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

**FULL PUBLIC REPORT**

**Polymer in BYK-019**

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**Director  
Chemicals Notification and Assessment**

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## **FULL PUBLIC REPORT**

### **Polymer in BYK-019**

#### **1. APPLICANT AND NOTIFICATION DETAILS**

##### APPLICANT(S)

Nuplex Industries (Aust) Pty Ltd (ABN 25 000 045 572) 49 – 61 Stephen Rd BOTANY NSW 2019.

##### EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication: chemical name, CAS No., molecular and structural formulae, spectral data, import volume, polymer constituents.

##### 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

Canada (1997).

#### **2. IDENTITY OF CHEMICAL**

##### MARKETING NAME(S)

BYK-019 contains the notified polymer at approximately 50% . The MSDS attached to this report is for BYK-019.

##### MOLECULAR WEIGHT

Number Average Molecular Weight (Mn)	< 5000
Weight Average Molecular Weight (Mw)	< 20000
% of Low MW Species < 1000	<15
% of Low MW Species < 500	< 5

#### **3. COMPOSITION**

##### PLC CRITERIA JUSTIFICATION

Functional Group	Category	Equivalent Weight (FGEW)
Alkoxy silane	High Concern	200 – 500 (approx.)

Charge Density	The notified polymer has low charge density.
Elemental Criteria	The notified polymer contains only approved elements.
Degradability	The notified polymer is not biodegradable.
Water Absorbing	The notified polymer is not a water-absorbing polymer.
Residual Monomers	All residual monomers are below the relevant cut-off.
Hazard Category	The notified polymer is not classified as a hazardous substance.

The notified polymer does not meet the PLC criteria. However, it is accepted for assessment as a PLC on the following grounds: the alkyl moiety in the alkoxy group is a long chain. In addition, as the polymer is designed for use as an aqueous dispersion it would appear that hydrolysis does not occur and the potentially reactive functional groups are not, in fact, reactive.

#### **4. 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>	< 10	< 10	< 10	< 10	< 10

USE

Defoamer for coatings, inks and pigment concentrates.

## 5. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance at 20°C and 101.3 kPa</b>	BYK-019 is a colourless to light yellow liquid.
<b>Melting Point/Glass Transition Temp</b>	Not determined.
<b>Density</b>	980 kg/m <sup>3</sup> (polymer solution)
<b>Water Solubility</b>	Polymers related to that notified are hydrophobic.
<b>Particle Size</b>	Not applicable.
<b>Flash Point</b>	78°C (polymer solution)
<b>Degradation Products</b>	None.
<b>Loss of monomers, other reactants, additives impurities</b>	None.

## COMMENTS ON ADDITIONAL PROPERTIES

<b>Hydrolysis as a Function of pH</b>	Not determined
Remarks	The notified polymer contains a bond that could be expected to undergo hydrolysis. However, in the environmental pH range of 4 to 9, significant hydrolysis is not expected to occur.
<b>Partition Coefficient (n-octanol/water)</b>	Not determined
Remarks	The notified polymer's low water solubility and its hydrophobic nature is indicative of partitioning into the octanol phase.
<b>Adsorption/Desorption</b>	Not determined
Remarks	The notified polymer is expected to be relatively immobile in soil due its low water solubility.
<b>Dissociation Constant</b>	Not determined
Remarks	The notified polymer does not contain any groups that are expected to dissociate.

## 6. HUMAN HEALTH IMPLICATIONS

### 6.1 Toxicology

#### Toxicological Investigations (Pharmatox, 1994a, 1994b, 1994c)

The following toxicological studies were submitted:

<i>Endpoint and Result</i>	<i>Assessment Conclusion</i>
Rat, acute oral LD50 > 8000 mg/kg bw	low toxicity
Rabbit, skin irritation	non-irritating
Rabbit, eye irritation	slightly irritating

All results were indicative of low hazard.

#### Human Health Hazard Assessment

The notified polymer does not meet the PLC criteria. However, the high concern alkoxy silane reactive functional groups can be predicted not to hydrolyse as the polymer is designed for use in aqueous dispersion. Therefore the polymer can be considered to be of low hazard.

### 6.2 Occupational Health

#### Occupational Exposure

- Exposure may occur to drips and spills during addition of polymer solution to mixing vessels for production of inks, ink/pigment concentrates or paints. Once formulated the notified polymer is at < 1% during subsequent formulation or product application.
- Exposure may occur during application of products containing the notified polymer, for example, spray or roller application of paints.

#### Exposure Assessment

Dermal and ocular exposure can occur during certain formulation processes, for example, addition of the notified polymer to the mixer during paint manufacture. However, exposure to significant amounts of the notified polymer is limited because of the engineering controls and personal protective equipment worn by workers. Exposure to the finished product, for example, filling of containers after formulation and paint/inks application is low due to the low concentration of notified polymer in the product.

After application and once dried, the inks/paint containing the notified polymer is cured into an inert matrix and is hence unavailable to exposure.

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

### 6.3 Public Health

#### Public Exposure

- The public will only be exposed to the polymer in a dried film where it is cross-linked and not bioavailable.

#### Exposure Assessment

The notified polymer is intended only for use in industry.

## 7. ENVIRONMENTAL IMPLICATIONS

## 7.1 Ecotoxicology

### Ecotoxicological Investigations

No toxicological data were provided in the notification dossier.

### Environmental Hazard Assessment

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

## 7.2 Environmental Contamination

### Environmental Exposure

It is estimated that approximately 90% of the notified polymer will be used in aqueous coatings and the remainder in inks and pigment concentrates. BYK-019 containing the notified polymer is used at 0.1 - 0.5% of the total paint formulation manufactured by a variety of companies located throughout Australia.

The manufacture of coatings may result in spillage during blending in the mixer and during batch adjustment, filling and testing. However, such a spill would be contained to the plant through existing bunding. It is estimated that approximately 180 kg per annum of waste will be generated by cleaning up minor spills, cleaning out manufacturing equipment and rinsing drums during manufacture. This waste will be disposed of through licensed waste disposal contractors. Incineration of waste may also occur.

During the coating application there is potential for spillage to occur when the paint is pumped into trays and through spray and roller coating. The notifier indicates that the transfer efficiency of spray painting is approximately 60% while that of roller coating is generally greater than 90%. For a worst case scenario, it is assumed that the notified polymer is applied only by spray. Therefore, up to 4 tonnes of the waste polymer is expected to be formed per year. Overspray will be partially collected by kraft paper and other material as solid residues and will be disposed of to landfill by licensed contractor. Cleaning of the spray equipment will be carried out using solvents and will be disposed of in drums for incineration. This form of disposal would be similar for the roller coating scenario. Approximately 100 kg per annum will be disposed of during drum recycling and the drums will be cleaned by incineration.

### Exposure Assessment

Disposal of the notified polymer to landfill is unlikely to present a hazard to the environment, as it is not water soluble and thus will not be mobile in either terrestrial or aquatic environment. The notified polymer is likely to slowly degrade and become associated with the soil matrix and sediments. The notified polymer in waste from application equipment will be disposed of by incineration. Due to its high molecular weight and low water solubility, the polymer is not expected to bioaccumulate (Connell 1990).

Although the disposal quantity of the notified polymer to landfill is considered large (4 tonnes), it is expected to occur in a dispersed manner, thereby minimising the hazard associated with this mean of disposal. Given its use in many different smash repair shops, it is unlikely to be released to the environment in significant quantities.

Polymers similar to the notified polymer were tested for adsorption on sludge and for degradability. Wastewater treatment plants monitoring and simulation studies have confirmed that when they enter treatment plants they are largely removed by sorption to sludge. Experiments in several soils and under different test conditions demonstrated they will degrade in soil.

The main environmental hazard would arise through spillage in transport accidents that may release quantities of polymer to drains or waterways. However, the polymer is expected to sink to sediments and remain immobile pending collection and disposal to landfill, due to the expected low solubility of the substance. Recycling of spilt material will reduce losses due to spillage. The MSDS contains adequate directions for dealing with such spills. Should a spill occur it is imperative that all efforts are directed at avoiding the spill entering the waterway.

## 8. RISK ASSESSMENT

### 8.1. Environment

The majority of the notified polymer will be incorporated into a stable coating when applied to articles. Waste polymer disposed of to landfill will slowly degrade and eventually be incorporated into soil. Waste solvent containing the notified polymer from cleaning of the application/manufacture equipments will be incinerated. The likely risk to the environment is expected to be low.

## 8.2 Occupational health and safety

The OHS risk presented by the notified polymer is expected to be low due to the low hazard of the polymer and the low potential for exposure.

## 8.3 Public health

The notified polymer will not be available to the public. Members of the public may make dermal contact with dried films containing the notified polymer. However, the risk to public health will be negligible because the notified polymer is **bound within a matrix** and unlikely to be bioavailable.

Therefore, the risk to public from exposure to the notified polymer is considered low.

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

### 9.2. Environmental risk assessment

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

### 9.3. Human health risk assessment

#### 9.3.1. Occupational health and safety

There is No Concern to occupational health and safety under the conditions of the occupational settings described.

#### 9.3.2. Public health

There is Negligible Concern to public health when used as described.

## 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

- The following control measures should be conducted by users to minimise environmental release during manufacture and use of the notified polymer:

- Avoidance of the notified polymer entering the waterway during transport accidental spill.
- Containment of the notified polymer through bunding during manufacture/application spillage
- Recycling of spilt material to reduce losses due to spillage.
- Recycling of steel drum via steel can recycling program.

#### Disposal

- The waste notified polymer resulting from overspray/roller coating application should be disposed of by landfill or be incinerated in the case of the waste wash from cleaning of the application/manufacture equipments.

#### Emergency procedures

- Spills/release of the notified polymer should be handled by removing all sources of ignition. Increase ventilation. Contain the spill and place inert, non-combustible absorbent such as vermiculite, sand or dirt onto material. Collect material and place into a suitable labelled container for subsequent disposal. Do not allow spill to enter drains, sewers or watercourses-inform local authorities if this occurs.

### 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.

No additional secondary notification conditions are stipulated.

## 11. BIBLIOGRAPHY

Connell DW (1990) General characteristics of organic compounds which exhibit bioaccumulation. In: Connell DW ed. Bioaccumulation of xenobiotic compounds. Boca Raton, USA, CRC Press, pp 47-57.

Pharmatox (1994a) Acute Toxicological Study of Compound BYK-LP D 6329 after One Oral Application to the Rat. Project No. 4-74-94. Pharmatox, Germany (unpublished report submitted by notifier).

Pharmatox (1994b) Irritant Effects of BYK-LP D 6329 on Rabbit Skin Acc. to Draize. Project No. 3-75-94. Pharmatox, Germany (unpublished report submitted by notifier).

Pharmatox (1994c) Irritant Effects of Compound BYK-LP D 6329 on Rabbit Eye. Project No. 3-76-94. Pharmatox, Germany (unpublished report submitted by notifier).