

File No PLC/880

January 2010

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME  
(NICNAS)**

**FULL PUBLIC REPORT**

**1,3-Benzenedicarbonyl dichloride, polymer with 2-methyloxirane polymer with  
oxirane ether with 1,2,3-propanetriol (3:1), caprolactam-terminated**

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (Cwlth) (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 Department of Health and Ageing, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Department of the Environment, Water, Heritage and the Arts.

For the purposes of subsection 78(1) of the Act, this Full Public Report may be inspected at our NICNAS office by appointment only at 334-336 Illawarra Road, Marrickville NSW 2204.

This Full Public Report is also 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**

## TABLE OF CONTENTS

FULL PUBLIC REPORT.....	2
1. APPLICANT AND NOTIFICATION DETAILS .....	2
2. IDENTITY OF CHEMICAL .....	2
3. PLC CRITERIA JUSTIFICATION .....	2
4. PHYSICAL AND CHEMICAL PROPERTIES .....	2
5. INTRODUCTION AND USE INFORMATION.....	2
6. HUMAN HEALTH IMPLICATIONS.....	2
7. ENVIRONMENTAL IMPLICATIONS .....	2
8. CONCLUSIONS AND RECOMMENDATIONS.....	2

**FULL PUBLIC REPORT****1,3-Benzenedicarbonyl dichloride, polymer with 2-methyloxirane polymer with oxirane ether with 1,2,3-propanetriol (3:1), caprolactam-terminated****1. APPLICANT AND NOTIFICATION DETAILS**

## APPLICANT(S)

Plastral Pty Ltd (ABN 68 000 144 132)  
130 Denison Street  
Hillsdale, NSW 2036

## NOTIFICATION CATEGORY

Polymer of Low Concern

## EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication: Use Details and Import Volume.

## VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

No variation to the schedule of data requirements is claimed.

## PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

## NOTIFICATION IN OTHER COUNTRIES

USA (1999)

**2. IDENTITY OF CHEMICAL**

## MARKETING NAME(S)

NYRIM P1-30 (> 90% notified polymer)  
BRUGGOLEN PI-30  
NYRIM P1-40 (80% notified polymer)

## CHEMICAL NAME

1,3-Benzenedicarbonyl dichloride, polymer with 2-methyloxirane polymer with oxirane ether with 1,2,3-propanetriol (3:1), caprolactam-terminated

## OTHER NAME(S)

Polyoxypropylene-polyoxyethylene-block copolymer isophthalic acid biscaprolactum ester

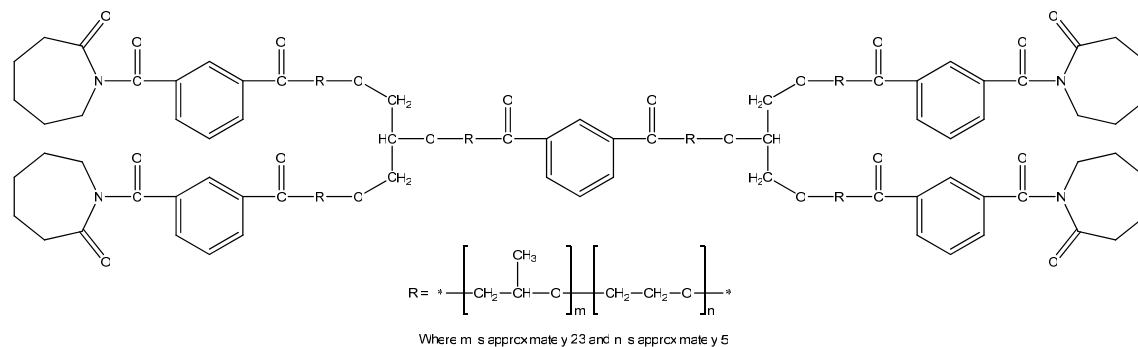
## CAS NUMBER

718612-97-6

## MOLECULAR FORMULA

$C_{20}H_{24}N_2O_4 \cdot [C_3H_8O_3 \cdot 3(C_3H_6O \cdot C_2H_4O)]_x$

## STRUCTURAL FORMULA



## MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn)	10,485 Da
Weight Average Molecular Weight (Mw)	27,143 Da
Polydispersity Index (Mw/Mn)	2.6
% of Low MW Species < 1000 Da	1%
% of Low MW Species < 500 Da	0%

## POLYMER CONSTITUENTS

Chemical Name	CAS No.	Weight % starting	Weight % residual
Oxirane, 2-methyl-, polymer with oxirane, ether with 1,2,3-propanetriol (3:1)	9082-00-2	83.9	~ 0
2H-Azepin-2-one, 1,1'-(1,3-phenylenedicarbonyl)bis[hexahydro-Benzenepropanoic acid, 3,5-bis(1,1-dimethylethyl)-4-hydroxy-, 1,1'-[2,2-bis[[3-[3,5-bis(1,1-dimethylethyl)-4-hydroxyphenyl]-1-oxopropoxy]methyl]-1,3-propanediyl] ester*	7381-13-7 6683-19-8	15.9 0.2	~ 3 0.2
2H-Azepin-2-one, hexahydro-	105-60-2	0	~ 5

\* Antioxidant – not contained in polymer structure.

## REACTIVE FUNCTIONAL GROUPS

The notified polymer contains only low concern functional groups.

## 3. PLC CRITERIA JUSTIFICATION

Criterion	Criterion met
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:	Viscous light-yellow liquid
Melting Point/Glass Transition Temp	Approximately 0°C
Density	1030 kg/m <sup>3</sup> at 20°C
Water Solubility	0.85 g/L at 20°C
	The water solubility was determined according to DIN ISO 787, part 8. The sample was dispersed in water. The insoluble residues were

	separated by filtration and the filtrates reduced by evaporation at 105°C. The resulting residue was determined gravimetrically. The water extractable component was equivalent to 0.4% by weight of the test substance.
Dissociation Constant	Not determined. Given the notified polymer's chemical structure, it is unlikely to ionise in the environmental pH range (4 – 9).
Reactivity	The notified polymer is a pre-polymer with reactivity appropriate for the manufacture of thermoplastics. It contains hydrolysable functionality, but hydrolysis is unlikely to occur under ambient abiotic conditions in the environmental pH range of 4 – 9.
Degradation Products	None under normal conditions of use.

## 5. INTRODUCTION AND USE INFORMATION

### MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Tonnes	10-30	10-30	10-30	30-100	30-100

#### Use

The notified polymer will be used in the manufacture of plastic articles.

The notified polymer acts as an activator and elastomeric component for nylon produced by reaction injection moulding (RIM) and rotational moulding. The articles produced from the notified polymer will be used in technical plastic parts for a wide range of industrial applications such as automotive, rail and agricultural vehicles and pumps.

The moulding of plastic articles containing the notified polymer will predominantly be done in closed systems to protect the notified polymer from atmospheric moisture which reduces its reactivity.

#### Mode of Introduction and Disposal

The notified polymer will not be manufactured within Australia.

The notified polymer will be imported through the ports of Melbourne and Sydney.

## 6. HUMAN HEALTH IMPLICATIONS

### Hazard Characterisation

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard. This is supported by data provided on an analogue polymer.

<i>Endpoint</i>	<i>Result</i>	<i>Effects Observed?</i>	<i>Test Guideline</i>
Rat, acute oral	LD50 > 5,000 mg/kg bw	unknown	unknown
Rat, acute dermal	LD50 > 2,000 mg/kg bw	unknown	unknown
Rabbit, skin irritation	non-irritating	no	unknown
Rabbit, eye irritation	slightly-irritating	yes	unknown

All results were indicative of low hazard.

All irritant effects observed in the eye had subsided 48 hours after exposure.

### Occupational Health and Safety Risk Assessment

Dermal and ocular exposure to the notified polymer is possible from drips, spills and splashes during the moulding of plastic articles. The use of closed systems is expected to reduce exposure. Appropriate Personal Protective Equipment (PPE) including impervious gloves, safety glasses and coveralls to minimise dermal and ocular exposure is also expected to be used by workers.

There is potential for dermal exposure to plastic articles that contain the notified polymer. However, the

notified polymer will be incorporated into a polymer matrix and hence not bioavailable.

Although exposure to the notified polymer could occur during moulding processes and handling of plastic articles containing the notified polymer, the risk to workers is not considered unacceptable due to its assumed low hazard.

#### **Public Health Risk Assessment**

There is potential for dermal exposure by the public to plastic articles that contain the notified polymer. However, the notified polymer will be incorporated into a polymer matrix and hence not bioavailable. Given exposure is expected to be negligible the risk to public health is not considered to be unacceptable.

## **7. ENVIRONMENTAL IMPLICATIONS**

### **Hazard Characterisation**

No ecotoxicological data were submitted. PLCs without significant ionic functionality are of low concern to the aquatic environment.

### **Environmental Risk Assessment**

Direct release to the aquatic compartment is not expected at any stage of the notified polymer's lifecycle within Australia as the vast majority of the polymer will be irreversibly combined within a thermoplastic matrix limiting any significant environmental exposure. Plastic articles containing the notified polymer are expected to be eventually disposed to landfill. In landfill, the notified polymer is expected to be immobile and to eventually degrade by biotic and abiotic processes to oxides of carbon and nitrogen, and water vapour. Therefore, the notified polymer is expected to pose a minimal risk to the environment based on the proposed use pattern.

## **8. CONCLUSIONS AND RECOMMENDATIONS**

### **Human health risk assessment**

Under the conditions of the occupational settings described, the notified polymer is not considered to pose an unacceptable risk to the health of workers.

When used in the proposed manner, the notified polymer is not considered to pose an unacceptable risk to public health.

### **Environmental risk assessment**

Based on the reported use pattern, the notified polymer is not expected to pose a risk to the environment.

### **Recommendations**

#### **CONTROL MEASURES**

#### **Occupational Health and Safety**

- No specific engineering controls, work practices or personal protective equipment are required for the safe use of the notified polymer itself, however, these should be selected on the basis of all ingredients in the formulation.

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

- A copy of the MSDS should be easily accessible to employees.
- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)], workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

#### Disposal

- The notified polymer should be disposed to landfill.

#### Emergency procedures

- Spills and/or accidental release of the notified polymer should be handled by physical containment, collection and subsequent safe disposal.

### **Regulatory Obligations**

#### *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 a prepolymer for making plastic, 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 chemical 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.

#### *Material Safety Data Sheet*

The MSDS of the products containing the notified polymer provided by the notifier were reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.