

File No: PLC/203

January 2001

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in Adcote 507

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act* 1989 (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 National Occupational Health and Safety Commission which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment and the assessment of public health is conducted by the Department of Health and Aged Care.

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**Polymer in Adcote 507****1. APPLICANT**

Rohm and Haas Australia Pty Ltd (ACN No. 004 513 188) of 4th Floor 969 Burke Road, CAMBERWELL VICTORIA 3124 and Coates Brothers Australia Pty Ltd (ACN No. 000 079 550) of 323 Chisholm Road AUBURN NSW 2144 have submitted a Polymer of Low Concern notification statement in support of their application for an assessment certificate for Polymer in Adcote 507.

2. IDENTITY OF THE CHEMICAL

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

Marketing name: Polymer in Adcote 507 (45% w/w notified polymer)

3. POLYMER COMPOSITION AND PURITY

Precise details of the polymer composition have been exempted from publication in the Full Public Report.

Purity (%): > 99% w/w

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer exists in solution with methyl ethyl ketone (56%). The physico-chemical properties below are for the polymer solution unless otherwise stated.

Property	Result	Comments
Appearance	yellowish coloured viscous solution	
Melting point	not determined	
Specific gravity	0.958	polymer in methyl ethyl ketone in solution
Water solubility	not determined	the solubility of polymer is very low and it cannot be measured accurately
Flammability	not determined	polymer itself will burn
Autoignition temperature	not determined	polymer itself will not ignite
Flash point	-5°C	
Explosive properties	not explosive	polymer does not have explosive properties
Stability/reactivity	stable under normal environmental conditions	polymer has low potential for reactivity
Hydrolysis as function of pH	not determined	
Partition coefficient	not determined	
Adsorption/desorption	not determined	
Dissociation constant	not determined	

5.1 Comments on physical and chemical properties

Tests were performed according to EEC/OECD test guidelines at facilities complying with OECD Principles of Good Laboratory Practice. The data provided is acceptable for a polymer of low concern.

Although no water solubility data is provided the notifier expects the polymer to be of low solubility by analogy to a structurally similar polymer (PLC/204). The analogous polymer has a number average molecular weight of 1 700 g/mol and a water solubility of 71 mg/L. The notified polymer is expected to have a water solubility of considerably less than 71 mg/L due to the notified polymer's: (a) higher number average molecular weight; (b) lower proportion of low molecular weight species; and (c) lower level of hydroxyl groups. Therefore, the water solubility of the notified polymer is expected to be low.

The polymer contains ester linkages that could be expected to undergo hydrolysis under extreme pH. The typical acidity of any terminal carboxylic acid functionalities would not

sufficiently lower the pH of the solution to induce hydrolysis. Thus, hydrolysis is unlikely in the environmental pH range of between 4 and 9.

The notified polymer contains only reactive functional groups of low concern. It is expected to remain stable under ambient conditions.

6. USE, VOLUME AND FORMULATION

Use:

The notified polymer will be used as a component of a “two pack” laminating adhesive for pet food packaging and other general packaging. The laminating adhesive will be produced in Australia mixed with another polymeric material.

Manufacture/Import volume:

The notifier estimates that the import volume of the notified polymer will be up to 20 tonnes per annum in the first year of importation, rising up to 40 tonnes per annum in the next four years.

Formulation details:

The notified polymer at a concentration of 45% (w/w) will be imported as one component of a “two pack” laminating adhesive in methyl ethyl ketone. The imported product will be reformulated at one site in Australia to produce the laminating adhesive, containing up to 40% (w/w) notified polymer. The Polymer in Adcote 507 will be imported in 200 L steel drums.

7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
Transport		
<i>Waterside (3 workers)</i>		
dermal, 45 % solution	exposure is expected only in the event of an accident	none
<i>Transport and warehouse (5-10 workers)</i>		
dermal, 45 % solution	exposure is expected only in the event of an accident	none
Formulation		
<i>Laminating machine (2-4 workers, 6-8 hours/day, 150 days/year)</i>		

Dermal and occasionally ocular, 45% and 40% solution	workers may be exposed during connecting and disconnecting hoses	exhaust ventilation, safety glasses, impervious gloves, coveralls and safety boots
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Cleaning equipment

Dermal 40% solution	manual transfer of unused blended adhesive from laminating machine to a waste adhesive and solvent drum and wiping of adhesive residues from laminating machinery using rags	exhaust ventilation, impervious gloves, coveralls and goggles
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8. PUBLIC EXPOSURE

The Polymer in Adcote 507 is not available for sale to the general public. After completion of the packaging manufacture, the notified polymer in the adhesive material is “sandwiched” between two aluminium or polymer films. Hence the potential for public exposure to the notified polymer as laminating adhesives for a variety of pet food and other packaging materials is considered low.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

During formulation the notifier estimates that up to 380 kg per annum of notified polymer waste will be generated. This will be derived from:

Spills:	50 kg/annum
Residues in import containers:	90 kg/annum.
Equipment cleaning:	60 kg/annum
Unused blend:	180 kg/annum

Any unused blended adhesive on the blending equipment, adhesive trays and laminating machinery is manually transferred to a waste adhesive and solvent drum or wiped up using rags and ethyl acetate. The polymer waste produced from the above processes will be incinerated by licensed hazardous waste contractors.

The remainder of the notified polymer, approximately 19.5–39.5 tonnes/annum, will be incorporated into pet food packaging.

9.2. Fate

Notified polymer spilt or wasted during the formulation process, will be incinerated by licensed hazardous waste contractors. Upon incineration, the polymer will be rapidly destroyed and converted to water vapour and oxides of carbon. If the spilt and wasted notified polymer is disposed to landfill in the 200 L import drums, it is expected that any subsequent leakage will become associated with the soil matrix and will not leach into the aquatic environment.

The majority of the notified polymer will ultimately make its way into domestic landfill as household garbage. Upon eventual degradation of the packaging films the notifier expects that the resulting end polymer will become part of the soil matrix and will not leach from the soil by water due to its high molecular weight and hydrophobicity.

The notified polymer is not expected to cross biological membranes, due to its high molecular weight and predicted low water solubility, and should not bioaccumulate (Connell, 1990).

10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological data were submitted.

The notified polymer is not classified as a hazardous substance according to the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999a). It contains low level of residual monomers.

The notified polymer as manufactured contains a solvent methyl ethyl ketone (56%) which is hazardous according to Designated List of Hazardous Substances (NOHSC, 1999b). Therefore product Adcote 507 is classified as hazardous according to NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999a). The health hazards of methyl ethyl ketone are tabulated below.

Chemical	Health hazards (NOHSC, 1999a)	Regulatory controls (NOHSC, 1995)
Methyl ethyl ketone	Irritating to eyes and respiratory system	Exposure standard 300 ppm STEL 150 ppm TWA

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were submitted.

12. ENVIRONMENTAL HAZARD (RISK) ASSESSMENT

Minimal release to the aquatic environment is expected during the use of the notified polymer in the formulation of the laminated adhesive. Small quantities of the notified polymer, derived from either spills or residue waste, will ultimately be incinerated forming water vapour and oxides of carbon.

Residual polymer leaking from drums in landfill is unlikely to be mobile in the soil environment. It would be expected to slowly degrade to carbon dioxide gas through abiotic and biotic processes. The environmental hazard of the notified polymer in landfill is expected to be low.

Minimal release to the aquatic environment is expected through the disposal of packaging to domestic landfill. As the packaging degrades the resulting end polymer is likely to become part of the soil matrix and not to leach from the soil by water because of its high molecular weight and hydrophobicity.

In the event of accidental release of the notified polymer into soils or waterways, the correct Material Safety Data Sheet (MSDS) procedures should be followed, including preventing the material from contaminating soil or entering the sewers.

The polymer's large molecular weight and expected low water solubility should prevent bioaccumulation.

Given the above considerations, the overall environmental hazard is expected to be low.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

The notified polymer will not be introduced in isolation, but as a component in solution of Adcote 507 containing methyl ethyl ketone up to 56%.

No toxicological information has been provided for the notified polymer and therefore the substance cannot be assessed against the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999a). The polymer solution (Adcote 507) is a hazardous substance (irritating to eyes and respiratory system) because of methyl ethyl ketone concentration. The MSDS for the polymer solution lists a number of potential health effects, namely mouth, throat and stomach irritation, nausea, vomiting, diarrhea, dizziness, faintness, headache, incoordination and skin, eye and respiratory irritation. These relate mainly to the solvent, rather than the notified polymer.

13.2. Occupational health and safety

There is little potential for significant occupational exposure to the notified polymer in the transport and storage of the polymer solution other than in the event of an accidental spill.

During the reformulation processes (blending and transfer of adhesive) and cleaning equipment, the main exposure route for the notified polymer will be dermal. The high molecular weight of the polymer will preclude its absorption through the skin. Standard protective measures including local exhaust ventilation, coveralls, protective eyewear and impervious gloves used during reformulation and end use should provide sufficient protection against the notified polymer.

The final adhesive mix, containing the notified polymer, could contain a wide variety of additional ingredients, which may cause adverse health effects. Exhaust ventilation, personal protective equipment, such as safety glasses, impervious gloves, coveralls and safety boots should provide adequate protection to workers handling the adhesive mix.

The notified polymer per se presents a low hazard to human health, and the control measures required to prevent exposure to the hazardous components of the polymer solution will ensure sufficient protection against the notified polymer itself.

13.3. Public health

The polymer in Adcote 507 will not be sold to the public. After completion of the packaging manufacture, the notified polymer in the adhesive material is “sandwiched” between two aluminium or polymer films. Hence the potential for public exposure to the notified polymer as laminating adhesives for a variety of food and other packaging materials is considered low.

Based on the use pattern of the notified polymer and its physico-chemical properties, it is considered not to pose a significant hazard to public health.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS of the notified polymer solution 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 solution 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

To minimise occupational exposure to Polymer in Adcote 507, the following guidelines and precautions should be observed:

- Safety glasses, impervious gloves, coveralls and safety footwear should be used during occupational use of the products containing the notified polymer; where engineering controls and work practices do not reduce vapour and particulate exposure to safe levels, an air fed respirator should also be used;
- 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, 1999a), 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).

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 Polymer in Adcote 507 becomes aware of any of these circumstances, 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

Connell D. W. (1990) General characteristics of organic compounds which exhibit bioaccumulation. In Connell D. W., (Ed) *Bioaccumulation of Xenobiotic Compounds*. CRC Press, Boca Raton, USA.

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 (1995) Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment, [NOHSC:1003(1995)]. In: Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards. Australian Government Publishing Service, Canberra.

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National Occupational Health and Safety Commission (1999b) List of Designated Hazardous Substances [NOHSC:10005(1999)]. Australian Government Publishing Service, Canberra.

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

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