

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

POLYMER OF LOW CONCERN PUBLIC REPORT

Oxirane, 2-phenyl-, polymer with oxirane, monooctyl ether

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act) and Regulations. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the Australian Government Department of Health, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Australian Government Department of the Environment and Energy.

This Public Report is 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:	Level 7, 260 Elizabeth Street, SURRY HILLS NSW 2010, AUSTRALIA.
Postal Address:	GPO Box 58, SYDNEY NSW 2001, AUSTRALIA.
TEL:	+ 61 2 8577 8800
FAX:	+ 61 2 8577 8888
Website:	www.nicnas.gov.au

**Director
NICNAS**

January 2020

Table of Contents

SUMMARY	2
CONCLUSIONS AND REGULATORY OBLIGATIONS.....	2
ASSESSMENT DETAILS.....	4
1. APPLICANT AND NOTIFICATION DETAILS.....	4
2. IDENTITY OF POLYMER	4
3. PLC CRITERIA JUSTIFICATION	4
4. PHYSICAL AND CHEMICAL PROPERTIES.....	4
5. INTRODUCTION AND USE INFORMATION.....	5
6. HUMAN HEALTH RISK ASSESSMENT.....	5
7. ENVIRONMENTAL RISK ASSESSMENT	5
BIBLIOGRAPHY	7

SUMMARY

The following details will be published in the NICNAS *Chemical Gazette*:

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS SUBSTANCE	INTRODUCTION VOLUME	USE
PLC/1571	Evonik Australia Pty Ltd	Oxirane, 2-phenyl-, polymer with oxirane, monoethyl ether	No	≤ 200 tonnes per annum	Component of coatings and inks

CONCLUSIONS AND REGULATORY OBLIGATIONS

Human Health Risk Assessment

Based on the assumed low hazard and the assessed use pattern, the notified polymer is not considered to pose an unreasonable risk to the health of workers and the public.

Environmental Risk Assessment

Based on the assessed use pattern, the notified polymer is not considered to pose an unreasonable risk to the environment.

Health and Safety Recommendations

- No specific engineering controls, work practices or personal protective equipment are required for the safe use of the notified polymer itself. However, these should be selected on the basis of all ingredients in the formulation.
- A copy of the SDS should be easily accessible to employees.
- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS)*, as adopted for industrial chemicals in Australia, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation should be in operation.

Disposal

- Where reuse or recycling are not appropriate, dispose of the notified polymer in an environmentally sound manner in accordance with relevant Commonwealth, state, territory and local government legislation.

Emergency Procedures

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

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 polymer 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 polymer, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified polymer 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 notified polymer is introduced in a chemical form that does not meet the PLC criteria.

or

- (2) Under Section 64(2) of the Act; if
- the function or use of the notified polymer has changed from component of coatings and inks, or is likely to change significantly;
 - the amount of notified polymer being introduced has increased, or is likely to increase, significantly;
 - the notified polymer has begun to be manufactured in Australia;
 - additional information has become available to the person as to an adverse effect of the notified polymer 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.

Safety Data Sheet

The SDS of the notified polymer was provided by the applicant. The accuracy of the information on the SDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

Applicants

Evonik Australia Pty Ltd (ABN: 31 1457 396 08)
Suite 33, 1 Ricketts Road
MOUNT WAVERLEY VIC 3149

Exempt Information (Section 75 of the Act)

Data items and details exempt from publication include: structural formula, molecular weight, spectral data, polymer constituents, residual monomers/impurities, and import volume.

2. IDENTITY OF POLYMER

Marketing Name(s)

Tego Dispers 650

Chemical Name

Oxirane, 2-phenyl-, polymer with oxirane, monooctyl ether

Other Name(s)

Oxirane, polymer with phenyloxirane, monooctyl ether
Ethylene oxide-styrene oxide copolymer monooctyl ether

CAS Number

83653-00-3

Molecular Formula

$C_8H_{18}O.(C_8H_8O.C_2H_4O)_x$

Molecular Weight

Number Average Molecular Weight (Mn) is > 1,000 g/mol

3. PLC CRITERIA JUSTIFICATION

<i>Criterion</i>	<i>Criterion met</i>
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	Yes
Low Charge Density	Yes
Approved Elements Only	Yes
Stable Under Normal Conditions of Use	Yes
Not Water Absorbing	Yes
Not a Hazard Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

4. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20 °C and 101.3 kPa	Yellow liquid
Melting Point/Glass Transition Temperature	Expected to be < 0 °C
Density	1,050 kg/m ³ at 25 °C
Water Solubility	Expected to have low solubility
Reactivity	Stable under normal environmental conditions
Degradation Products	None under normal conditions of use

5. INTRODUCTION AND USE INFORMATION

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>
Tonnes	50 – 200	50 – 200	50 – 200	50 – 200	50 – 200

Use

The notified polymer will be used as a wetting and dispersing agent for waterborne and solvent-borne coating and ink products. The notified polymer will not be manufactured in Australia. It will be imported in neat form or in pigment concentrates for reformulation into end-use products (containing the notified polymer at $\leq 10\%$ concentration). It will also be imported in the finished coating and ink products.

Coatings will be applied by workers in an industrial setting, by professional applicators of architectural paint, and by DIY users. Application will be carried out by brush, roller or spray. Use of appropriate personal protective equipment (PPE) as suggested by the notifier in the application will minimise the potential for exposure.

Inks containing the notified polymer at $\leq 10\%$ will be imported in finished form and mostly in sealed cartridges. These inks may be used for large scale commercial printing, office printing, and home printing. The end users will insert the cartridges or containers into the printer, and remove them after they are depleted.

Once the paints and inks are cured, the notified polymer will be bound into an inert matrix and will not be available for exposure.

6. HUMAN HEALTH RISK ASSESSMENT

The notified polymer meets the PLC criteria and is therefore assumed to be of low hazard. This is supported by tests submitted on the following toxicological endpoints.

<i>Endpoint</i>	<i>Result</i>	<i>Effects Observed</i>	<i>Test Guideline</i>
Acute oral toxicity – rat	LD50 > 2,000 mg/kg bw; low toxicity	yes*	OECD TG 423
Skin irritation – rabbit	non-irritating	yes^	OECD TG 404
Eye irritation – rabbit	non-irritating	yes#	OECD TG 405

* Moderate dilatation of the renal pelvis was observed in 1/3 animals.

^ Slight erythema was observed in all animals, which had resolved by the 72 h observation.

Slight conjunctival chemosis and secretion was observed in one animal, at the 1 h observation only.

All results were indicative of low hazard.

Given the low hazard, as shown for the acute toxicity and irritation endpoints and assumed for other endpoints, the risk of the notified polymer to occupational and public health is not considered to be unreasonable.

7. ENVIRONMENTAL RISK ASSESSMENT

The notified polymer will be imported in 25 L pails, 200 L drums and 1000 L IBCs for local formulation. The notified polymer will be used in commercial and domestic printers, water based architectural paints, solvent based paints and components of printing inks. Accidental spills of the notified polymer during import, transport, storage and use are expected to be absorbed on suitable materials and disposed of to

landfill in accordance with local government regulations. The notifier estimates that empty cartridges contain residues of the notified polymer up to 0.5% of the import volume which are expected to be sent to landfill for disposal.

The paints will be used by professional workers and the public, and may be applied by brush, roller or spray. Paint excess to requirements is expected to be collected and cured before disposal to landfill. The liquid waste from cleaning of professional application equipment is expected to be collected by an approved waste contractor for disposal in accordance with local government regulations. As the worst case scenario, it is assumed that up to 5% of the total annual import volume of notified polymer used by do-it-yourself (DIY) users may be incorrectly disposed of to the sewer, drains, or ground from waste and washing of application equipment.

The notified polymer used in ink formulation is expected to share the fate of the paper to which it has been applied, either subjected to paper recycling processes or being disposed of to landfill at the end of its useful lives. According to the recent Australian National Waste Report (Blue Environment Ltd., 2016), 60% of the waste paper treated with the notified polymer is expected to be recycled domestically. During recycling processes, waste paper is repulped using a variety of chemical agents, which, amongst other things, enhance detachment of inks and coatings from the fibres. Based on its high molecular weight, the notified polymer discharged to wastewater from paper recycling processes is expected to be effectively removed through adsorption to sludge or by flocculation at wastewater treatment plants (US EPA, 2013; Boethling and Nabholz, 1997), and only a small proportion of the notified polymer may be released to surface waters after treatment processes.

A worst case scenario would be the assumption that the total import volume of 200 tonnes per annum is used in inks, with 60% release of the notified polymer into the sewer systems through paper recycling processes and no removal within wastewater treatment plants. The conservative predicted environmental concentration (PEC) in sewage effluent on a nationwide basis over 260 working days per year is calculated to be 94.63 µg/L [$0.6 \times 200,000 \text{ kg/year} \div 260 \text{ days/year} \div (24.386 \text{ million persons} \times 200 \text{ L/person/day})$]. This estimation would not be significantly changed by releases from DIY use of paint.

The notifier has advised that the notified polymer was shown to be harmful to fish (96 h LC50 = 33.3 mg/L) and aquatic invertebrates (48 h EC50 = 16.6 mg/L). As the calculated worst case exposure of the aquatic environment to the notified polymer from the recycling and deinking processes is much lower than these ecotoxicity values, use of the polymer is not expected to lead to ecotoxicologically significant concentrations in the aquatic environment.

The notified polymer used in coating application is expected to share the fate of the articles to which it has been applied, to be disposed of to landfill at the end of their useful lives. Residual notified polymer in empty containers are expected to be cured before disposal to landfill. In landfill, the notified polymer will be present as cured solids and will be neither bioavailable nor mobile

Sludge containing the notified polymer may be sent to landfill for disposal or agricultural land for remediation. Based on its high molecular weight, the notified polymer is expected to have low mobility in landfill and soil (US EPA, 2013). The notified polymer is not expected to be bioaccumulative given its high molecular weight. In landfill, soil and water, the notified polymer is expected to undergo degradation by biotic and abiotic processes, eventually forming water and oxides of carbon.

Therefore, based on the known hazard characteristics and assessed use pattern, the notified polymer is not considered to pose an unreasonable risk to the aquatic environment.

BIBLIOGRAPHY

Blue Environment Pty Ltd (2016) Australian National Waste Report 2016. Canberra, Australia.

Boethling, RS & Nabholz VJ (1997) Chapter 10 Environmental Assessment of Polymers under the U.S. Toxic Substances Control Act. In: Hamilton, JD Sutcliffe R ed. Ecological Assessment of Polymers Strategies for Product Stewardship and Regulatory Programs, 1st ed. New York, Van Nostrand Reinhold, pp 187-234.

US EPA (2013) Interpretive Assistance Document for Assessment of Polymers – Sustainable Futures Summary Assessment, US Environmental Protection Agency, https://www.epa.gov/sites/production/files/2015-05/documents/06-iad_polymers_june2013.pdf.