-----------------------------

### **Maximum Pumping Temperature**

Not determined.

### **Maximum Handling Temperature**

70 Deg C, 158 Deg F

### **Handling Procedures**

Keep containers closed when not in use. Wash thoroughly after handling. Empty container contains product residue which may exhibit hazards of product.

### **Maximum Storage Temperature**

45 Deg C, 113 Deg F

### **Storage Procedures**

No special storage precautions required.

### **Loading Temperature**

70 Deg C, 158 Deg F

## Temperature

8	Exposure Controls/Personal Protection
---	---------------------------------------

### Exposure Limits

#### Australia

Not applicable.

#### New Zealand

Not applicable.

### Ventilation Procedures

Use with adequate ventilation.

### Hand Protection

Nitrile.

### Eye Protection

Safety Glasses.

### Respiratory Protection

Under normal use conditions, respirator is not usually required. Use disposable dust/mist mask if the recommended exposure limit is exceeded. Use self-contained breathing apparatus for entry into confined space, for other poorly ventilated areas and for large spill clean-up sites.

### Clothing Recommendation

Long sleeve shirt is recommended.

9	Physical and Chemical Properties
---	----------------------------------

### Flash Point

> 165 Deg C, 329 Deg F PMCC (Minimum)

<b>Upper Flammable Limit</b>	Not determined.
<b>Lower Flammable Limit</b>	Not determined.
<b>Autoignition Point</b>	Not determined.
<b>Explosion Data</b>	Material does not have explosive properties.
<b>Vapor Pressure</b>	Not determined.
<b>pH</b>	Not determined.
<b>Specific Gravity</b>	1.01 (15.6 Deg C)
<b>Water Solubility</b>	Insoluble.
<b>Percent Volatile</b>	Unknown.
<b>Percent VOC</b>	Not determined.
<b>Vapor Density</b>	Not determined.
<b>Evaporation Rate</b>	Not determined.
<b>Odor</b>	Mild
<b>Appearance</b>	Dark amber liquid.
<b>Viscosity</b>	700 Centistokes (40 Deg C) 35 Centistokes (100 Deg C)
<b>Odor Threshold</b>	Unknown.

<b>Threshold</b>	
<b>Boiling Point</b>	Not determined.
<b>Pour Point Temperature</b>	Not determined.
<b>Melting/Freezing Point</b>	Not determined.
<b>Flash Point</b>	> 165 Deg C, 329 Deg F PMCC (Minimum)

*The above data are typical values and do not constitute a specification. Vapor pressure data are calculated unless otherwise noted.*

<b>10</b>	<b>Stability and Reactivity</b>
-----------	---------------------------------

<b>Stability</b>	Material is normally stable at moderately elevated temperatures and pressures.
<b>Decomposition Temperature</b>	Not determined.
<b>Incompatibility</b>	None known, avoid contact with reactive chemicals.
<b>Polymerization</b>	Will not occur.
<b>Thermal Decomposition</b>	Smoke, carbon monoxide, carbon dioxide, aldehydes and other products of incomplete combustion. Under combustion conditions, oxides of the following elements will be formed: calcium.

<b>11</b>	<b>Toxicological Information</b>
-----------	----------------------------------

**-- ACUTE EXPOSURE--**

<b>Oral Toxicity</b>	The LD50 in rats is > 5000 mg/Kg. Based on data from similar materials.
<b>Eye Irritation</b>	Not expected to cause eye irritation. Based on data from components or similar materials. Not expected to cause eye irritation. Based on data from similar materials.
<b>Skin Irritation</b>	May cause skin irritation. Based on data from similar materials. Prolonged or repeated skin contact as from clothing wet with material may cause dermatitis. Symptoms may include redness, edema, drying, and cracking of the skin.
<b>Dermal Toxicity</b>	The LD50 in rabbits is > 2000 mg/Kg. Based on other data or data on similar materials.
<b>Inhalation Toxicity</b>	No data available to indicate product or components may be a toxic inhalation hazard.
<b>Respiratory Irritation</b>	If material is misted or if vapors are generated from heating, exposure may cause irritation of mucous membranes and the upper respiratory tract similar to that observed with mineral oil. Based on data from components or similar materials. Under good industrial hygiene practices where all exposure limits are observed, respiratory irritation should not be a problem.
<b>Dermal Sensitization</b>	No data available to indicate product or components may be a skin sensitizer.
<b>Inhalation Sensitization</b>	No data available to indicate product or components may be respiratory sensitizers.

**-- CHRONIC EXPOSURE--**

<b>Chronic Toxicity</b>	No data available to indicate product or components present at greater than 1% are chronic health hazards.
<b>Carcinogenicity</b>	No data available to indicate any components present at greater than 0.1% may present a carcinogenic hazard.
<b>Mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are

mutagenic or genotoxic.

**Reproductive Toxicity** No data available to indicate either product or components present at greater than 0.1% that may cause reproductive toxicity.

**Teratogenicity** No data available to indicate product or any components contained at greater than 0.1% may cause birth defects.

**-- ADDITIONAL INFORMATION--**

**Other** No other health hazards known.

**Exposure Limits** Contains mineral oil. Under conditions which may generate mists, observe the OSHA PEL of 5 mg per cubic meter, ACGIH STEL of 10 mg per cubic meter.

12	<b>Ecological Information</b>
----	-------------------------------

**-- ENVIRONMENTAL TOXICITY--**

**Freshwater Fish Toxicity** The acute EC50 for freshwater fish is > 1000 ppm based on actual data.

**Freshwater Invertebrates Toxicity** The acute EC50 for freshwater invertebrates is 100 - 1000 ppm based on actual data. Chronic effects for freshwater invertebrates expected at 10 - 100 ppm based on actual data.

**Algal Inhibition** The acute EC50 is > 1000 mg/L based on actual data.

**Saltwater Fish Toxicity** Not determined.

**Saltwater Invertebrates Toxicity** Not determined.

**Bacteria Toxicity** The acute EC50 for bacteria is > 1000 ppm based on actual data.

**Miscellaneous Toxicity** Not determined.

**-- ENVIRONMENTAL FATE--**

**Biodegradation** This product shows limited biodegradation based on OECD 301-type test data for similar products. At least 25% of the components in this product show moderate biodegradation based on OECD 302-type test data.

**Bioaccumulation** This material potentially bioconcentrates, based on QSAR calculated octanol/water coefficient data.

**Soil Mobility** Not determined.

<b>13</b>	<b>Disposal Consideration</b>
-----------	-------------------------------

**Waste Disposal** This material, if discarded, is not a hazardous waste under RCRA Regulation 40 CFR 261.

<b>14</b>	<b>Transport Information</b>
-----------	------------------------------

**ICAO/IATA** Not regulated.

**IMDG (Ambient)** Not regulated.

**IMDG (Elevated)** Not regulated.

**IMDG EMS** Not applicable.

**IMDG MFAG** Not applicable.

**IMO Marine Bulk** DO NOT TRANSPORT - ADDITIONAL INFORMATION REQUIRED

**USCG  
Compatibility** Not determined.

**ADG  
(Ambient)** Not regulated.

**ADG  
(Elevated)** Not regulated.

**ADG  
HAZCHEM** 3 [Z]

<b>15</b>	<b>Regulatory Information</b>
-----------	-------------------------------

**U.S. TSCA  
Inventory** All components of this material are on the US TSCA Inventory.

**U.S. Tariff  
Heading  
Number** 3811.21.00.00

**Schedule B  
Number** 3811.21.0000

**FDA  
Approval** Not applicable.

**EEC EINECS** All components comply with the EU 7th Amendment and are approved for EU sales. Lubrizol must maintain records of all imports of this product into the EU. Third party importers are asked to report every import to The Lubrizol PSCD Manager (Europe),Hazelwood,Derby DE56 1QN, UK.

**Finnish  
Registration  
Number** Not Registered

**Sweden  
Registration  
Number** Not Registered

<b>Norway Registration Number</b>	Not Registered
<b>Danish Registration Number</b>	Not Registered
<b>Japan METI</b>	This product may be imported to Japan only by Lubrizol Japan.
<b>Australia</b>	A component(s) of this product has been notified and assessed under the Industrial Chemicals (Notification and Assessment) Act, 1989. This product may be imported only by Lubrizol Australia.
<b>Canada</b>	This material contains a chemical which must be notified and tracked by all Canadian Importers of Record as required by the Canadian Environmental Protection Agency. This material or products containing this material may be exported to Canada in limited quantities. Please contact the Lubrizol Product Safety and Compliance Department for details.
<b>Switzerland</b>	This product requires notification before sale in Switzerland.
<b>Switzerland Bag T Registration Number</b>	Not Registered
<b>Korea</b>	All components are in compliance in Korea.
<b>Korean Registration Number</b>	Not Registered
<b>Philippines</b>	This product requires notification before sale in the Philippines.
<b>New Zealand Registration Number</b>	Not Registered

**Malta  
Registration  
Number** Not Registered

**Ukraine  
Registration  
Number** Not Registered

**China** This product requires notification in China.

**China  
Registration  
Number** Not Registered

**Signal Word** Hazardous

**Labelling  
Information** R38 -- Irritating to skin.  
S37 -- Wear suitable gloves.

16	<b>Other Information</b>
----	--------------------------

<b>US NFPA Codes</b>	Health	Fire	Reactivity	Special
	1	1	0	N/E

<b>HMIS Codes</b>	Health	Fire	Reactivity
	1	1	0

**Precautionary  
Labels** CAUTION.

- MAY CAUSE SKIN IRRITATION.

**Revision  
Indicators**

Section: 12  
ACCUMULATION

Changed: 05  
October 2002

**Contact Point**

Lubrizol Australia, David Blackwell (Technical  
Manager), Phone No. (61) (02) 9648 5122

---

***The information presented herein has been compiled from sources considered to be dependable and is accurate to the best of The Lubrizol Corporation's knowledge; however, The Lubrizol Corporation makes no warranty whatsoever, expressed or implied of MERCHANTABILITY OR FITNESS FOR THE PARTICULAR PURPOSE, regarding the accuracy of such data or the results to be obtained from use thereof. The Lubrizol Corporation assumes no responsibility for injury to recipient or to third persons or for any damage to any property and recipient assumes all such risks.***

# References

Connell DW (1990) Bioaccumulation of xenobiotic compounds. Boca Raton, Florida, CRC Press, p56.

NOHSC (National Occupational Health and Safety Commission) (1999) Approved criteria for classifying hazardous substances [NOHSC:1008(1999)]. Canberra, ACT, Australian Government Publishing Service.

NOHSC (National Occupational Health and Safety Commission) (2003) National code of practice for the preparation of Material Safety Data Sheets (2nd edition) [NOHSC:2011(2003)]. Canberra, ACT, Australian Government Publishing Service.

OECD (Organisation for Economic Cooperation and Development). OECD guidelines for testing of chemicals. Paris, France, OECD.

OECD (2002a) Guidance document on aquatic toxicity testing of difficult substances and mixtures. DNV/JM/MONO(2000)6. Organisation for Economic Cooperation and Development.

OECD (2002b) Amendment to the GHS. Sub-Committee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals. Third Session, 10-12 July, 2002. UN/SCEGHS/3/INF.16. 6 pp. Prepared as Annex 3 of OECD Document ST/SG/AC.10/C.4/2001/26. Organisation for Economic Cooperation and Development.

Ricerca (1997) Activated Sludge, Respiration Inhibition Test on Test Substance OS 112452. Document Number: 7059-96-0282-AC-001. Department of Analytical and Biological Services, Ricerca Inc Painesville, USA. (Unpublished).

Standards Australia (1994) Australian Standard 1336-1994: Recommended practices for eye protection in the industrial environment. Sydney, Australia, Standards Association of Australia.

Standards Australia, Standards New Zealand (1992) Australian/ New Zealand Standard 1337-1992: Eye protectors for industrial applications. Wellington, New Zealand, Standards Association of New Zealand; Sydney, Australia, Standards Association of Australia,

Standards Australia (1978) Australian Standard 2161-1978: Industrial safety gloves and mittens (excluding electrical and medical gloves). Sydney, Standards Association of Australia.

Standards Australia (1987) Australian Standard 2919 – 1987: Industrial clothing. Sydney, Standards Association of Australia.

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. Sydney, Standards Association of Australia, Wellington, Standards Association of New Zealand.

SUSDP (2003) National Drugs and Poisons Schedule Committee. Standard for the Uniform Scheduling of Drugs and Poisons. Canberra, ACT, Australian Government Publishing Service

Wilbury Laboratories Inc (1997a). Acute toxicity of OS# 112452E to the rainbow trout (*Oncorhynchus mykiss*) – dispersion method test. Study number 1214-LU. Massachusetts, USA, TR Wilbury Laboratories, Inc. (Unpublished).

Wilbury Laboratories Inc (1997b). Acute toxicity of OS# 112452E to the zebra fish (*Brachydanio rerio*) – dispersion method test. Study number 1213-LU. Massachusetts, USA, TR Wilbury Laboratories, Inc. (Unpublished).

Wilbury Laboratories Inc (1997c). Acute toxicity of the water accommodated fraction (WAF) of OS# 112452E to the daphnid, *Daphnia magna*. Study number 1215-LU. Massachusetts, USA, TR Wilbury Laboratories, Inc. (Unpublished).

Wilbury Laboratories Inc (1997d). Chronic toxicity of the water accommodated fraction (WAF) of OS# 112452E to the daphnid, *Daphnia magna*. Study number 1216-LU. Massachusetts, USA, TR Wilbury Laboratories, Inc. (Unpublished).

Wilbury Laboratories Inc (1997e). Acute toxicity of the water accommodated fraction (WAF) of OS# 112452E to the freshwater alga, *Selenastrum capricornutum*. Study Number 1217-LU. Massachusetts, USA, TR Wilbury Laboratories, Inc. (Unpublished).



# Order Form

FOR NICNAS PUBLICATIONS



List of Publications	Quantity	Amount
----------------------	----------	--------

Handbook for Notifiers @ AUD \$55.00 each (incl. GST)	<input type="text"/>	<input type="text"/>
---	----------------------	----------------------

Australian Inventory of Chemical Substances (AICS) CD ROM @ \$242.00 (incl. GST). (2003 version)	<input type="text"/>	<input type="text"/>
--	----------------------	----------------------

Available within Australia only.

Copy/s of Full Public Report/s of the following complete assessments.

<input type="text"/>	<input type="text"/>
----------------------	----------------------

Include NICNAS reference number/s (no charge).

Full Public Report for Priority Existing Chemical –

<input type="text"/>	<input type="text"/>
----------------------	----------------------

Please specify report name (no charge).

Total \$

All prices include postage and packaging within Australia and by SEAMAIL overseas.  
For AIRMAIL please include an additional \$50.00 per Handbook and \$10.00 each for other NICNAS products.

All orders must be accompanied by prepayment in Australian Dollars. Purchase orders NOT accepted.

Overseas only: Please send by AIRMAIL Yes  No

I enclose a cheque/money order payable to: NICNAS.

Drawn on an Australian bank in Australian Dollars for: \$

or: Bankcard / Viscard / Mastercard only. Card no.

Signature of card holder \_\_\_\_\_ Expiry date \_\_\_\_\_

\_\_\_\_\_ Name of card holder \_\_\_\_\_

Please ensure you complete this section. Please send me a tax invoice Yes/No

Name of recipient \_\_\_\_\_ Position \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

Telephone ( ) \_\_\_\_\_ Fax ( ) \_\_\_\_\_

Send this order to: NICNAS, Finance  
GPO Box 58, Sydney, NSW 2001 Australia

For further information about NICNAS publications please call: Free Call 1800 638 528  
Or email info@nicnas.gov.au