

File No PLC/754

March 2008

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

**FULL PUBLIC REPORT**

**Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol**

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**

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**FULL PUBLIC REPORT****Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol****1. APPLICANT AND NOTIFICATION DETAILS**

## APPLICANT(S)

Polymers International Australia Pty Ltd (ABN 92 069 883 825)  
17-19 Endeavour Way  
Braeside VIC 3195

## NOTIFICATION CATEGORY

Polymer of Low Concern

## EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Molecular Weight, Polymer Constituents, Residual Monomers/Impurities, 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)

No

## NOTIFICATION IN OTHER COUNTRIES

US, Canada, China, Korea

**2. IDENTITY OF CHEMICAL**

## MARKETING NAME(S)

KetaSpire

## CHEMICAL NAME

Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol

## OTHER NAME(S)

Bis(4-fluorophenyl)methanone polymer with 1,4-benzenediol  
4,4'-Difluorobenzophenone, hydroquinone polymer  
4,4'-Difluorobenzophenone-4-hydroxyphenol copolymer  
4,4'-Difluorobenzophenone-hydroquinone copolymer  
Benzophenone, 4,4'-difluoro-, polymer with hydroquinone  
Bis(4-fluorophenyl) ketone-hydroquinone copolymer  
Hydroquinone-4,4'-difluorobenzophenone copolymer  
Polyetheretherketone (PEEK)

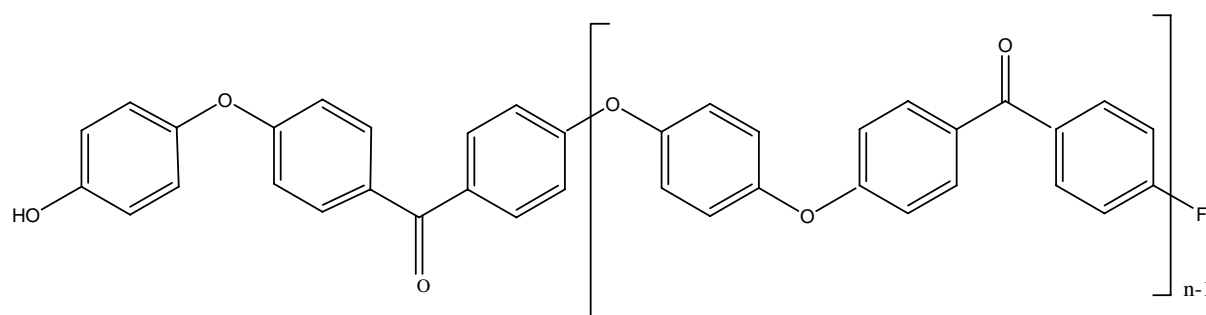
## CAS NUMBER

29658-26-2

## MOLECULAR FORMULA

$(C_{13}H_8F_2O.C_6H_6O_2)_x$

## STRUCTURAL FORMULA



MOLECULAR WEIGHT (MW)  
Number Average Molecular Weight (Mn) >10000 Da

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: white/grey/beige pellets or powder

Melting Point	336-340°C
Density	1280-1320 kg/m <sup>3</sup> at 23°C
Water Solubility	< 0.1% (estimated) The notified polymer is highly hydrophobic due to its organic aromatic backbone. The notified polymer has a very limited solubility even in organic solvents.
Dissociation Constant	The structure of the notified polymer has reactive functionalities but will not significantly dissociate in environmental pH of 4-9.
Particle Size	<10 µm = 24.6% <100 µm = 76.7% Mass median diameter = approximately 38 µm
Reactivity	The notified polymer is expected to be stable under normal environmental conditions (pH 4-9).
Degradation Products	Degrades to carbon monoxide and hydrocarbons.

## 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	1-3	1-3	3-10	3-10	3-10

### Use

The notified polymer is used for manufacture of injection-moulded parts for electrical and/or electronic goods.

### Mode of Introduction

The notified polymer will be imported as ready-to-use solid pellets or powder formulations in either plastic pails (4.4, 13.2 or 22 L) or in 25 kg bags or gaylord. The concentration of the notified polymer in these formulations will range from 50 to >99%. The other components of the formulation could be additives and/or colorants, such as glass fibre, carbon fibre, titanium dioxide, carbon black, or other polymers.

## 6. HUMAN HEALTH IMPLICATIONS

### Hazard Characterisation

No toxicological data were submitted. The notified polymer meets the PLC criteria and is assumed to be of low hazard.

### Occupational Health and Safety Risk Assessment

No reformulation or repackaging will occur in Australia. During manufacture of injection-moulded parts, the imported formulation will be automatically transferred into a hopper equipped with dust extractors. It will be dried in the hopper and then automatically conveyed to an injection machine where it will be melted and injected into shapes. The moulded articles will be cooled and automatically discharged from the machine. They will then subsequently be assembled into finished products.

Inhalation and dermal exposure may potentially occur during certain processes involving the notified polymer, such as via spillages and dust generation at hopper, dryer, and injection machines. However, exposure to significant amounts of the notified polymer will be limited because of the fully automated processes, the engineering controls in place, and the personal protective equipment worn by workers (including protective clothing, gloves, goggles, and respirators if ventilation is not adequate).

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

### Public Health Risk Assessment

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 electrical and/or electronic consumer goods comprised wholly or partly of the notified polymer. Blooming/leeching of the notified polymer from articles is not expected and hence exposure will be low.

Due to the notified polymer's assumed low hazard and the very limited exposure of the public, the risk to public health from exposure to the notified polymer is considered to be negligible.

## 7. ENVIRONMENTAL IMPLICATIONS

### Environmental Hazard Characterisation

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

### **Environmental Risk Assessment**

The environmental releases from the notified polymer would be minimal. The material will mostly be packaged in pails and therefore spills from forklift punctures and such will not be likely. In the event of transporting the material in a 25 kg bag or Gaylord, the maximum size of the spill would be either 25 kg or 1 tonne if the entire contents were to spill. However, in the event of a damaged container, usually only small amounts of the notified polymer spill out which would be easily contained by vacuuming or sweeping the pellets or powder. The residual amount left in packaging will be < 1%. This residual amount will be disposed of in a landfill. During injection moulding of articles it is expected that waste generated will be approximately 2% of the total import amount. Most of this will be reused, with the remainder going to landfill.

The notified polymer is expected to be stable under normal environmental conditions. Due to its low water solubility, the notified polymer in solid wastes is expected to remain bound within the soils and sediments of landfills and eventually degrade through biotic and abiotic processes. If spilt on land, the notified polymer is expected to be immobilised in the soil layer. If spilt to water, it is not expected to dissolve but rather disperse or settle to sediment. It is not expected to be readily biodegradable but due to its high molecular weight, it is not expected to bioaccumulate. Incineration of the notified polymer will result in the formation of carbon dioxide, water and possibly hydrogen fluoride.

Based on the proposed use pattern, the release of the notified polymer to the environment is expected to be very low. The use pattern of the notified polymer in injection-moulded parts will result in limited if any exposure to the aquatic environment. These parts are expected to be recycled or more likely landfilled at the end of their useful lives. While no ecotoxicity data are available, due to limited release to water it is unlikely that the polymer would exist at levels which could pose a risk to aquatic organisms. The high molecular weight indicates a low potential for bioaccumulation. Therefore, the polymer is not considered to pose a risk to the environment when it is stored, transported and used in the proposed manner.

## **8. CONCLUSIONS AND RECOMMENDATIONS**

### **Human health risk assessment**

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

### **Environmental risk assessment**

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

### **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.

##### **Environment**

- The notified polymer should be disposed to landfill.

- Keep away from source of heat and ignition.
- Spills and/or accidental release of the notified polymer should be shovelled into suitable containers for 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 chemical 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 chemical, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified chemical 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 chemical has changed from manufacture of injection-moulded articles, or is likely to change significantly;
  - the amount of chemical being introduced has increased from 10 tonnes per annum, or is likely to increase, significantly;
  - if the chemical 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 notified chemical provided by the notifier was reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.