

File No: PLC/204

January 2001

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**Polymer in Morfree C-83**

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 Morfree C-83****1. APPLICANT**

Rohm and Haas Australia Pty Ltd of 969 Burke Road CAMBERWELL VIC 3124 (ACN 004 513 188) and Coates Brothers Australia Pty Ltd of 323 Chisholm Road AUBURN NSW 2144 (ACN 000 079 550) have submitted a joint notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC) "Polymer in Morfree C-83".

**2. IDENTITY OF THE CHEMICAL**

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

**Marketing name:** Polymer in Morfree C-83

**3. POLYMER COMPOSITION AND PURITY**

**Purity (%):** >99%

**Hazardous impurities (other than residual monomers and reactants):** None.

**Non-hazardous impurities at 1% by weight or more:** None.

**Additives/adjuvants:**

<b>Chemical name</b>	<b>CAS no.</b>	<b>% Weight</b>
Ammonium chloride	12125-02-9	0-5%
Acetic acid	64-19-7	0-5%

#### 4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

#### 5. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is imported as a 30% solution in glycol ether. The properties reported below are those of the polymer solution unless stated otherwise.

Property	Result	Comments
<b>Appearance</b>	Yellow pale liquid; mild odour (the product).	
<b>Specific gravity</b>	1.09	Imported product is a solution.
<b>Water solubility</b>	71 ppm	The water solubility is expected to be low.
<b>Particle size</b>	Not applicable.	Imported product is a liquid.
<b>Flammability</b>	Not determined.	Expected to be combustible but not flammable.
<b>Autoignition temperature</b>	Not determined.	
<b>Flash point:</b>	>93° C	
<b>Explosive properties</b>	None.	
<b>Stability/reactivity</b>	The polymer is expected to be stable under normal conditions.	
<b>Hydrolysis:</b>	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 are acceptable for a polymer of low concern.

The water solubility of the notified polymer was determined in the following manner. Approximately 0.5 g of the notified polymer was shaken for 96 hours in 100.0 mL of double filtered deionised water. Undissolved solids were removed through a 0.2 µm filter and an aliquot of the solution containing the dissolved material was evaporated to enable the determination of the total dissolved solids (71 ppm).

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 lower the pH of the solution sufficiently 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

The notified polymer will be used as one component of a two-pack laminating adhesive in dry food packaging and other general packaging.

The notified polymer will not be manufactured in Australia. It will be imported as a component of Morfree C-83 (30%, w/w) adhesive solution, packed in 200L steel drums or 20 L steel pails. The estimated import quantity of the notified is approximately 10 tonnes in the first year increasing to 30 tonnes per annum after 5 years.

In Australia, the imported Morfree C-83 will be blended with other ingredients to form an adhesive. The blended adhesive (containing 10-15% w/w notified polymer) will be applied by a gravure coating process, whereby two polymer and/or aluminium films are laminated together and the adhesive is sandwiched by the films.

## 7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
<b><i>Laminating machine operators</i></b>		
<i>Blending adhesive &amp; operating laminating machine (10-15 workers; 6-8 hours/day, 150 days/year)</i>		
Dermal and ocular.	Morfree C-83 (30% notified polymer) is decanted from drums by gravity feed into 20-50 L stainless steel vessels (pails of the material are poured manually) and pumped through a hose to a mixing nozzle where it mixes with a second component.	Blending vessels are in a bunded area with local exhaust ventilation.
	Application of adhesive mixture (approximately 10-15% notified polymer) onto laminating machine rollers (adhesive in tray) - mechanical processes.	Laminating machine is open, however, either fitted with exhaust ventilation ducts above the adhesive tray or in a wall or ceiling adjacent to the machinery.

Unused adhesive in the laminating machine tray or reservoir is manually transferred to a waste adhesive and solvent drum.

Workers wear safety glasses, impervious gloves, overalls and safety boots when handling adhesives.

Residue on the laminating machinery is wiped off manually using ethyl acetate.

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**Packaging**

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*Storemen and packaging line operators (number of workers not specified)*

Dermal	Workers at the packaging factories will pack dry food and other goods with the material containing the notified polymer. They will handle the laminated material and packed goods where the notified polymer is unavailable for absorption.	Not specified.
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**Transport and storage**

*5-10 waterside workers, 10-20 transport & warehouse workers*

Dermal and ocular.	Workers will handle Morfree C-83 containing 30% notified polymer and packed goods where the notified polymer is unavailable for absorption.	Not specified.
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Exposure to the 30% resin solution is only possible in the event of a spill.

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**Disposal**

Dermal and ocular.	Drums containing residue of the notified polymer solution are re-used at the same site for waste cleaning solvent and adhesive. The drums of waste solvent are disposed of by a licensed hazardous waste contractor.	Not specified.
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**8. PUBLIC EXPOSURE**

The notified polymer is not available for sale to the general public. The potential for public exposure to the notified polymer during transport, reformulation or disposal is assessed as negligible. Although members of the general public will handle dry food and other goods in packaging manufactured using the notified polymer (~10-15%), there is little potential for exposure due to the polymer being sandwiched between two impervious films.

## 9. ENVIRONMENTAL EXPOSURE

### 9.1. Release

During formulation the notifier estimates that up to 240 kg per annum of notified polymer waste will be generated. This will be derived from:

Spills:	40 kg/annum
Residues in import containers:	50 kg/annum.
Equipment cleaning:	50 kg/annum
Unused blend:	100 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. The waste in these drums will be sent for incineration. Spilt adhesive contained on rags and absorbent materials will be sent to landfill and disposed of by licensed hazardous waste contractors.

The remainder of the notified polymer, approximately 7.75–27.75 tonnes/annum, will be incorporated into dry food packaging.

### 9.2. Fate

Notified polymer either spilt or wasted during the formulation process will be disposed to landfill by licensed hazardous waste contractors in the 200 L steel importation drums or and 20 L steel pans. If any leakage were to occur from the importation drums, the notified polymer is expected to associate with the soil matrix and not leach into the aquatic environment. If the spilt waste polymer is incinerated, it will be rapidly destroyed and converted to water vapour and oxides of carbon.

The majority of the notified polymer is contained in dry food packaging and will ultimately end up in domestic landfill as household garbage. Upon eventual degradation of the packaging films the notifier expects the resulting end polymer to become part of the soil matrix and not leach because of the high molecular weight and hydrophobicity of the adhesive.

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

## 10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological data were provided. The health hazards of the hazardous additives and adjuvants are tabulated below. Both are present in Morfree C-83 at concentrations below their cut-off levels.

<b>Chemical</b>	<b>Health hazards</b>	<b>Regulatory controls</b>
<b>Additives/adjuvants</b>		
Ammonium chloride	Harmful if swallowed (>25%). Irritating to eyes (>20%)	Exposure standard 10 mg/m <sup>3</sup> TWA, 20 mg/m <sup>3</sup> STEL (NOHSC, 1995).
Acetic acid	Irritating to eyes and skin (10-25%) Causes burns (25-90%) Causes severe burns (>90%)	Exposure standard 25 mg/m <sup>3</sup> TWA, 37 mg/m <sup>3</sup> STEL (NOHSC, 1995).

## 11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were provided.

## 12. ENVIRONMENTAL HAZARD 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 be released to landfill in the 200L import drums and 20L steel pans. In the event of a subsequent leak, the polymer is unlikely to be mobile in the soil environment due to its moderate solubility and 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. Incinerated polymer would be rapidly destroyed and converted to water vapour and oxides of carbon.

Minimal leaching to the aquatic environment is expected through the disposal and degradation of dry food packaging in domestic landfill. As the packaging gradually degrades, the resulting end polymer is likely to become part of the soil matrix and would not leach because of the high molecular weight and hydrophobicity of the formulated adhesive.

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 expected large molecular weight and low water solubility of the formulated adhesive 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**

No toxicological information was provided. The notified polymer in Morfree C-83 is considered stable under normal conditions of use. Given the high molecular weight and lack of reactive functional groups, the polymer is unlikely to be a hazardous substance according to the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999a). Since the notified polymer has high NAMW, absorption across biological membranes would be restricted.

The product, Morfree C-83, has been classified by the notifier as a hazardous substance based on the eye irritant effects (risk phrase R36).

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

Laminating machine operators may be exposed to the polymer during manual addition of the polymer to the mixing vessels and transfer of the mixing adhesive on to the laminating machine rollers. Potential exposure to the notified polymer is by skin contact, with inhalation exposure unlikely due to the high molecular weight of the polymer. Exposure to the operators may also occur during the manual transfer of unused adhesive and wiping residues off the laminator rolls.

Although there is considerable potential for exposure, the risk of adverse health effects due to the notified polymer is low due to its expected low toxicity.

As the operators may be exposed to hazardous chemicals during the mixing and laminating processes, personal protective equipment consisting of goggles, coveralls, impermeable gloves and occupational footwear is recommended during use.

The notified polymer becomes unavailable for absorption once it is incorporated in the laminated material. The health risk for workers in the packaging industry, and in the distribution and retailing dry food and other packaged goods is considered to be negligible.

#### *Transport and storage*

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.

### **13.3. Public health**

The notified polymer is not available for sale to the general public. It will be used in laminate adhesive products for use in food and other packaging applications. Although members of the public may consume food from laminated packages manufactured using the notified



polymer, the risk to public health from the notified polymer is likely to be low because the notified polymer is sandwiched between two impermeable layers and is unlikely to be bioavailable.

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

### **14.1. MSDS**

MSDS for Morfree C-83, containing the notified polymer, was provided by the notifier. It 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 Morfree C-83 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 the Polymer in Morfree C-83, 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 of the products containing the notified polymer;
- Spillage of the adhesive 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 polymer are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b), workplace practices and control procedures consistent with State and territory hazardous substances regulations must be in operation.

Guidance in selection of goggles 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) or 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 chemical) 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.

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

National Occupational Health and Safety Commission (1999b) List of Designated Hazardous Substances [NOHSC:10005(1999)]. 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.

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

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