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April 2001

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**Polymer in Lucidene 4015**

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Director  
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## TABLE OF CONTENTS

FULL PUBLIC REPORT .....	3
1. APPLICANT .....	3
2. IDENTITY OF THE CHEMICAL .....	3
3. POLYMER COMPOSITION AND PURITY .....	3
4. PLC JUSTIFICATION .....	3
5. PHYSICAL AND CHEMICAL PROPERTIES .....	3
5.1 Comments on physical and chemical properties .....	4
6. USE, VOLUME AND FORMULATION .....	4
7. OCCUPATIONAL EXPOSURE .....	5
8. PUBLIC EXPOSURE .....	6
9. ENVIRONMENTAL EXPOSURE .....	6
9.1. Release .....	6
9.2. Fate .....	7
10. EVALUATION OF HEALTH EFFECTS DATA .....	8
11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA .....	8
12. ENVIRONMENTAL RISK ASSESSMENT .....	8
13. HEALTH AND SAFETY RISK ASSESSMENT .....	8
13.1. Hazard assessment .....	8
13.2. Occupational health and safety .....	9
13.3. Public health .....	9
14. MSDS AND LABEL ASSESSMENT .....	9
14.1. MSDS .....	9
14.2. Label .....	9
15. RECOMMENDATIONS .....	10
16. REQUIREMENTS FOR SECONDARY NOTIFICATION .....	10
17. REFERENCES .....	11

**FULL PUBLIC REPORT****Polymer in Lucidene 4015****1. APPLICANT**

Rohm and Haas Australia Pty Ltd of 969 Burke Road CAMBERWELL VIC 3124 (ABN 29 004 513 188) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC) Polymer in Lucidene 4015.

**2. IDENTITY OF THE CHEMICAL**

The chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data and details of the polymer composition have been exempted from publication in the Full Public Report.

**Marketing names:** Polymer in Lucidene 4015

**3. POLYMER COMPOSITION AND PURITY**

Details of the polymer composition and purity have been exempted from publication in the Full Public Report.

**4. PLC JUSTIFICATION**

The notified polymer meets the PLC criteria.

**5. PHYSICAL AND CHEMICAL PROPERTIES**

The physical and chemical properties given below are for the imported product, Lucidene 4015, containing 26% w/w notified polymer, unless otherwise stated.

<b>Property</b>	<b>Result</b>	<b>Comments</b>
<b>Appearance</b>	milky white liquid	
<b>Boiling point</b>	100°C	
<b>Density</b>	1.04 g/cm <sup>3</sup>	

<b>Vapour pressure</b>	3.25 kPa at 20°C	
<b>Water solubility</b>	readily soluble	(see comments below)
<b>Flash point</b>	93°C	
<b>Flammability</b>	not determined	not expected to be flammable
<b>Autoignition temperature</b>	not determined	
<b>Explosive properties</b>	not known	
<b>Stability/reactivity</b>	not determined	the notified polymer has low potential for reactivity
<b>Hydrolysis as function of pH</b>	not determined	(see comments below)
<b>Dissociation constant</b>	not determined	(see comments below)

## 5.1 Comments on physical and chemical properties

The notified polymer is readily soluble in water as the ammonium salt. However, as the ink dries, the notified polymer loses ammonia and becomes the acid form, which is only slightly soluble in water.

Water solubility of the acid form of the notified polymer was determined according to OECD TG 105, by adding approximately 0.5 g of the polymer to 50 mL double filtered deionised water and shaking the flasks for 24 h. The samples were then allowed to equilibrate for 24 h before being filtered and dried to determine Total Dissolved Solids. Triplicates were analysed and the average value reported.

Hydrolysis of the ester linkages of the polymer is possible but would not be expected under environmental conditions (pH 4-9).

The notified polymer is readily soluble in water and is expected to be mobile in soil. On drying, the aqueous solution containing the notified polymer readily loses ammonia to give the acid form, which is expected to be immobile due to low water solubility, and associate with the soil matrix due to its polyanionic nature.

## 6. USE, VOLUME AND FORMULATION

### Use:

The notified polymer will be used as a binder for aqueous flexographic printing inks used for printing of paper and cardboard packaging materials.

The notified polymer will be imported into Australia as a component of Lucidene 4015 at a concentration of 26% w/w. It will be imported as an aqueous emulsion in 200 L steel drums. Lucidene 4015 will be sold to printing ink manufacturers for formulation into printing inks.

Finished printing inks are gravity fed or pumped into 1000L IBC containers, 200L drums or 20 L pails. Finished ink products containing 10-15% w/w notified polymer are sold to printers for printing on corrugated cardboard boxes for packaging applications.

**Manufacture/Import volume:**

The estimated quantity of the notified polymer to be imported is approximately 6.5 tonnes in the first year, increasing to 26 tonnes per annum in the next 4 years.

There is a possibility that the notified polymer will be manufactured in Australia in future.

**7. OCCUPATIONAL EXPOSURE**

The occupational exposure described below represents exposure during formulation of the imported polymer emulsion and does not include exposure during possible future manufacture of the notified polymer in Australia.

Exposure route	Exposure details	Controls indicated by notifier
<i>Formulation</i>		
<i>Ink Makers (15-20 workers, 6-8 hr/day, 50 days/year)</i>		
dermal and ocular	transferring and pumping out polymer emulsion from the container into a mixing vessel (26% w/w notified polymer)	impervious gloves, coveralls, safety boots and safety glasses; ink mixing vessels are fitted with local exhaust ventilation
dermal and ocular	connecting and disconnecting transfer hoses, during transfer of inks into containers for packaging, and when cleaning spills and equipment (maximum 15% w/w notified polymer)	impervious gloves, coveralls, safety boots and safety glasses
<i>Ink Technicians (5-10 workers, 0.5 hr/day, 50 days/year)</i>		
dermal and ocular	exposure to small quantities when collecting samples and performing QC testing of liquid inks (maximum 15% w/w notified polymer)	impervious gloves, coveralls, safety boots

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**End use**

*Printers (30-40 workers, 7 hr/day, 150 days/year)*

dermal and ocular	liquid ink is transferred from supplied containers to printing press ink trays by either pumping or manual transfer from pails; exposure to spills and drips when loading ink trays and cleaning of printing presses (maximum 15% w/w notified polymer)	impervious gloves, coveralls, safety boots and safety glasses; local ventilation above printing presses
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**Transport and storage**

*Transport and Storage workers (15-20 workers)*

dermal	no exposure is expected as the notified polymer will only be handled in sealed containers, except in case of an accident	none
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*Waterside workers (5 workers)*

dermal	no exposure is expected as the notified polymer will only be handled in sealed containers, except in case of an accident	none
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**8. PUBLIC EXPOSURE**

The notified polymer and the products containing it are not available for sale to the public.

The potential for public exposure to the notified polymer during transport, reformulation or disposal is likely to be negligible. Although the public will make dermal contact with dried form of the notified polymer when handling cardboard packaging materials printed with ink containing the notified polymer, public exposure is expected to be low.

**9. ENVIRONMENTAL EXPOSURE****9.1. Release***Storage sites*

The notified polymer in Lucidene 4015 will be stored in banded warehouses at the transport depot and customer sites. In the event of a spill, the polymer emulsion will be taken up by absorbent material and disposed of to a licensed waste landfill site.

### *Ink Manufacturing*

There is potential for spillage of the notified polymer during formulation. In the event of a spill, the polymer emulsion is expected to be contained within the plant by bunding. It is estimated that 0.5 % per annum per site will be lost in this manner. At a maximum import rate of 100 tonnes/annum, approximately 130 kg per annum of notified polymer will be lost through spillage.

Wash water from ink manufacture will be re-used in subsequent batches of ink where possible. Otherwise, it will be treated on-site or sent off-site to a licensed waste disposal contractor. During treatment on-site or by contractor, it is estimated that >90 % of the notified polymer will be precipitated in treatment plant sludge and disposed of to landfill. The remaining <10 % in the supernatant water will be released to the sewer. It is estimated that 0.5 % of manufactured ink is lost to wash water which equates to 117 kg/annum of the notified polymer to landfill and 13 kg/annum of the notified polymer to the sewer.

An estimated 130 kg/annum of the notified polymer will be lost to landfill as residue in the empty import drums.

### *Printing of Packaging*

Any ink spills will be taken up by absorbent material and disposed of to licensed waste landfill site. It is estimated that approximately 173 kg of ink (26 kg of the notified polymer) will be lost in this manner.

Up to 0.5 % of the printing ink will remain as residues in the transport containers. This is equivalent to approximately 130 kg/annum of the notified polymer in drums and pails, with disposal to either a licensed drum reconditioner or landfill. The empty IBCs will be returned to the ink manufacturer for reuse with wash water disposed in the same manner as described above.

Unused ink from the printing process will be reused and ink residues for the printing presses will be wiped off with rags/paper towelling and disposed of to a licensed waste landfill site. It is estimated that approximately 1 kg of ink residue will remain on the presses at the end of a day's shift. Based on 150 days usage per site and 20 printing sites, approximately 3000 kg of ink will be disposed of (450 kg of the notified polymer).

### *Disposal of packaging*

The ultimate fate of packaging material will be recycling, incineration or landfill. The majority is expected to be recycled where more than 90 % of the notified polymer is expected to be precipitated in waste treatment sludge and disposed of to landfill.

## **9.2. Fate**

The majority of the notified polymer from spills, cleaning, wash water and recycling of packaging will go to landfill. The polymer reaching landfill is expected to eventually become part of the soil matrix due to its polyanionic nature. The notified polymer is soluble and therefore would be expected to be mobile with the potential to leach, except for in acid soils where the free acid will be formed.

In water, the notified polymer would be expected to dilute and disperse, and eventually partition to the sediments due to its polyanionic nature and conversion to the acid form. The polymer is not expected to cross biological membranes due to its high molecular weight. Therefore, the notified substance is not expected to bioaccumulate.

## **10. EVALUATION OF HEALTH EFFECTS DATA**

No toxicological data were submitted.

No residual monomers are present at and above the relevant cut-offs for the notified polymer to be classified as a hazardous substance. There are no known impurities and no adjuvants present in the notified polymer.

## **11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA**

No ecotoxicological data were submitted.

## **12. ENVIRONMENTAL RISK ASSESSMENT**

The notified polymer is readily soluble in water and is expected to be mobile in landfill. However, environmental exposure in this manner should be low and dispersed. Therefore, the overall environmental hazard should be low.

The majority of the notified polymer will be disposed in waste sludge resulting from the recycling of packaging. Packaging disposed of directly to landfill will slowly degrade and the polymer will associate with the soil matrix.

## **13. HEALTH AND SAFETY RISK ASSESSMENT**

### **13.1. Hazard assessment**

No toxicological information has been provided for the notified polymer. However, the notified polymer meets the PLC criteria and is unlikely to be hazardous substance according to the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999).

The notified polymer has high molecular weight and is not expected to cross biological membranes.

The Material Safety Data Sheet (MSDS) for Lucidene 4015 indicates that health effects such as nausea, vomiting, pain and stomach upset may occur following ingestion.



## **13.2. Occupational health and safety**

During formulation and end use, the major route of exposure for the notified polymer is dermal. Dermal exposure to polymer emulsion (26% notified polymer) may occur when transferring and pumping out polymer emulsion from the container into a mixing vessel.

Dermal contact with printing ink from drips and spills is possible while packaging of printing inks and cleaning spills and equipment, loading printing ink into ink trays and cleaning of printing presses. Eye exposure is also possible when splashing occurs. The printing ink contains notified polymer to a maximum of 15%. Therefore, occupational exposure to the notified polymer may occur.

During the above activities, workers wear skin and eye protection. Ink mixing vessels and printing presses are fitted with local exhaust ventilation.

There is no occupational exposure expected for waterside workers, truck drivers and storage workers except in case of an accident.

### *Conclusion*

The notified polymer is not hazardous to human health and measures are in place to control occupational exposure. Therefore, the notified polymer is of low concern to occupational health and safety and no specific risk reduction measures are necessary.

## **13.3. Public health**

The notified polymer and the products containing it are not available for sale to the public. Dermal contact with the dried form of the notified polymer is limited to handling cardboard packaging materials printed with ink containing the notified polymer. The dried form of the notified polymer printed on cardboard packaging is unlikely to be bioavailable. Therefore, the risk to public health from the notified polymer is low.

## **14. MSDS AND LABEL ASSESSMENT**

### **14.1. MSDS**

The MSDS of the notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). It is published here as part of the assessment report. The accuracy of the information on the MSDS remains the responsibility of the applicant.

### **14.2. Label**

The label for the notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994b). The accuracy of the information on the label remains the responsibility of the applicant.

## 15. RECOMMENDATIONS

No specific precautions are required to control exposure to the notified polymer. However, in the interests of good occupational health and safety, the following guidelines and precautions should be observed:

- Protective eyewear, chemical resistant industrial clothing and footwear and impermeable gloves should be used during occupational use;
- Spillage of the notified chemical should be avoided. Spillages should be cleaned up promptly with absorbents which should then be put into containers for disposal;
- A copy of the MSDS should be easily accessible to employees.

If products containing the notified chemical are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999), workplace practices and control procedures consistent with State and Territory hazardous substances regulations must be in operation.

Guidance in selection of protective eyewear may be obtained from Australian Standard (AS) 1336 (Standards Australia, 1994) and Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992); for industrial clothing, guidance may be found in AS 3765.2 (Standards Australia, 1990); for impermeable gloves or mittens, in AS 2161.2 (Standards Australia/ Standards New Zealand, 1998); for occupational footwear, in AS/NZS 2210 (Standards Australia/ Standards New Zealand, 1994a); for respirators, in AS/NZS 1715 (Standards Australia/ Standards New Zealand, 1994b) and AS/NZS 1716 (Standards Australia/ Standards New Zealand, 1994c), and other internationally acceptable standards.

## 16. REQUIREMENTS FOR SECONDARY NOTIFICATION

Secondary notification may be required if:

- (i) any of the circumstances stipulated under subsection 64(2) of the Act arise. If any importer or manufacturer of the notified polymer becomes aware of any of these circumstances, for instance that the notified polymer is to be manufactured in Australia, they must notify the Director within 28 days; or
- (ii) the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

## 17. REFERENCES

National Occupational Health and Safety Commission (1994a) National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1994b) National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1999) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]. Australian Government Publishing Service, Canberra.

Standards Australia (1990) Australian Standard 3765.2-1990, Clothing for Protection against Hazardous Chemicals Part 2 Limited protection against specific chemicals. Standards Association of Australia.

Standards Australia (1994) Australian Standard 1336-1994, Eye protection in the Industrial Environment. Standards Association of Australia.

Standards Australia/Standards New Zealand (1992) Australian/New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994a) Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994b) Australian/New Zealand Standard 1715-1994, Use and Maintenance of Respiratory Protective Devices. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994c) Australian/New Zealand Standard 1716-1994, Respiratory Protective Devices. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1998) Australian/New Zealand Standard 2161.2-1998, Occupational protective gloves, Part 2: General requirements. Standards Association of Australia/Standards Association of New Zealand.