

File No: LTD/1348

May 2008

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

**FULL PUBLIC REPORT**

**Solplus K500**

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (Cwlth) (the Act) and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the Department of Health and Ageing, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Department of the Environment, Water, Heritage and the Arts.

For the purposes of subsection 78(1) of the Act, this Full Public Report may be inspected at our NICNAS office by appointment only at 334-336 Illawarra Road, Marrickville NSW 2204.

This Full Public Report is also available for viewing and downloading from the NICNAS website or available on request, free of charge, by contacting NICNAS. For requests and enquiries please contact the NICNAS Administration Coordinator at:

Street Address:	334 - 336 Illawarra Road MARRICKVILLE NSW 2204, AUSTRALIA.
Postal Address:	GPO Box 58, SYDNEY NSW 2001, AUSTRALIA.
TEL:	+ 61 2 8577 8800
FAX	+ 61 2 8577 8888
Website:	<a href="http://www.nicnas.gov.au">www.nicnas.gov.au</a>

**Director  
NICNAS**

## **TABLE OF CONTENTS**

<b><u>FULL PUBLIC REPORT</u></b> .....	3
1. APPLICANT AND NOTIFICATION DETAILS.....	3
2. IDENTITY OF CHEMICAL .....	3
3. COMPOSITION.....	3
4. PHYSICAL AND CHEMICAL PROPERTIES.....	4
5. INTRODUCTION AND USE INFORMATION.....	5
6. HUMAN HEALTH IMPLICATIONS.....	5
6.1 Exposure assessment.....	5
6.1.1 Occupational exposure.....	6
6.1.2 Public exposure.....	6
6.2 Human health effects assessment.....	6
6.3 Human health risk characterisation.....	7
6.3.1 Occupational health and safety .....	7
6.3.2 Public health.....	8
7. ENVIRONMENTAL IMPLICATIONS .....	8
7.1 Environmental Exposure & Fate Assessment.....	8
7.1.1 Environmental Exposure.....	8
7.1.2 Environmental fate.....	8
7.1.3 Predicted Environmental Concentration (PEC) .....	8
7.2 Environmental effects assessment .....	8
7.2.1 Predicted No-Effect Concentration.....	9
7.3 Environmental risk assessment .....	9
8. CONCLUSIONS AND REGULATORY OBLIGATIONS.....	9
<b><u>BIBLIOGRAPHY</u></b> .....	12

## **FULL PUBLIC REPORT**

<b>Solplus K500</b>
---------------------

### **1. APPLICANT AND NOTIFICATION DETAILS**

#### APPLICANT(S)

Orica Australia Pty Ltd (ABN 99 004 117 828)  
1 Nicholson Street  
Melbourne VIC 3000

#### NOTIFICATION CATEGORY

Limited: Synthetic polymer with  $M_n \geq 1000$  Da.

#### EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication: Chemical name, other names, CAS number, molecular and structural formula, monomer constituents and percentages, Spectral details, molecular weight information, confidential details of use, impurities, import volume,.

#### 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)

None

#### NOTIFICATION IN OTHER COUNTRIES

US (2004), Canada (2008)

### **2. IDENTITY OF CHEMICAL**

#### MARKETING NAME(S)

Solplus K500

#### MOLECULAR WEIGHT

$M_n > 1000$  Da

#### ANALYTICAL DATA

Reference NMR, IR, MS, and GPC spectra were provided.

### **3. COMPOSITION**

DEGREE OF PURITY             $> 95\%$

#### HAZARDOUS IMPURITIES/RESIDUAL MONOMERS

All hazardous impurities are present at concentrations below the cut-off for classification.

#### LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES

Losses of monomers due to volatility are likely to be minimal. The level of residual monomers of the notified polymer is low.

#### DEGRADATION PRODUCTS

No detailed examination of degradation products has been carried out. Degradation, decomposition or depolymerisation of the notified polymer would only be expected under the following conditions: In the event of fire, combustion products of pyrolysis (oxygen limited) are likely to include miscellaneous hydrocarbons and oxides of carbon and nitrogen.

#### 4. PHYSICAL AND CHEMICAL PROPERTIES

Property	Value	Test Method/Justification
Physical state	clear brown viscous liquid	Visual observation
Melting point	< 4 °C (pour point)	Visual Observation
Boiling point	> 275 °C (dec)	Melting point apparatus
Relative density	0.94 g/cm <sup>3</sup>	Pycnometer
Vapour pressure	1.28E-21 mmHg	estimate
Water solubility	11.91 mg/L @ pH 7 @ 20°C (0.12%)	Extractability, OECD TG 120
	6.6E-07 mg/L	<i>estimate</i>
Hydrolysis as a Function of pH	t <sub>1/2</sub> = 32 yr @ pH 7	<i>estimate</i>
Partition coefficient n-octanol/water (log value)	12.7 and 8.51	<i>estimates</i>
Adsorption/desorption	Log K <sub>oc</sub> = 8.66	<i>estimate</i>
Dissociation Constant	pK <sub>a</sub> for tertiary amine = 9.27	<i>estimate</i>
Particle Size	Not determined	The notified polymer is a liquid at room temperature
Flash point	> 300°C	Closed cup
Flammability	Not determined	Not expected to form a flammable air/vapour mixture based on its flash point.
Autoignition Temperature	Not determined	-
Explosive Properties	Not expected to be explosive	Estimated based on chemical structure

NOTE: the estimates were generated for a smaller notified substance using EPISUITE 3.20 and/or PALLAS 3.5.1.1

#### DISCUSSION OF PROPERTIES

Data on water solubility were generated following OECD TG 120. TG120 recommends filtering / centrifugation to obtain a “clear solution”. Although in this case the dispersed material was also of interest, the laboratory did indeed clear the solution by filtering the polymer out of the aqueous phase; it was reported that the 0.45 µm filter clogged immediately and was replaced by a 1.2 µm glass fiber filter of 260 µm thickness, which also clogged repeatedly and had to be changed about every 200 ml. Analytical determination was performed gravimetrically and via GPC with significantly differing results. Only the gravimetrically determined values are reported in the table above as the notifier had claimed in the notification package that GPC on the notified substance was not possible and no reason could be found why it would be suitable in this case. Furthermore the results are not reasonable (0.04 mg/L / < 0.01% at pH 7), thus the GPC results were not taken into consideration.

At 20°C and pH 7 the gravimetrically determined result was 11.92 mg/L, equivalent to 0.12% of the 10 g used for the test. However this value is still considered too low; the polymer functions as a hyperdispersant and is thus expected to be at least somewhat dispersible in water and therefore bioavailable to aquatic biota. An aquatic toxicity study performed at 150 mg/L (considered the dispersion limit) and analytically determined to actually correspond to 64 mg/L (equivalent to 42.67%) confirmed this assumption. It should be noted that in this case a different method, FTIR, was used for the analysis which clearly demonstrates the dependency of the test result on the analytical method applied.

#### Reactivity

The notified polymer is expected to be stable under normal conditions. The MSDS indicates that contact with strong oxidizing agents should be avoided.

## 5. INTRODUCTION AND USE INFORMATION

### MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

The notified polymer will be imported into Australia in 20 kg and 180 kg 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>	< 1	< 1	< 1	< 1	< 1

### PORT OF ENTRY

Melbourne

### IDENTITY OF MANUFACTURER/RECIPIENTS

Orica Australia Ltd

### TRANSPORTATION AND PACKAGING

The notified polymer will be transported from the dock to the notifier's site, and then to the customer sites by road or rail. The blended coatings products containing the notified polymer (<5% concentration) will be packaged into drums and pails and transported by road.

### USE

The notified polymer is marketed for use as a dispersing agent for inorganic pigments and fillers in plasticizers for adhesive plastisols and paints and for dispersion of pigments in epoxy resin for adhesive applications. In Australia it is likely that the predominant use will be as a dispersing agent in the formulation of industrial paints.

### OPERATION DESCRIPTION

The notifier has provided an operation description based on industrial paint reformulation only as it is expected that this will be the predominant use in Australia. The notifier has indicated that other uses (reformulation and use of adhesive plastisols and epoxy resin adhesives) are expected to result in similar operational descriptions and exposures to workers and to the environment, or where different, reduced exposures to workers and the environment are expected.

### *Storage*

The drums containing the notified polymer will be stored at the notifier's site and will not be opened but sent to blending plant sites.

### *Paint reformulation*

Workers will connect a vacuum hose line to the drums from which the polymer is pumped to the blender. All operations that involve transfer are carried out under exhaust ventilation. Blending of the polymer to finished coatings (final concentration <5% notified polymer) generally occurs in a closed automated system with dedicated transfer lines, thereby minimising the potential for occupational exposure. Occasionally coatings manufacture may occur in batch mixers where addition of the polymer is semi-automated. Blending equipment is fitted with exhaust ventilation systems and there is a regular maintenance programme in place to control air flow levels at regular intervals. Filtration, drum and pail filling are automated and metered processes and worker intervention is not required unless the filling line requires adjustment. The blended product will be sampled for laboratory analysis.

### *Paint Application*

Prior to application, the paint will be stirred and transferred into trays. Coatings will be applied by spray, roller or brush. Mixing and spraying is conducted in spray booths where the overspray is collected within the spray booth by its filtering system or on masking materials (e.g. kraft and newspaper). The notifier has indicated that the bulk of the spray painting would be conducted at industrial sites using spray booths in accordance with AS/NZ 4114:1995. However the level of controls and ventilation may vary from site to site.

## 6. HUMAN HEALTH IMPLICATIONS

### 6.1 Exposure assessment

### 6.1.1 Occupational exposure

#### NUMBER AND CATEGORY OF WORKERS

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration (hours/day)</i>	<i>Exposure Frequency (days/year)</i>
(a) Transport and Warehousing Personnel	10	minimal	200
(b) Reformulation			
- high speed dispersing	40	4	30
- makeup	40	2	30
- QC testing	10	8	30
- filling into containers	40	8	30
(c) Application			
- addition to coater trays and mixing	1000's	6	200
- application by spray, roller or brush	100's	4	200
- cleaning of equipment	1000's	2	200

#### EXPOSURE DETAILS

##### *Transport and storage*

Transport and storage workers are not expected to be exposed to the notified polymer except in the case of an accident involving spillage of the notified polymer.

##### *Paint reformulation*

Inhalation exposure during reformulation processes is expected to be minimal, based on the expected low vapour pressure of the notified polymer and the local exhaust ventilation used during processes where aerosols may be formed. Dermal and accidental ocular exposure may occur due to splashes, drips and spills during connection/disconnection of vacuum lines, quality control sampling and analysis and during filling/emptying of mixing vessels (only when a semi-automated batch mixer is used). This exposure will be incidental and minimised by the use of personal protective equipment, including impervious gloves, coveralls and goggles.

##### *Paint application*

Dermal, ocular and inhalation exposure to the notified polymer may occur during spray application of the coating (<5% notified polymer). Exposure during spray operations should be reduced by the predominant use within spray booths. In addition, workers are expected to wear, as a minimum, eye protection, safety shoes, coveralls, and impermeable gloves; if necessary an air-fed respirator will also be worn.

Dermal and ocular exposure of workers to the notified polymer may occur during roller and brush applications, particularly during manual decanting and manual application. Exposure should be reduced by the wearing of PPE, including overalls, eye protection and impermeable gloves.

### 6.1.2. Public exposure

The notified polymer, and paint products containing it will not be sold to the public. The public may come into contact with surfaces coated with the paint containing the notified polymer, however at this stage the notified polymer is contained within the coating and so is not expected to be available for exposure. Therefore public exposure to the notified polymer would only be possible in the unlikely event of a spill during transportation.

## 6.2. Human health effects assessment

No toxicity data is available on the notified polymer. Limited toxicity data for a similar substance (Polymer 1) was provided and is summarised below.

##### *Acute toxicity*

For Polymer 1, acute oral toxicity was tested in the year 2000, using OECD 423. Three fasted female Sprague Dawley rats were gavaged with 2000 mg/kg bw test article in distilled water. Thereafter, the test article was administered at the same level to male rats. Animals were kept for two weeks, then sacrificed. All animals gained weight during both weeks of the study. No clinical signs were noted for any animal at any of the daily observations. No test article-related mortality occurred. No abnormalities were observed upon gross necropsy.

The oral LD50 of the test article is >2000 mg/kg bw, indicating low acute oral toxicity.

#### *Irritation*

For Polymer 1, acute dermal irritation was tested in the year 2000 on New Zealand White rabbits, following OECD 404. A single, 4-hour semi-occluded application of 0.5 mL undiluted test material was administered to the intact skin of three rabbits. One rabbit from the 4-hour application showed erythema at 24 hours, but not at any other time point, and the irritation was considered completely reversible, with no other effects. PII was calculated at 0.2, representing “mild” irritation. No corrosive effects were observed for 3-minute and 1-hour applications to the intact skin of one rabbit.

For Polymer 1, acute ocular irritation was tested, in the year 2000, on New Zealand White rabbits, following OECD 405. A single, 0.1 mL application of the undiluted test material was administered to the non-irrigated eye of three rabbits. Ocular reactions were recorded up to 72 hours after administration. Moderate conjunctival irritation was observed (maximum group mean score 10/110, at 1 hour, decreasing thereafter to 1.33/110 at 24 hours, 0.67 at 48 hours and 0 at 72 hours) showing reversibility. The substance was considered to be “mildly irritating” to rabbit eye

#### *Mutagenicity*

For Polymer 1, a reverse mutation (Ames) test was performed, in the year 2000, using *Salmonella typhimurium* strains TA1535, TA1537, TA102, TA98 and TA 100 and the *Escherichia coli* strain WP2uvrA<sup>-</sup>. The preincubation method (20 minutes at 37°C) was used. Assays were performed in triplicate, with and without a rat liver metabolizing system (S9). Vehicle control was DMSO. Revertant numbers for negative controls were within the normal range, and for positive controls were significantly increased over baseline. The test material caused a visible reduction in the growth of the bacterial background lawn initially at 500 µg/plate (without S9) or at 1500 µg/plate (with S9). No toxicity was observed for strain WP2uvrA<sup>-</sup> in the presence of S9 mix. The test substance was tested from 5 or 15 µg/plate up to the maximum recommended level of 5000 µg/plate or toxic limit, depending on strain type, and the presence or absence of S9-mix. Precipitate was observed at and above 500 µg/plate. The test article did not cause any increase in the frequency of revertant colonies for any tester strains, with or without metabolic activation. Polymer 1 was considered to be non-mutagenic under the test conditions.

Therefore, based on toxicity tests from a similar surrogate substance, the notified polymer is likely to show low oral toxicity, to be a mild irritant to skin and eye, and to be negative in a test for bacterial reverse mutation.

#### *Classification*

Although based on the available data the notified polymer can not be classified under the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)], the notifier has classified the notified polymer as hazardous based on its potential to cause skin and eye irritation and has applied the following risk phrases:

R36 Irritating to eyes

R38 Irritating to skin

As the functional group which would cause the irritation is not exactly the same in Polymer 1 and the notified polymer, a difference in severity of irritation effects can not be ruled out. Therefore the precautionary classification by the notifier is considered to be appropriate.

### **6.3. Human health risk characterisation**

#### **6.3.1. Occupational health and safety**

##### *Acute effects*

The notified polymer is considered to have the potential to cause skin and eye irritation. Dermal and ocular exposure to the notified polymer and notified polymer dispersions (< 5% concentration) may occur during reformulation and end-use. However, the risk of irritation effects in workers is considered to be low due to the engineering controls and PPE expected to be in use, as well as the low concentration in the end-use products.

##### *Systemic effects*

The notified polymer was found to be non-mutagenic in a test in bacteria. The systemic toxicity has not been tested, however given the high molecular weight of the polymer (Mn > 1000) it is unlikely to cross biological membranes to a significant degree. Therefore the risk of systemic effects after repeated exposure is expected to be low.

### **6.3.2. Public health**

As the products containing the notified polymer are not sold to the public, and the public are only exposed to surfaces coated with paint incorporating the notified polymer, the public exposure is considered to be negligible. Therefore the notified polymer is not considered to present a concern to the public.

## **7. ENVIRONMENTAL IMPLICATIONS**

### **7.1. Environmental Exposure & Fate Assessment**

#### **7.1.1 Environmental Exposure**

##### **RELEASE OF CHEMICAL AT SITE**

Although spills are not frequent, during formulation it is estimated that up to 1% of the notified polymer may be spilt. These spills will be contained within bunding and disposed of by a licensed waste contractor. Small amounts (<1%) will be present in washes after equipment cleaning. These washes will undergo a process of flocculation during which time the polymer will be removed and disposed of to landfill. Less than 1% of the notified polymer may remain as residue in the drums. This will be disposed of to landfill or incinerated.

##### **RELEASE OF CHEMICAL FROM USE**

During industrial use it is estimated that less than 1% of the notified polymer will be spilt. These spills will be contained within bunding and disposed of by a licensed waste contractor. Small amounts (<1%) will be present in washes after equipment cleaning. These washes will undergo a process of flocculation during which time the polymer will be removed and disposed of to landfill. Less than 1% of the notified polymer may remain as residue in the drums. This will be disposed of to landfill or incinerated.

When the coating is applied by spraying it is expected that approximately 20% will form overspray. At industrial sites the overspray will be captured in the spray booth and on kraft paper. The spray will then harden and be disposed of by a licensed waste contractor.

##### **RELEASE OF CHEMICAL FROM DISPOSAL**

The notified polymer will be disposed of to landfill, by incineration, where permissible, and to sewage treatment plants. The dominant method of disposal will be to landfill. Prior to disposal to release from sewage treatment plants the polymer will undergo a process of flocculation where the polymer is separated from the solution, and then disposed of to landfill. In landfill, the notified polymer is expected to eventually degrade to simple organic and nitrogen based compounds.

#### **7.1.2 Environmental fate**

No environmental fate data were submitted. Based on the size and chemical composition, the notified polymer is not anticipated to be readily biodegradable.

#### **7.1.3 Predicted Environmental Concentration (PEC)**

As release to the aquatic compartment is expected to be minimal, a Predicted Environmental Concentration (PEC) is not able to be calculated.

### **7.2. Environmental effects assessment**

#### **Aquatic Effects**

Due to the cationic nature of the substance one acute aquatic toxicity study was required. Based on SAR equations developed by Boethling and Nabholz (1997), for substances with 0.7% amine, fish is anticipated to be the most sensitive species.

#### ***Acute Toxicity Test Results***

Acute toxicity to fish was tested on Rainbow trout (*Oncorhynchus mykiss*) according to OECD Test Guideline 203 under semi-static conditions and in accordance with the Principles of GLP (Brixham 2007). The test was performed on the notified substance as a limit test, i.e. on one concentration only, 10 fish were exposed in each of the two test vessels with dilution water and the test solution respectively. The test solution was prepared at the dispersion limit of the substance, determined to be 150 mg/L nominal, which was analytically determined by FT-IR to be 64 mg/L.



No symptoms of toxicity were noted although due to dispersion density and the corresponding limited visibility observations were only possible during fish transfers (24, 48 and 72 hours) and at the end of the test. At the highest concentration tested, no adverse effects were noticeable. The reported effect concentration of 150 mg/L nominal (64 mg/L measured) therefore represents the no observed effect concentration, NOEC.

#### ***Chronic Toxicity Test Results***

No test data were provided.

#### ***Toxicity to Microorganisms***

No test data were provided.

#### **Terrestrial Effects**

No test data were provided.

#### **Other Environmental Effects**

Based on the information provided, at the time of notification no other environmental effects are known.

### **7.2.1 Predicted No-Effect Concentration**

The environmental predicted no effect concentration (PNEC) is derived from the effect concentration (in this case a NOEC) provided in a limit test. The PNEC is calculated by dividing the 96 h fish NOEC (64 mg/L) by an assessment factor of 1,000. This factor represents factors of 10 for each of the following: moving from a limited set of aquatic toxicity data to a full base set, estimating chronic "maximum acceptable toxicant concentration" (MATC) from the base set; and extrapolating from the MATC to the PNEC. Thus the PNEC is 64 µg/L.

### **7.3. Environmental risk assessment**

As a PEC can not be calculated, it is not possible to calculate the risk quotient (Q). However, given the minimal release to the aquatic environment, the risk to the environment posed by the notified polymer is considered to be acceptable.

## **8. CONCLUSIONS AND REGULATORY OBLIGATIONS**

### **Hazard classification**

The notifier has classified the notified polymer as hazardous based on its potential to cause skin and eye irritation and has applied the following risk phrases:

R36 Irritating to eyes

R38 Irritating to skin

and

As a comparison only, the classification of the notified polymer using the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS) (United Nations 2003) is presented below. This system is not mandated in Australia and carries no legal status but is presented for information purposes.

	<b><i>Hazard category</i></b>	<b><i>Hazard statement</i></b>
Environment	Acute Category 3	Harmful to aquatic life

### **Human health risk assessment**

Under the conditions of the occupational settings described, the notified polymer is not considered to pose an unacceptable risk to the health of workers.

When used in the proposed manner, the notified polymer is not considered to pose an unacceptable risk to public health.

## Environmental risk assessment

The notified chemical is not considered to pose a risk to the environment based on its reported use pattern.

## Recommendations

### CONTROL MEASURES

#### Occupational Health and Safety

- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer as introduced:
  - Avoid skin and eye contact
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer as introduced:
  - Protective clothing
  - Safety glasses
  - Protective gloves

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 chemical are classified as hazardous to health in accordance with the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)] 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 to landfill.

#### Emergency procedures

- Spills or accidental release of the notified chemical should be handled by physical containment, collection and subsequent safe disposal.

## Regulatory Obligations

### *Secondary Notification*

This risk assessment is based on the information available at the time of notification. The Director may call for the reassessment of the chemical under secondary notification provisions based on changes in certain circumstances. Under Section 64 of the *Industrial Chemicals (Notification and Assessment) Act (1989)* the notifier, as well as any other importer or manufacturer of the notified chemical, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified chemical is listed on the Australian Inventory of Chemical Substances (AICS).

Therefore, the Director of NICNAS 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 polymer has a number-average molecular weight of less than 1000; oror
- (2) Under Section 64(2) of the Act; if
  - the function or use of the chemical has changed from a dispersing agent in industrial paints, plastisols and adhesives, or is likely to change significantly;

- the amount of chemical being introduced has increased from one tonne, or is likely to increase, significantly;
- if the chemical has begun to be manufactured in Australia;
- additional information has become available to the person as to an adverse effect of the chemical on occupational health and safety, public health, or the environment.

The Director will then decide whether a reassessment (i.e. a secondary notification and assessment) is required.

*Material Safety Data Sheet*

The MSDS of the notified polymer provided by the notifier was reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.

## **BIBLIOGRAPHY**

- Boethling, R. S. & Nabholz, J. V. Environmental Assessment of Polymers under U.S. Toxic Substances Control Act. In: Ecological assessment of polymers: strategies for product stewardship and regulatory programs, edited by Hamilton, J. D., Sutcliffe, R., 1997.
- Brixham (2007) Acute toxicity to rainbow trout (*Oncorhynchus mykiss*) (Report No. BL8469/B, 5 October 2007), Brixham Environmental Laboratory, AstraZeneca UK Limited, Devon UK (Unpublished report provided by notifier)
- FORS (Federal Office of Road Safety) (1998) Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG code), 6th Edition, Canberra, Australian Government Publishing Service
- NOHSC (1994) National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.
- NOHSC (2004) Approved Criteria for Classifying Hazardous Substances, 3<sup>rd</sup> edition [NOHSC:1008(2004)]. National Occupational Health and Safety Commission, Canberra, AusInfo.
- NOHSC (2003) National Code of Practice for the Preparation of Material Safety Data Sheets, 2<sup>nd</sup> edition [NOHSC:2011(2003)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.
- United Nations (2003) Globally Harmonised System of Classification and Labelling of Chemicals (GHS). United Nations Economic Commission for Europe (UN/ECE), New York and Geneva.