

File No PLC/620

16 October 2006

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

**FULL PUBLIC REPORT**

**Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene)**

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 and Heritage.

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**Director  
NICNAS**

## **TABLE OF CONTENTS**

FULL PUBLIC REPORT .....	3
1. APPLICANT AND NOTIFICATION DETAILS .....	3
2. IDENTITY OF CHEMICAL .....	3
3. PLC CRITERIA JUSTIFICATION .....	4
4. PHYSICAL AND CHEMICAL PROPERTIES .....	4
5. INTRODUCTION AND USE INFORMATION .....	5
6. HUMAN HEALTH IMPLICATIONS .....	5
6.1. Exposure Assessment .....	6
6.2. Toxicological Hazard Characterisation .....	6
6.3. Human Health Risk Assessment .....	6
7. ENVIRONMENTAL IMPLICATIONS .....	6
7.1. Exposure Assessment .....	7
7.2. Environmental Hazard Characterisation .....	7
7.3. Environmental Risk Assessment .....	7
8. CONCLUSIONS .....	7
8.1. Level of Concern for Occupational Health and Safety .....	7
8.2. Level of Concern for Public Health .....	7
8.3. Level of Concern for the Environment .....	7
9. MATERIAL SAFETY DATA SHEET .....	7
9.1. Material Safety Data Sheet .....	7
10. RECOMMENDATIONS .....	7
10.1. Secondary Notification .....	8

**FULL PUBLIC REPORT****Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene)****1. APPLICANT AND NOTIFICATION DETAILS**

## APPLICANT(S)

Fluoro Pacific Pty Ltd (ABN: 31 358 935 194)  
4 Chilvers Rd  
Thornleigh NSW 2120

## NOTIFICATION CATEGORY

Polymer of Low Concern

## EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Polymer Constituents  
Residual Monomers/Impurities  
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)

No

## NOTIFICATION IN OTHER COUNTRIES

Not known

**2. IDENTITY OF CHEMICAL**

## CHEMICAL NAME

Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene)

## OTHER NAME(S)

poly (p-oxyphenylene p-oxyphenylene p-carboxyphenylene)  
Poly-ether-ether-ketone

## MARKETING NAME(S)

Victrex PEEK

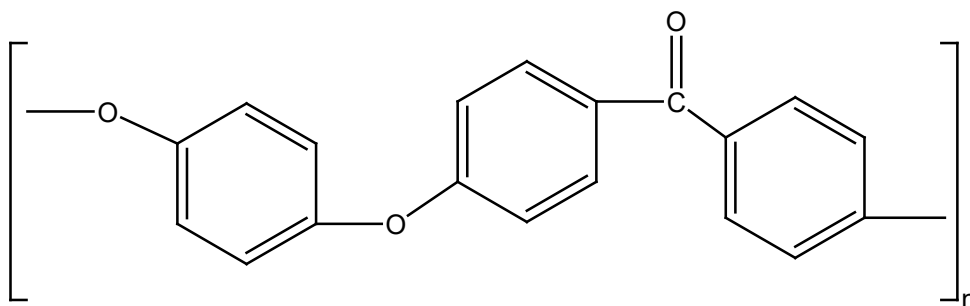
## CAS NUMBER

31694-16-3

## MOLECULAR FORMULA

(C<sub>19</sub>H<sub>12</sub>O<sub>3</sub>)<sub>n</sub>

## STRUCTURAL FORMULA

**MOLECULAR WEIGHT (MW)**

Number Average Molecular Weight (Mn)

21000-32000

Weight Average Molecular Weight (Mw)

57000-100000

Polydispersity Index (Mw/Mn)

Varied

% of Low MW Species &lt; 1000

Not detected

% of Low MW Species &lt; 500

Not detected

**REACTIVE FUNCTIONAL GROUPS**

The notified polymer contains only low concern functional groups.

**3. PLC CRITERIA JUSTIFICATION**

<i>Criterion</i>	<i>Criterion met (yes/no/not applicable)</i>
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**  
**Melting Point/Glass Transition Temp**  
**Density**

White powder, light beige granules  
 T<sub>m</sub> 343°C; T<sub>g</sub> 143°C  
 1320 kg/m<sup>3</sup> (temperature unspecified)

**Water Solubility**

0.00% (w/w) – the notified polymer is a semi-crystalline, solid organic aromatic material without significant polar groups and thus is not soluble.

**Particle Size**

Particle size varies for the powders. Expected D50 range for finest powder is 8-12 microns.

**Reactivity**

Stable under normal environmental conditions. No hydrolysable groups.

**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>
<i>Tonnes</i>	1-3	1-3	3-10	3-10	3-10

### USE AND MODE OF INTRODUCTION AND DISPOSAL

#### Mode of Introduction

Imported as pure raw material (100%) in powder or granular form or in compounds with various fillers in a sealed polyethylene bag inside a heavy-duty cardboard box or a pallet sized box.

#### Reformulation/manufacture processes

A plastic which is sold as powder or granules and is applied by melt processing. This could be injection moulding, compression moulding, a variety of extrusion techniques or powder coating. Melt processing will typically involve heating the polymer to above its melt temperature of 343°C to melt it and then shaping the polymer (in a mould or through a die) before cooling in a controlled manner to control the crystallinity of the final product. In powder coating, Victrex Peek in fine powder form may be used to coat metal substrates. Thick coats of up to 2 mm can be applied by electrostatic spraying or fluidised bed coating. Coating as thin as 25 µm may be obtained using dispersion techniques.

#### Use

To be moulded/extruded/coated into various shapes and finished components for use in all industrial sectors, including aerospace, automotive, food and beverage, wire and cable.

## 6. HUMAN HEALTH IMPLICATIONS

## 6.1. Exposure Assessment

### OCCUPATIONAL EXPOSURE

Dermal and ocular exposure may potentially occur during certain processes involving the notified polymer, such as injection moulding, compression moulding and extrusion. However, exposure to significant amounts of the notified polymer is limited because of the largely automated processes, and the engineering controls and personal protective equipment worn by workers. Workers will make dermal contact with pellets/powder containing the notified polymer (up to 100%). However, the notified polymer is cured into an inert matrix and is hence unavailable for exposure.

Inhalation exposure to the fine powder when filling the hopper of a powder coating applicator is expected to be controlled by Local Exhaust Ventilation (LEV) and a dust mask or respirator if necessary. Dermal and occasional ocular exposure is expected to be controlled by the use of gloves and safety goggles. Because the application of powder coating is expected to be automated, the concentration of dust in the workplace should be minimised by the spray booth design including the use of LEV. The most likely exposure scenarios involve cleaning up dust residues with an industrial vacuum cleaner and its emptying and cleaning. There is a possibility of dust generation requiring the use of a mask or respirator to control inhalation exposure while cleaning.

The Australian Safety and Compensation Council (ASCC) exposure standard for nuisance dust of 10 mg/m<sup>3</sup> (The Exposure Standards for Atmospheric Contaminants in the Occupational Environment. Guidance Note [NOHSC:3008(1995)] and National Exposure Standards [NOHSC:1003(1995)]) is unlikely to be reached in the workplace. There may be some potential for exposure while cleaning up dust residues but as this should be conducted using an industrial vacuum cleaner the majority of the dust should be collected into the vacuum cleaner itself and there should be little atmospheric dust generated.

A large proportion of the polymer dust generated during application should be respirable (mean particle size < 10 µm) and there may be respiratory effects in some individuals if atmospheric levels of nuisance dust approach the ASCC exposure standard.

### PUBLIC EXPOSURE

The notified polymer will not be sold to the public except in the form of finished articles. There is potential for extensive public exposure to articles such as electronic items comprised wholly or partly of the notified polymer. Blooming/leaching of the notified polymer from the articles is not expected and hence exposure will be low.

Members of the public may make dermal contact with articles containing the notified polymer. However, the risk to public health will be negligible because the notified polymer is bound within a matrix, resistant to degradation and unlikely to be bioavailable.

## 6.2. Toxicological Hazard Characterisation

No toxicological data were submitted. The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard.

## 6.3. Human Health Risk Assessment

### OCCUPATIONAL HEALTH AND SAFETY

The OHS risk presented by the notified polymer is expected to be low, based on the minimal exposure to workers and the low intrinsic hazard of the polymer.

### PUBLIC HEALTH

The notified polymer will not be available to the public. Members of the public may make dermal contact with products containing the notified polymer. However, the risk to public health will be negligible because the notified polymer is of low hazard, and is not bioavailable.

## 7. ENVIRONMENTAL IMPLICATIONS

## 7.1. Exposure Assessment

### ENVIRONMENTAL RELEASE

The notified polymer is imported into Australia as a powder or pellets in bulk packaging such as "Octoboxes". Packaging may be returned to the overseas manufacturer to the extent practicable. It is likely that only a small amount of the pellets or powder (~0.1%; 10kg) would remain in the empty packaging requiring disposal. No release is expected from the moulding processes other than from minor spills during the loading of pellets or powder. These are likely to be added back to the moulding process to the extent practicable. It is expected that less than 1% (100 kg) would require disposal resulting from spills. A variety of products will be moulded from the polymer. These will be disposed of at the end of their useful lives. The polymer is likely to be used in powder coating. Powder coating of metal substrates is an efficient process and it is expected that less than 5% (500 kg) will be wasted during this process. The waste will be collected and disposed of.

### ENVIRONMENTAL FATE

The notified polymer is likely to be disposed of to landfill either as waste powder or pellets or at the end of the useful life of the products in which the polymer is incorporated. The polymer is water insoluble and is likely to undergo eventual in-situ degradation by biotic and abiotic processes to form landfill gases, including methane and oxides of carbon; and water vapour. The metal article having the polymer coating thereon is likely to be landfilled or recycled at the end of its useful life. During metal recycling the polymer coating is likely to be completely thermally decomposed to form oxides of carbon and water vapour.

## 7.2. Environmental Hazard Characterisation

No ecotoxicological data were submitted. PLCs without significant ionic functionality are of low concern to the aquatic environment. The notified polymer is practically inert and has a high molecular weight and is thus unlikely to cross biological membranes.

## 7.3. Environmental Risk Assessment

The notified polymer is unlikely to be hazardous as it has no ionic functionalities, is practically inert and has a high molecular weight. The notified polymer is unlikely to be released to the aquatic environment in any significant quantities and is water insoluble. The notified polymer is unlikely pose an unacceptable risk to the environment.

## 8. CONCLUSIONS

### 8.1. Level of Concern for Occupational Health and Safety

There is Low Concern to occupational health and safety under the conditions of the occupational settings described.

### 8.2. Level of Concern for Public Health

There is Negligible Concern to public health when used in the proposed manner.

### 8.3. Level of Concern for the Environment

The polymer is not considered to pose a risk to the environment based on its reported use pattern.

## 9. MATERIAL SAFETY DATA SHEET

### 9.1. Material Safety Data Sheet

The notifier has provided MSDS as part of the notification statement. The accuracy of the information on the MSDS remains the responsibility of the applicant.

## 10. RECOMMENDATIONS

### CONTROL MEASURES

#### Occupational Health and Safety

- Employers should implement the following engineering controls to minimise occupational

exposure to the notified polymer during the powder coating process where dust may be generated:

- Use of LEV if necessary when filling the hopper of a powder coating applicator
  - Powder coating process being carried out in a spray booth design including the use of LEV
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer during the powder coating process where dust may be generated:
    - Use of a dust mask or respirator if necessary when filling the hopper of a powder coating applicator
    - Use of a mask or respirator while cleaning up dust residues with an industrial vacuum cleaner and emptying and cleaning of the industrial vacuum cleaner
    - Use of gloves and safety goggles
  - In the interest of occupational health and safety, the following guidelines and precautions should be observed for use of the notified polymer as introduced in powder form
    - The level of atmospheric nuisance dust should be maintained as low as possible. The ASCC exposure standard for atmospheric dust is 10 mg/m<sup>3</sup>.

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 NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

#### MSDS

- The MSDS should be generated in accordance with NOHSC (2003) National Code of Practice for the Preparation of Material Safety Data Sheets, 2nd edn [NOHSC:2011(2003)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

#### Disposal

- The notified polymer should be disposed of by authorised landfill.

#### Emergency procedures

- Spills and/or accidental release of the notified polymer should be handled by physical collection, while preventing dust build up. Reuse to extent practicable and place any residue into suitable containers for disposal.

### 10.1. Secondary Notification

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

- (1) Under subsection 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 subsection 64(2) of the Act:
  - if any of the circumstances listed in the subsection arise.



The Director will then decide whether secondary notification is required.