

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

POLYMER OF LOW CONCERN PUBLIC REPORT

Z-191

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:

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**Director
NICNAS**

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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/1483	Lubrizol International Inc.	Z-191	No	< 90 tonnes per annum	Additive in coatings and paints

CONCLUSIONS AND REGULATORY OBLIGATIONS

Human Health Risk Assessment

Provided that the recommended controls are in place to reduce worker exposure to ethanamine, *N,N*-diethyl- (triethylamine) that is released during drying of the coating or paint films, the notified polymer is not considered to pose an unreasonable risk to the health of workers.

When used in the proposed manner, with labelling of coatings and paints regarding ventilation during use and drying, the notified polymer is not considered to pose an unreasonable risk to public health.

Environmental 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 environment.

Health and Safety Recommendations

- A person conducting a business or undertaking at a workplace should implement the following engineering controls to minimise occupational exposure to triethylamine, released from the coatings or paints during drying:
 - Adequate exhaust ventilation
- A person conducting a business or undertaking at a workplace should implement the following safe work practices to minimise occupational exposure to triethylamine, released from the coatings or paints during drying:
 - Use in well ventilated areas
 - Avoid contact with skin and eyes
 - Avoid inhalation of vapours during drying of coatings or paints
- A person conducting a business or undertaking at a workplace should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to triethylamine, released from the coatings or paints during drying:
 - Gloves, coveralls and eye protection
 - Respiratory protection if exposure through inhalation is expected
- Water insoluble high molecular weight polymer has the potential to cause lung overloading if inhaled. Respiratory protection and local exhaust ventilation should be used to prevent inhalation exposure if the notified polymer is expected to be aerosolised.

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

- Spray applications should be carried out in accordance with the Safe Work Australia Code of Practice for *Spray Painting and Powder Coating* (Safe Work Australia, 2015) or relevant State or Territory Code of Practice.
- Atmospheric monitoring should be conducted to measure workplace concentrations of triethylamine during use of products containing the notified polymer. Employers should ensure that the exposure standard for triethylamine, listed by Safe Work Australia in the *Hazardous Chemical Information System (HCIS)*, is not exceeded for all areas where the notified polymer is present.
- 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.

Public Health

- The following measures should be taken by producers of coatings and paints containing the notified polymer for do-it-yourself (DIY) use to minimise potential public exposure to triethylamine:
 - Labelling of coatings and paints, recommending that they be used only in well ventilated areas
 - Labelling of coatings and paints, recommending avoidance of breathing the vapours during drying

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 additive in coatings and paints, 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

Applicant

Lubrizol International Inc.
28 River Street
SILVERWATER NSW 2128

Exempt Information (Section 75 of the Act)

Data items and details claimed exempt from publication: chemical name, other names, CAS number, molecular and structural formulae, molecular weight, polymer constituents, residual monomers/impurities, use details and import volume.

2. IDENTITY OF POLYMER

Marketing Name

Z-191

Molecular Weight

Number Average Molecular Weight (Mn) is > 10,000 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	Solid pellet; colourless to amber
Melting Point/Glass Transition Temperature	Not determined
Density	0.9 – 1.2 kg/m ³ at 24 °C
Water Solubility	Not expected to be water soluble as the notified polymer is mainly composed of hydrophobic species and has a high molecular weight.
Dissociation Constant	Not determined. The notified polymer is a salt and is expected to dissociate in the environmental pH of 4 – 9.
Particle Size	Not determined*
Reactivity	Stable under normal environmental conditions
Degradation Products	None under normal conditions of use
* Imported in liquid formulations	

5. INTRODUCTION AND USE INFORMATION

Maximum Introduction Volume of Notified Chemical (100%) Over Next 5 Years

Year	1	2	3	4	5
Tonnes	< 50	< 70	< 80	< 80	< 90

Use

The notified polymer will not be manufactured in Australia and will not be imported in neat form. The notified polymer will be imported as a component in coating and paint additive products at $\leq 35\%$ concentration for reformulation or in finished coatings and paints at $\leq 30\%$ concentration for end use. The imported additive products will be reformulated locally into finished coatings and paints.

The notified polymer will be used as an additive in coatings and paints. Finished surface coating and paint products may be applied by brush, roller or spray on a wide range of substrates, primarily by industrial users. The notifier stated that commercial and do-it-yourself (DIY) use of coatings and paints containing the notified polymer is expected to be considerably less than industry.

6. HUMAN HEALTH RISK ASSESSMENT

No toxicological data were submitted. The notified polymer meets the PLC criteria and is therefore assumed to be of low hazard. The risk of the notified polymer to occupational and public health is not considered to be unreasonable given the assumed low hazard and the assessed use pattern.

It is noted that the notified polymer is water-insoluble with molecule weight $> 10,000$ g/mol. Inhalation of polymers with molecular weights $> 70,000$ g/mol has been linked with irreversible lung damage due to lung overloading and impaired clearance of particles from the lung, particularly following repeated exposure (US EPA, <https://www.epa.gov/reviewing-new-chemicals-under-toxic-substances-control-act-tsca/high-molecular-weight-polymers-new>, accessed on 20 June 2018). There is a data gap for polymers with MW between 10,000 and 70,000 g/mol, and uncertainty may exist. If the notified polymer is inhaled at low levels and/or infrequently, it is assumed that it will be cleared from the lungs.

The notified polymer contains ethanamine, *N,N*-diethyl- (CAS No. 121-44-8) as a neutralising agent at $> 1\%$ concentration. Ethanamine, *N,N*-diethyl-, also known as triethylamine (TEA), is listed by Safe Work Australia in the *Hazardous Chemical Information System (HCIS)* with the following hazard information:

Flammable liquid (Category 2)	H225: Highly flammable liquid and vapour
Acute toxicity (Category 4)	H302: Harmful if swallowed
Acute toxicity (Category 4)	H312: Harmful in contact with skin
Acute toxicity (Category 4)	H332: Harmful if inhaled
Skin corrosion (Category 1A)*	H314: Causes severe skin burns and eye damage

* Mixture containing triethylamine at $1\% \leq$ concentration $< 3\%$ should also be classified as Skin Irritation Category 2 (H315: Causes skin irritation).

Triethylamine has an Australian workplace exposure standard of 8 mg/m^3 (2 ppm) time weighted average (TWA) and 17 mg/m^3 (4 ppm) short-term exposure limit (STEL) (Safe Work Australia, 2013).

Based on the proposed maximum use concentration of the notified polymer in coatings and paints, the notifier stated that, in a worst case scenario the maximum amount of triethylamine liberated during drying would be 0.5 g/m^2 of painted surface. The concentration of the released triethylamine in air may vary depending on the volume, air flow and rate of emission from the coating or paint films and it may exceed the Australian exposure standard in many use scenarios, especially when coating or paint application occurs in confined indoor spaces. Use of engineering controls, safe work practices and personal protective equipment (PPE) is expected to mitigate the exposure and risk to workers. In

particular the coating or paint application process should be carried out in well ventilated spaces, and mechanical ventilation should be used if possible. Where ventilation is not adequate, respiratory protection should be used to reduce the potential for inhalation exposure.

DIY use of finished products containing the notified polymer is not expected to be frequent and in large scale. Warnings on the coating or paint labels regarding use of good ventilation and avoidance of inhalation of coating or paint fumes would reduce the potential of exposure and risk to the public.

7. ENVIRONMENTAL RISK ASSESSMENT

No ecotoxicological data were submitted. Anionic polymers are generally of low toxicity to fish and daphnia; however, they are known to be moderately toxic to algae. The mode of toxic action is over-chelation of nutrient elements needed by algae for growth. The highest toxicity is when the acid is on alternating carbons of the polymer backbone. This is not applicable to the notified polymer.

The notified polymer will be imported into Australia as a component of coating and paint additive products for reformulation into finished coating and paint formulations. During reformulation, the product containing the notified polymer will be blended with other ingredients at industrial sites and packaged for distribution to end users. Release of the notified polymer to the environment during import, reformulation, storage, and transport is expected to be limited to accidental spills or leaks and residue in import packaging. Spills or accidental release of the products containing the notified polymer are expected to be collected with adsorbents, and disposed of to landfill in accordance with local government regulations.

Final coating or paint products containing the notified polymer will be used mainly in an industrial setting with limited use by commercial and DIY users (< 5%). Coatings and paints containing the notified polymer are expected to be applied by brush, roller and spray techniques. During use, the notified polymer may be released to the environment as accidental spills and container residues. These releases are expected to be collected and disposed of to landfill in accordance with local government regulations.

The main release of the notified polymer is likely from overspray during use, estimated by the notifier to account for up to 20 – 30% of the total import volume. The overspray will be collected and trapped onto filters and cured before disposal of to landfill. Residues containing the notified polymer on brushes and rollers are expected to be rinsed into containers, and then allowed to cure before disposal as solid wastes to landfill. As a worst case scenario, it is assumed that up to 5% of the coatings and paints containing the notified polymer used by DIY users may be incorrectly disposed of to the sewer, drains, or ground from waste and washing of application equipment. It is estimated that the resultant predicted environmental concentrations in sewage effluent on a nationwide basis over 365 working days per year is 0.63 µg/L $[(90 \text{ tonnes/annum} \times 0.25 \times 0.05) \div (200 \text{ L/day/person} \times 24.4 \text{ million person} \times 365 \text{ days/annum})]$. However, based on its limited expected aquatic release and expected low toxicity to aquatic organisms, the notified polymer is not anticipated to be released to surface waters at ecotoxicologically significant concentrations.

The notified polymer in coatings and paints will share the fate of the coated articles, which ultimately is expected to be disposed of to landfill or enter metal recycling. In landfill, the notified polymer will be present as cured solids, which will be neither bioavailable nor mobile. During metal recycling the notified polymer will be completely thermally decomposed. Based on its high molecular weight, the notified polymer is not expected to cross biological membranes, and is therefore unlikely to bioaccumulate. In landfill the notified polymer is expected to eventually degrade via biotic and abiotic processes to form water and oxides of carbon and nitrogen.

Therefore, based on its assumed low hazard and reported use pattern, the notified polymer is not considered to pose an unreasonable risk to the environment.

BIBLIOGRAPHY

Safe Work Australia (2015) Code of Practice: Spray Painting and Powder Coating, Safe Work Australia, <https://www.safeworkaustralia.gov.au/doc/model-code-practice-spray-painting-and-powder-coating>

Safe Work Australia (2013) Workplace exposure standards for airborne contaminants, Safe Work Australia, <https://www.safeworkaustralia.gov.au/doc/workplace-exposure-standards-airborne-contaminants>