

File No PLC/641

13th June 2006

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

FULL PUBLIC REPORT

Polymer in Polyplex 3047

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**Director
NICNAS**

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FULL PUBLIC REPORT**Polymer in Polyplex 3047****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

Nuplex Industries (Aust) Pty Ltd (ABN: 25 000 045 572)
49-61 Stephen Road
Botany NSW 2019

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

Weight Percentage of Polymer Species with MW < 1000 and MW < 500

Polymer Constituents

Residual Monomers/Impurities

Means of Identification

Intended Use

Manufacture/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

None

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Polymer in Polyplex 3047 (67% notified polymer in styrene)

MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn) >1000

REACTIVE FUNCTIONAL GROUPS

The notified polymer contains only low concern functional groups.

SPECTRAL DATA

An FTIR spectrum of the notified polymer was provided.

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**Comments**

The notified polymer is not isolated during the manufacturing process. It is dissolved in styrene.

**Appearance at 20°C and 101.3 kPa
Melting Point/Glass Transition Temp**

Viscous straw coloured liquid.
Not determined. Based on polymers of similar composition, the notified polymer is expected to be a highly viscous liquid that will not have a specific melting point due to the spread of molecular weights of the polymer chain.

Density

T_g expected to be $<25^\circ\text{C}$ (ie. below ambient temperature)
 1200 kg/m^3 at 25°C (calculated from 67% end product in styrene)

Water Solubility

Expected to be $\ll 0.04 \text{ g/100 g}$. Estimate is based upon the trend of decreasing solubilities of related monomers with increasing molecular weight. The polymer largely has hydrophobic groups once the monomers are joined together.

Reactivity

Polymer co-polymerised with styrene is expected to be stable for the service life of a composite article (>25 years). Small amounts of hydrolysis and photodegradation are expected during service life as part of the natural weathering process.

Degradation Products

Oligomers and monomers of styrene and polyester ingredients.

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>	30-100	100-300	100-300	100-300	100-300

USE AND MODE OF INTRODUCTION AND DISPOSAL**Mode of Introduction**

Initially, the polymer will be introduced as an imported formulation at 67% concentration in styrene. The formulation will enter at the ports of Sydney or Brisbane and be transported by road. After market acceptance justifies full batch sizes, the polymer will be manufactured in Australia at Canning Vale WA or Wacol Qld.

The styrene solution of the notified polymer and end-use products may be packaged in bulk road and rail tankers, 1000 L Hazacons, 205 L metal drums, 23 kg metal pails, 4 kg metal tins, 2 kg metal tins, 1 kg metal tins, and 500 g metal tins. The polymer will then be transported to locations anywhere in Australia by road, rail, sea or air.

Reformulation/manufacture processes*Manufacture*

Liquid raw materials are generally loaded by pumping from drums or bulk tanks. Solid reactants are generally added manually from 25 kg bags or bulk bags of capacity up to 1000 kg. The polymer solution containing 67% of the notified polymer is manufactured in a sealed reactor at elevated temperatures. Upon completion of the reaction, the polymer solution will be pumped into a sealed holding tank, where a sample is removed for quality control purposes, and adjustment of the batch to final specifications is made. The solution is then filtered directly into drums and the drums sealed. The filter system may be either sealed or unsealed.

Packaging

For package sizes greater than 20 kg, the finished polymer solution will be pumped into packaging and automatic cut-off valves will be used to control the quantities packed. For pack sizes less than 20 kg, the polymer solution will be repackaged manually from larger pack sizes.

Reformulation

Further blending may take place at the site of manufacture, or alternatively, the notified polymer solution may be transported by road or rail for further blending at Botany NSW. At this step, further additions would be made, such as inhibitors, organometallic promoters, styrenes and thixotropes. Such processes will utilise contained vessels and fume extraction will be used during any open stages. The notified polymer will be present in reformulated solutions at a concentration of approximately 60%.

End-use

At fibreglass fabricators' workshops, the notified polymer solution will be mixed with a catalyst and sprayed onto a suitable mould. Following curing, a resin/glass mixture, of different chemical composition, will be sprayed over the polymer coating. Entrapped air on the mould will be removed by vigorously running a grooved washer consolidation roller over the resin/glass mix.

Use

Manufacture of thermosetting composite articles

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

OCCUPATIONAL EXPOSURE

Manufacture

Worker exposure to the notified polymer is limited because the manufacturing process is carried out in a sealed reactor. Dermal and ocular exposure could occur during sampling, final batch adjustment and filtering of the final polymer solution. An extractor system will be used over any unsealed filter systems. Exposure to the notified polymer is limited because of the personal protective equipment worn by workers such as safety glasses, gloves and protective clothing.

Packaging

Exposure of workers to the notified polymer during packaging processes may occur during pumping or manual repackaging. However, this will be minimised by the use of extraction and the wearing of personal protective equipment including eye protection, impermeable gloves, and protective clothing.

Reformulation

Exposure of workers to the notified polymer may occur during reformulation processes. However, this will be minimised by the use of extraction and the wearing of personal protective equipment including eye protection, impermeable gloves, and protective clothing.

Transport and storage

During transport and storage, workers are unlikely to be exposed to the notified polymer except when packaging is accidentally breached.

End-use

Occupational exposure during fabrication will vary depending on the facilities available in the fibreglass fabricators' workshops. The spray room used for product application should be fitted with an effective fume extraction system. Worker exposure to the notified polymer should be minimised by following recognised fibreglassing practices in combination with engineering controls and personal protective equipment such as overalls, goggles and solvent resistant gloves. The workshops will have down draft ventilation.

PUBLIC EXPOSURE

Resin solutions containing the notified polymer will be available to fibreglass fabricators as an industrial product. The risk of public exposure is negligible. Any public contact will be with the final fabricated article. In the fabricated article, the polymer will be fully cured, with the result that its number average molecular weight will be much greater than 1968 (the WAMW of the notified polymer). Therefore, public exposure will be limited to a fully cross-linked inert polymer in the finished article.

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

As there will be no exposure of the public to the notified polymer or products containing the notified polymer the risk to the public from exposure to the notified polymer is considered to be negligible. Where exposure occurs, the low hazard of the polymer translates to low risk.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Exposure Assessment

ENVIRONMENTAL RELEASE

The notified polymer may be manufactured overseas or locally. Environmental release as a result of local manufacture is expected to account for less than 2% of the total annual volume produced, arising from equipment cleaning, etc. This is expected to be disposed of to secure landfill. Residual notified polymer within containers is expected to account for up to 3% of the total annual volume, and it is expected that this too will be disposed of to landfill.

During use, the notified polymer is reacted in the thermosetting process, and will bind irreversibly with fibreglass. Environmental release is not expected to be significant during the process. Any waste from trimming, etc, will be landfilled. At the end of the useful life of the products containing the notified polymer, it is expected that they will be disposed of to landfill.

ENVIRONMENTAL FATE

Effectively all of the notified polymer will eventually be disposed of to landfill. The majority of the notified polymer (approximately 95%) will be reacted in the thermosetting process and will be associated with fibreglass and should be inert and stable. The remaining 5% of notified polymer (from manufacturing and container residues) which is unreacted, is expected to associate with soil and sediment within the landfill environment and not be mobile. Overtime, this proportion may degrade via biotic and abiotic processes to form simple organic compounds.

7.2. Environmental Hazard Characterisation

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

7.3. Environmental Risk Assessment

Environmental release is only expected to be to landfill. 95% of notified polymer that is released to landfill is expected to be thermally reacted and associated with fibreglass, and therefore should be inert and stable. The remaining 5% is expected to eventually degrade to simple organic compounds. Release to the aquatic environment is not expected. Therefore the risk to the environment is expected to be acceptable.

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 a 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

- 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 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.

Environment

Disposal

- The notified polymer should be disposed of to landfill.

Emergency procedures

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