File No: PLC/11

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME**

# FULL PUBLIC REPORT

# POLYMER LATEX 4549/101

This Assessment has been compiled in accordance with the provisions of *the Industrial Chemicals (Notification and Assessment) Act 1989,* as amended and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by Worksafe Australia which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Commonwealth Environment Protection Agency and the assessment of public health is conducted by the Department of Health, Housing, Local Government and Community Services.

For the purposes of subsection 78(1) of the Act, copies of this full public report may be inspected by the public at the Library, Worksafe Australia, 92-94 Parramatta Road, Camperdown NSW 2050, between the hours of 10.00 a.m. and 12.00 noon and 2.00 p.m. and 4.00 p.m. each week day except on public holidays.

Under subsection 34(2) of the Act the Director of Chemicals Notification and Assessment is to publish this Report in the Chemical Gazette on .

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Director
Chemicals Notification and Assessment
November 17, 2015

# FULL PUBLIC REPORT

# POLYMER LATEX 4549/101

## 1. APPLICANT

Dulux Australia, McNaughton Road, Clayton, Victoria 3168.

## 2. IDENTITY OF THE POLYMER

Based on the nature of the chemical and the data provided, polymer latex 4549/101 is not considered to be hazardous. Therefore, the details of chemical name, CAS number, molecular formula, structural formula, spectral data, polymer constituents and residual monomers, have been exempted from publication in the Full Public Report.

**Other name:** Polymer latex 4549/101

**Means of identification:**

Infrared spectrum.

## 3. PHYSICAL AND CHEMICAL PROPERTIES

The physical and chemical properties listed below are that of Polymer latex 4549/101 containing 30-60% notified polymer in water unless otherwise stated, as the polymer is manufactured in this form and never isolated.

| | | |
|---|---|---|
| **Appearance at 20°C and 101.3 kPa:** | | Milky white liquid |
| **Odour:** | | Odourless |
| **Boiling Point:** | 100°C | |
| **Density:** | | 1070 kg/m$^3$<br>1150 kg/m$^3$ (calculated for polymer) |
| **Water Solubility:** | | < 1 mg/L at 20°C (estimated) |

**. comments on physico-chemical identity**

A melting point for the polymer was not determined as the polymer is always manufactured as a dispersion in water, and is never isolated.

The notifier claims that in polymer dispersions of the type notified here, polymerisation begins in the aqueous phase, with a certain critical threshold of solubility being reached. As the polymerisation proceeds past this point, a high molecular weight polymer forms, with surfactants and other additives being required to stabilise the final product against separation. As there is no evidence of low molecular weight oligomers in the dispersion, the company

therefore estimated that the solubility of the solution to be < 1 mg.$L^{-1}$. This is acceptable, as low water solubility is a required property of a paint resin.

A dissociation constant was not determined on the grounds that the polymer does not contain any ionisable groups and should not be cationic or anionic in the pH range 4-9. This is acceptable.

The polymer contains a number of ester groups, which means that hydrolysis is theoretically possible, but unlikely under environmental conditions due to the low solubility. Omission of hydrolysis data is therefore acceptable.

## 4. INDUSTRIAL USE

The polymer will be used as a film forming agent in industrial coatings.

The projected manufactured volume is 100-200 tonnes per annum in the first year and 200-600 tonnes per annum in the next four years.

## 5. OCCUPATIONAL EXPOSURE

The polymer will be manufactured in a closed reactor as a 30-60% aqueous dispersion, located in a bunded area. The polymer is filtered, and then filled into 200 litre plastic lined steel drums for storage.

The polymer dispersion will be blended into paint with other ingredients at a single site. Typically blending involves adding the aqueous polymer dispersion by pump to a mixing vessel with paddle stirrers. The process is automated and is carried out under local exhaust ventilation.

Once blended, the paint containing the notified polymer is pumped into 200 litre plastic lined steel drums or 20 litre pails under exhaust ventilation for storage and transportation.

Application of the paint to equipment is by the use of spray, roller coating or dipping equipment in spray booths fitted with exhaust ventilation.

## 6. PUBLIC EXPOSURE

The public should not be directly exposed to the polymer during manufacture or paint production. Furthermore, since the paints containing this polymer are for industrial use, the public will not come into contact with the polymer when using paints.

## 7. ENVIRONMENTAL EXPOSURE

### · Formulation and handling

Any spills during either the manufacturing or drumming off processes will be contained by the bunding of the building. Waste polymer latex generated from the filtration and drumming procedures is contained and diluted with water to meet the Melbourne Waste Water specification prior to it being passed into sewers. The notifier expects that **5 tonnes of polymer waste** (as approximately 50 kg per 7 tonne batch of latex production) **per annum will be disposed of in this way.**

During paint manufacture, the polymer may be released as a result of adding it (with other ingredients) to the mixer, during batch adjustment and testing, during filtration of the paint

and drum filling prior to storage. Again, such spills are expected to be controlled by on-site bunding, with no atmospheric losses anticipated due to the involatile nature of the polymer. The company estimates that approximately **2.5 tonnes of waste per year** will be generated by the paint manufacturing process (which includes spills, cleanup procedures and polymer emulsion drum rinsing). These wastes will be disposed of by a licensed liquid waste disposal contractor. Who treats the waste by flocculation. The resultant flocculated solid polymer is then buried in a landfill.

· Use

Paints manufactured from the polymer dispersion will be used as industrial coatings, and will be heat cured following application. The paints will thus form inert coatings on the surface of materials. The paint will be applied by dipping, rollers or spraying in spraying booths. Potential release points during the painting process including stirring of the paint, pumping of the paint into trays and during application. Paint trapped in the spray booths and any spills during the procedures outlined above will be collected from the painting plants. Washing water from cleaning of rollers and other equipment is stored until disposed of by licensed waste disposal contractors**..** The company states that up to 5 tonnes of waste polymer in paint per annum are anticipated. Such wastes are to be treated (by flocculation) prior to disposal by licensed waste disposal contractors at landfill trade waste sites.

Overall an expected 5 tonnes of the polymer dispersion are expected to be disposed of directly to sewers, and 7.5 tonnes of polymer waste in paint are to be landfilled in trade waste dumps.

**Fate**

Polymer wastes disposed of to sewers following dilution are expected to settle out on the bottom of waterways, and become immobile in the sediments.

The polymer will be cured following application to painted surfaces. Such curing is expected to increase the molecular weight, and should further decrease the solubility. These factors should ensure that any of the paint contained in articles disposed of to landfills will remain immobile in the soil compartment.

Breakdown of the polymer by hydrolysis, UV degradation or biodegradation is expected to occur very slowly, if at all. Bioaccumulation of the polymer is unlikely, given the high molecular weight and low solubility of the polymer.

## 8. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were supplied, which is acceptable for polymers of low concern. No toxic effects are anticipated from a neutral polymer with low water solubility and high molecular weight.

## 9. ASSESSMENT OF ENVIRONMENTAL HAZARD

Although significant quantities of the polymer and polymer in paints are expected to be released to sewers and landfills, the polymer latex dispersion is not expected to have significant ecotoxic properties. The low solubility and high molecular weight should mean that the polymer will not cross biological membranes. The anticipated curing of the painted items prior to their use should serve to increase the molecular weight, reducing the chance of adverse environmental impact still further.

## 10. ASSESSMENT OF OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY EFFECTS

Polymer latex 4549/101 has been notified as a synthetic polymer of low concern under section 23 for the purposes of section 24A of the *Industrial Chemicals Notification and Assessment Act 1989*.

The notified polymer has a number average molecular weight well above 1000 and, as such, is not expected to cross biological membranes. As a result adverse health effects would not be expected to result from exposure to the polymer.

The polymer would not be classified as a hazardous substance on the basis of the levels of residual monomers.

Exposure of workers to the polymer during manufacture, blending, storage, transport and application is expected to be low as a result of engineering controls and the use of robust containers.

The low expected intrinsic toxicity of the polymer and low exposure suggests that the occupational health risk is minimal. Material Safety Data Sheet states Polymer latex 4549/101 to be an eye and skin irritant. There is no sufficient data to attribute this to the notified polymer.

The polymer meets the criteria for a synthetic polymer of low concern specified in regulation 4A of the Act and can therefore be considered to be of low hazard to human health.

There is limited chance for public contact with the notified chemical, either during manufacture, transport or in the application of industrial paint coatings. Furthermore, the properties of the chemical suggest there should be negligible absorption and therefore low risk to public safety. After coating, the polymer forms an inert film on the coated article and would be unlikely to present any hazard to public exposed to coated articles.

## 11. RECOMMENDATIONS

To minimise occupational exposure to Polymer latex 4549/101 the following guidelines and precautions should be observed:

. if engineering controls and work practices are insufficient to reduce exposure to Polymer latex 4549/101 to a safe level, then personal protective devices which conform to and are used in accordance with Australian Standards (AS) for eye protection (AS 1336, AS 1337) (1,2), impermeable gloves (AS 2161) (3) and overalls should be worn.

. good work practices should be implemented to avoid spillages.

. good personal hygiene should be adopted.

. a copy of the Material Safety Data Sheet should be easily accessible to employees.

## 12. MATERIAL SAFETY DATA SHEET

The Material Safety Data Sheet (MSDS) for Polymer latex 4549/101 containing the notified polymer was provided in Worksafe Australia format (4).

This MSDS was provided by Dulux Australia as part of their notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of Dulux Australia.

## 13. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of Polymer latex 4549/101 shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

## 14. REFERENCES


1. Australian Standard 1336-1982, *Recommended Practices for Eye Protection in the Industrial Environment*, Standards Association of Australia Publ., Sydney, 1982.

2. Australian Standard 1337-1984, *Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, 1984.

3. Australian Standard 2161-1978, *Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ., Sydney, 1978.

4. National Occupational Health and Safety Commission, *Guidance Note for the Completion of a Material Safety Data Sheet*, 2nd. edition, AGPS, Canberra, 1990.