

File No PLC/616

21 December 2005

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

FULL PUBLIC REPORT

Styrosun Polystyrene Resin

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.

For the purposes of subsection 78(1) of the Act, this Full Public Report may be inspected at:

Library
Australian Safety and Compensation Council
25 Constitution Avenue
CANBERRA ACT 2600
AUSTRALIA

To arrange an appointment contact the Librarian on TEL + 61 2 6279 1162 or email ascc.library@dewr.gov.au

This Full Public Report is 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:

Street Address:	334 - 336 Illawarra Road MARRICKVILLE NSW 2204, AUSTRALIA.
Postal Address:	GPO Box 58, SYDNEY NSW 2001, AUSTRALIA.
TEL:	+ 61 2 8577 8800
FAX:	+ 61 2 8577 8888.
Website:	www.nicnas.gov.au

**Director
NICNAS**

TABLE OF CONTENTS

1.	APPLICANT AND NOTIFICATION DETAILS	Error! Bookmark not defined.
2.	IDENTITY OF CHEMICAL	Error! Bookmark not defined.
3.	COMPOSITION	Error! Bookmark not defined.
4.	INTRODUCTION AND USE INFORMATION.....	Error! Bookmark not defined.
5.	PROCESS AND RELEASE INFORMATION	Error! Bookmark not defined.
5.1.	Operation Description.....	Error! Bookmark not defined.
6.	EXPOSURE INFORMATION	Error! Bookmark not defined.
6.1.	Summary of Occupational Exposure	Error! Bookmark not defined.
6.2.	Summary of Public Exposure	Error! Bookmark not defined.
6.3.	Summary of Environmental Exposure.....	Error! Bookmark not defined.
6.3.1.	Environmental Release	Error! Bookmark not defined.
6.3.2.	Environmental Fate.....	Error! Bookmark not defined.
7.	PHYSICAL AND CHEMICAL PROPERTIES	Error! Bookmark not defined.
8.	HUMAN HEALTH IMPLICATIONS.....	Error! Bookmark not defined.
8.1.	Toxicology.....	Error! Bookmark not defined.
8.2.	Human Health Hazard Assessment.....	Error! Bookmark not defined.
9.	ENVIRONMENTAL HAZARDS	Error! Bookmark not defined.
9.1.	Ecotoxicology.....	Error! Bookmark not defined.
9.2.	Environmental Hazard Assessment	Error! Bookmark not defined.
10.	RISK ASSESSMENT	Error! Bookmark not defined.
10.1.	Environment	Error! Bookmark not defined.
10.2.	Occupational Health and Safety	Error! Bookmark not defined.
10.3.	Public Health	Error! Bookmark not defined.
11.	CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS.....	Error! Bookmark not defined.
11.1.	Environmental Risk Assessment	Error! Bookmark not defined.
11.2.	Human Health Risk Assessment.....	Error! Bookmark not defined.
11.2.1.	Occupational health and safety	Error! Bookmark not defined.
11.2.2.	Public health.....	Error! Bookmark not defined.
12.	MATERIAL SAFETY DATA SHEET.....	Error! Bookmark not defined.
12.1.	Material Safety Data Sheet	Error! Bookmark not defined.
13.	RECOMMENDATIONS	Error! Bookmark not defined.
13.1.	Secondary Notification	Error! Bookmark not defined.

Styrosun Polystyrene Resin

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

Polystyrene Australia, (ABN 851 185 135 80) of 2-4 Mephan Street, Maribyrnong, Victoria, 3032

NOTIFICATION CATEGORY

Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical Name, Other Names, CAS Number, Molecular and Structural Formulae, Molecular Weight, Polymer Constituents and Residual Monomers/Impurities

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

None

2. IDENTITY OF CHEMICAL

OTHER NAME(S)

The notified polymer will be introduced into Australia in products Styrosun 3600 and Styrosun 6600.

MARKETING NAME(S)

Styrosun Polystyrene Resin

MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn) > 10000

3. COMPOSITION

PLC CRITERIA JUSTIFICATION

The notified polymer contains only low concern functional groups.

<i>Criterion</i>	<i>Criterion met (yes/no/not applicable)</i>
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	not applicable
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. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

Imported

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>	< 100	< 100	< 100	< 100	< 100

USE

The notified polymer will be used in the manufacture of thermoplastic articles such as ventilation grilles and ducts, caravan window frames, outdoor lighting, synthetic wood, decorative profiles, advertising signage.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

The processing methods for the notified polymer is either by injection moulding or by extrusion. The notified polymer arrives in pellet form (100% notified polymer) in 25 Kg bags at customers' warehouses where they are stored under cover in a designated storage area. The notified polymer is usually conveyed by vacuum loader to the hopper of the injection moulding machine or the extruder. The vacuum loader is equipped with a dust extraction filter to remove any dust that might be in the bag. During the injection moulding or extrusion process the notified polymer is melted at approximately 220 °C, moulded to form the shape of the plastic article, and then cooled within a mould, prior to ejection into a suitable receptacle. The compounded product is removed from moulds either manually or automatically ejected.

6. EXPOSURE INFORMATION

6.1. Summary of Occupational Exposure

Dermal exposure to the notified polymer could occur during transfer of the pellets to the vacuum loader. Inhalation and ocular exposure to the notified polymer is expected to be low due to the form of the notified polymer (pellet) and the engineering controls (dust extraction filter) present. Due to the expected low vapour pressure of the notified polymer and the likely presence of extraction systems release of fumes is unlikely to be a significant source of exposure. Dermal exposure to the notified polymer could occur during the removal and handling of the finished articles.

The notified polymer has a high molecular weight and negligible water solubility, and is therefore unlikely to cross biological membranes.

6.2. Summary of 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 comprised wholly or partly of the notified polymer. The notified polymer has a high molecular weight and negligible water solubility, and is therefore unlikely to cross biological membranes.

6.3. Summary of Environmental Exposure

6.3.1. Environmental Release

The notified polymer will not be manufactured locally, and therefore, there will be no environmental exposure associated with this process within Australia.

During reformulation, it has been determined that up to 500 mg of notified polymer per 25 kg import bag may remain as residual (equivalent to 2 kg per year based on the maximum 100 tonne per year import volume), and will either enter a recycling stream together with the bag or would be disposed of

to landfill.

During the cleaning of the processing equipment, any quantities of the notified polymer that remain in the barrel of an injection moulding machine will be purged out with the follow-up polymer or purging compound. These purgings can be recycled or be disposed of to landfill. The notifier estimates that an average of 2 kg of notified polymer would be associated with each purge. This is not expected to result in significant environmental release.

6.3.2. Environmental Fate

The majority of the notified polymer will be incorporated into moulded or extruded plastic articles which will be eventually disposed of to landfill at the end of their useful lives. In landfill, the notified polymer is expected to be stable and is expected to degrade very slowly by biotic or abiotic processes. It is not expected to leach, and should remain within the landfill indefinitely. The notified polymer that is exposed to sunlight is expected to degrade more quickly.

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	Off-white solid in pellet form
Melting Point/Glass Transition Temp	86 °C (Styrosun 3600) 89 °C (Styrosun 6600)
Density	1030 kg/m ³
Water Solubility	Insoluble. After 168 hour contact with water, no solubility was observed.
Particle Size	Plastic pellets 3.0 mm diameter, 2.75 mm long
Reactivity	Stable under normal environmental conditions
Degradation Products	None under normal conditions of use. Traces of styrene monomer, butadiene, carbon monoxide, aldehydes and organic acids may be formed at high temperatures.

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

No toxicological data were submitted.

8.2. Human Health Hazard Assessment

The notified polymer meets the PLC criteria and can therefore be considered likely to be of low hazard.

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology

No toxicological data were submitted.

9.2. Environmental Hazard Assessment

Non-ionic polymers with NAMW > 1000 are generally of low concern to the aquatic environment.

10. RISK ASSESSMENT

10.1. Environment

The majority of the imported volume of notified polymer will be reformulated into plastic moulding products. At the end of the useful life of the moulded products, they may be recycled or be disposed of to landfill. Within the landfill environment, the notified polymer is expected to remain in a stable form, and will very slowly degrade by abiotic and biotic means, with the

rate of degradation increased in the presence of sunlight. The notified polymer is not expected to leach.

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 will result in limited if any exposure to the aquatic environment. 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 threat to aquatic organisms. The high molecular weight indicates a low potential for bioaccumulation.

Based on the reported exposure levels and use pattern, the polymer is not considered to pose a risk to the environment when it is stored, transported and used in the proposed manner.

10.2. Occupational Health and Safety

The OHS risk presented by the notified polymer is considered to be low due to the limited exposure expected and the predicted low toxicity of the notified polymer.

The level of atmospheric nuisance dust should be maintained as low as possible. The NOHSC exposure standard for atmospheric dust is 10 mg/m³.

10.3. Public Health

Although extensive contact with articles comprised wholly or partly of the notified polymer may occur, the risk to public health is considered to be low due to the low expected bioavailability of the notified polymer and the predicted low toxicity.

11. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS

11.1. Environmental Risk Assessment

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

11.2. Human Health Risk Assessment

11.2.1. Occupational health and safety

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

11.2.2. Public health

There is No Significant Concern to public health when used in the proposed manner.

12. MATERIAL SAFETY DATA SHEET

12.1. 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.

13. 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.

- In the interest of occupational health and safety, the following guidelines and precautions should be observed for use of the notified polymer as introduced:
 - The level of atmospheric nuisance dust should be maintained as low as possible.
- 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.

Disposal

- The notified polymer should be disposed of to landfill.

Emergency procedures

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

13.1. 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.