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

FULL PUBLIC REPORT

Polymer in BYK-LP N 21444 WS

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:

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**

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FULL PUBLIC REPORT**Polymer in BYK-LP N 21444 WS****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

Limited: Synthetic polymer with $M_n \geq 1000$ Da.

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication: chemical name, other names, molecular and structural formulae, molecular weight, polymer constituents, residual monomers/impurities, use details, import volume

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed as follows: Melting/Freezing Point, Boiling Point, Density, Vapour Pressure, Water Solubility, Hydrolysis as a Function of pH, Partition Coefficient, Adsorption/Desorption, Dissociation Constant, Particle Size, Flash Point, Flammability Limits, Autoignition Temperature, Explosive Properties

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

USA (2005)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

BYK-LP N 21444 WS (containing <30% notified polymer)

CAS NUMBER

Not assigned

OTHER NAME(S)

BYK-LP N 20733 (notified polymer)

MOLECULAR WEIGHT

$M_n > 1000$ Da.

ANALYTICAL DATA

Reference IR, and GPC spectra were provided.

3. COMPOSITION

DEGREE OF PURITY >99%

NON HAZARDOUS IMPURITIES/RESIDUAL MONOMERS (> 1% by weight)

None

ADDITIVES/ADJUVANTS

None

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES

None

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20°C AND 101.3 kPa: yellow solid powder

Property	Value	Data Source/Justification*
Melting Point	>20°C	Estimated (solid at room temperature)
Boiling Point	>200°C	Estimated
Density	Not determined	-
Vapour Pressure	<10 ⁻⁸ kPa	Estimated based on the high molecular weight.
Water Solubility	Not determined	A visual evaluation by stirring 1 g of the notified polymer in 1 L of water for 24 hours at room temperature indicated that the polymer was not soluble. The notified polymer is expected to be insoluble in water based on its use as a dispersant in non-aqueous media and the presence of hydrophobic sub-units in the polymer structure.
Hydrolysis as a Function of pH	Not determined	The notified polymer contains groups which are susceptible to hydrolysis. However, hydrolysis is expected to be slow in the environmental pH range of 4-9.
Partition Coefficient (n-octanol/water)	Not determined	The notified polymer may partition from water into octanol based on its hydrophobicity. However, the high molecular weight of the notified polymer indicates that it will not cross biological membranes.
Adsorption/Desorption	Not determined	Based on its ionic nature and low solubility in water, the notified polymer is expected to adsorb strongly to soil and sediment and have low mobility in the environment.
Dissociation Constant	Not determined	The notified polymer will be ionised in the environmental pH range based on the presence of ionic and basic functions in the polymer structure.
Particle Size	Not determined	The notified polymer will only be introduced as a component of wetting and dispersing formulations.
Flash Point	>100°C at 101.3 kPa	MSDS
Flammability	Not expected to be flammable	Estimated based on structure
Autoignition Temperature	>200°C	Calculated (MSDS)
Explosive Properties	Not expected to be explosive	Estimated based on structure

* No data were submitted for the notified polymer.

DISCUSSION OF PROPERTIES

Reactivity

The notified polymer is expected to have the potential to become cationic in water.

Dangerous Goods classification

Based on the estimated physical-chemical data provided in the above table the notified polymer is not classified according to the Australian Dangerous Goods Code (NTC, 2007). However the data above do not address all Dangerous Goods endpoints. Therefore consideration of all endpoints should be undertaken before a final decision on the Dangerous Goods classification is made by the introducer of the polymer.

5. INTRODUCTION AND USE INFORMATION

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

The notified polymer will not be manufactured in Australia. It will be imported at <30% concentration in solution for use as a wetting and dispersing additive in pigment concentrates for incorporation into surface coatings.

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	<1	1-3	1-3	1-3

PORT OF ENTRY

Melbourne

IDENTITY OF RECIPIENTS

Nuplex Industries (Aust.) Pty Ltd

TRANSPORTATION AND PACKAGING

The notified polymer will be imported at <30% in solution by sea in sealed 25 kg or 200 kg drums which will be transported by road or rail to the notifier's warehouse for storage.

USE

The notified polymer will be used in surface coatings at <10% concentration for application to a variety of plastic, metal, wood and mineral substrates. Surface coatings containing the notified polymer will not be sold to the public.

OPERATION DESCRIPTION

Pigment treatment

The notified polymer will be imported at <30% concentration in solution and transported to the notifier's warehouse for storage. When required, the formulation containing the notified polymer will be weighed into a processing vessel for pigment treatment, dried and samples tested for quality control. The treated pigment powder containing the notified polymer at <30% concentration will be fed into various sized bags and stored in banded warehouses until distributed to coating manufacturers.

Manufacture of coatings

At the coating manufacturer, the treated pigment powder containing the notified polymer at <30% concentration will be manually weighed or metered directly from the storage bags into a stainless steel blending tank and mixed with resin and additives to form the mill base. The mill base will then be pumped into a large mixing vessel to which the remaining additives and resin will be added to form the finished surface coating product. Samples from the finished surface coating product containing <10% notified polymer will be tested for quality control by laboratory technicians. The finished surface coating product (containing <10% notified polymer) will be fed into containers by gravity from the bottom of the mixing vessel through a filter and filling lines.

Occasionally, the coatings may be reformulated in batch mixers, where addition of the treated pigment is semi-automated. This process will involve workers opening the bags, weighing the required amount of pigment and manually charging the blending vessels. All processes will occur under exhaust ventilation. All reformulation and application equipment will be cleaned by rinsing with water. The washings will be treated prior to release to sewer treatment plants, resulting in the collection and disposal of the notified polymer to landfill.

End-use of coatings

Surface coating products containing the notified polymer at <10% concentration will be sold to industrial customers only. Surface coating products will be stirred manually and then applied by spray in a ventilated spray booth, or by brush or roller to a variety of substrates in industrial settings.

6. HUMAN HEALTH IMPLICATIONS

6.1 Exposure assessment

6.1.1 Occupational exposure

NUMBER AND CATEGORY OF WORKERS

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration (hours/day)</i>	<i>Exposure Frequency (days/year)</i>
Transport	6-8	2-3	10-15
Pigment treatment	4	8	50
Coating manufacture	4	8	50
Laboratory technician	2	1	20
End-use application	100	6	260

EXPOSURE DETAILS

Transport and storage

Transport and storage workers are not expected to be exposed to the notified polymer except in the event of an accident.

Pigment treatment

Dermal and ocular exposure to the notified polymer at <30% concentration could occur during pigment treatment in processes such as: manual weighing (or metered dosing), charging the blending vessel, connecting and disconnecting pumps, testing for quality control, packaging of the dried pigments and cleaning and maintenance. However, exposure is expected to be minimised by the use of personal protective equipment (PPE) such as coveralls, safety glasses and impervious gloves. Inhalation exposure to the imported formulation containing the notified polymer at <30% concentration is not expected to be significant due to its anticipated low vapour pressure and the use of local exhaust ventilation. However, inhalation exposure to the dried, treated pigment powder containing the notified polymer at <30% concentration may occur if airborne dusts are formed during packaging.

Manufacture of coatings

There is potential for dermal, ocular and inhalation exposure to pigment powder containing the notified polymer at <30% concentration at the site of coatings manufacture during opening of the pigment bags, manual weighing or metered dosing, charging of blending vessels, testing for quality control (notified polymer at <10%), cleaning and maintenance. Inhalation exposure to treated pigments containing the notified polymer at <30% concentration is expected to be minimised by the use of local exhaust ventilation in areas where weighing and charging of blending vessels will occur. Once blended into a surface coating formulation, inhalation exposure is expected to be minimal due to the low vapour pressure of the notified polymer and low concentration (<10%) of the notified polymer. Dermal and ocular exposure during manufacture of coatings is expected to be limited due to the use of PPE such as coveralls, safety glasses and impervious gloves.

End-use of coatings

Dermal and ocular exposure to the notified polymer (at <10%) may occur during mixing and transfer of the surface coating to spraying equipment, during application and equipment cleaning and maintenance. Inhalation exposure to the notified polymer (at <10%) is also likely during spray application. However, it is anticipated that coatings will be applied in a ventilated spray booth by workers using PPE including coveralls, safety glasses, impervious gloves and respiratory protection which will minimise exposure.

Surface coatings containing the notified polymer at <10% may also be applied by roller or brush. Dermal and ocular exposure may occur during mixing and transfer of the surface coating as well as during application and cleaning of equipment. Dermal and ocular exposure is expected to be minimised by the use of PPE such as coveralls, safety glasses and gloves.

6.1.2. Public exposure

Surface coatings containing the notified polymer at <10% will not be sold to the public. Therefore, the public will not be exposed to the notified polymer as such. However, members of the public may experience dermal exposure to surfaces coated with the notified polymer at <10% concentration. The notified polymer in this case is expected to be bound within an inert matrix and is not expected to be bioavailable. Therefore, public exposure to the notified polymer is expected to be low.

6.2. Human health effects assessment

As no toxicity data were submitted, it is not possible to establish the hazard potential of the notified polymer. However, considering that the notified polymer has a high molecular weight, is insoluble in water and cationic, it is not expected to be absorbed by the oral, dermal or inhalation routes.

The notified polymer contains a number of functional groups of concern; with a combined functional group equivalent weight (FGEW) of approximately 2506 Da. The reactive functional groups are of concern for corrosion/irritation potential (Rorije and Huzelbos (2005), Tsakovska, Netzeva and Worth (2005)). Although the notified polymer is not expected to present significant hazards due to the relatively high FGEW (2506 Da), corrosion/irritation potential of the notified polymer cannot be ruled out.

Health hazard classification

In the absence of toxicity data, the notified polymer cannot be classified according to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004).

6.3. Human health risk characterisation

6.3.1. Occupational health and safety

The main risk for workers handling the notified polymer at <30% concentration is the potential for corrosion/irritation to the skin and eyes. The potential for exposure to the notified polymer at <30% concentration is considered to be limited to handling of the imported product containing the notified polymer during pigment treatment, packaging of pigments and addition of the treated pigment to mixing vessels during coatings manufacture. As workers are expected to wear PPE during these processes, dermal and ocular exposure is expected to be minimal.

Inhalation exposure may occur during packaging of the treated pigment powder containing the notified polymer at <30% concentration as well as addition of the pigment powder to the mixing vessel during surface coatings manufacture. Packaging of the pigment powder should be carried out using low dust techniques to prevent formation of airborne dust clouds and/or workers should use respiratory protection to minimise inhalation exposure. Local exhaust ventilation is expected to be in use during addition of the pigment powder to the mixing vessel during surface coatings manufacture which is expected to reduce inhalation exposure.

There is potential for dermal, ocular and inhalation exposure during application of surface coatings containing the notified polymer at <10% by spray, roller and brush. However, spray application is expected to take place in a ventilated spray booth and all workers involved in application are expected to use PPE to minimise exposure. Similarly, during application by roller or brush, workers are expected to use PPE to minimise dermal and ocular exposure.

Overall, the use of engineering controls and PPE by workers at pigment treatment, surface coatings manufacture facilities and during application are expected to reduce worker exposure. Therefore, the risks to workers are not considered to be unacceptable.

6.3.2. Public health

The public are not expected to be exposed to the notified polymer except through dermal contact with cured surface coatings containing the notified polymer at <10% concentration. Exposure is expected to be negligible as the notified polymer will be bound within the inert coating matrix and is not expected to be bioavailable. Therefore, the risk to public health is not expected to be unacceptable, based on the low potential for exposure.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1 Environmental Exposure

RELEASE OF CHEMICAL AT SITE

During blending of the coating formulations, an estimated 1% of the annual introduction volume of the notified polymer may be accidentally spilt. At most, 1% of the annual introduction volume of the notified polymer is anticipated to remain as residues in the storage containers. Spillages and storage containers containing residues will be disposed to landfill.

Manufacturing equipment will be rinsed with water. The washings will be treated prior to release to sewer treatment plants, resulting in the collection and disposal of the notified polymer to landfill. It is expected that <1% of the annual introduction volume of the notified polymer will be lost to cleaning the manufacturing equipment.

RELEASE OF CHEMICAL FROM USE

The paint containing the notified polymer may be used to coat a variety of plastic, metal, wood and mineral substrates. About 75% of the volume of notified polymer will be applied to substrates by spray, 20% by brushes and 5% by rollers. Mixing of the finished formulation and spray application will be conducted in spray booths located in industrial sites. The over spray, accounting for up to 30% of the applied coating, will be collected within the spray booth on protective materials (e.g. kraft paper or newspaper) and any volatile materials will be captured by the filtering systems. Rollers and brushes will be cleaned with an appropriate cleaning solvent and washings will be held in storage tanks prior to disposal.

RELEASE OF CHEMICAL FROM DISPOSAL

Most of the notified polymer will be applied via coating on metal, plastic, wood and mineral substrates, and share the fate of the associated substrates, which will be either sent to landfill or recycled at the end of their useful lives.

7.1.2 Environmental fate

No environmental fate data were submitted. The small amount of notified polymer washed to the sewers will have low mobility as it is expected to be removed in sewage treatment plants by adsorption to solids. The majority of the notified polymer will be irreversibly combined with other chemical substances as part of the manufacture of articles or immobilised within a polymeric film on coated articles, and be either decomposed during the recycling of the articles, or be sent to landfill. In landfill, the notified polymer is not expected to be mobile and will undergo slow abiotic or biotic degradation processes. The notified polymer will be degraded into water, oxides of carbon and nitrogen.

7.1.3 Predicted Environmental Concentration (PEC)

The concentration of the notified polymer in the aquatic environment is not expected to be of concern to aquatic organisms because of its anticipated low water solubility and low potential for direct release to surface waters. Moreover, partitioning of the notified polymer to solids by adsorption will further reduce its concentration in the aquatic environment.

7.2. Environmental effects assessment

No ecotoxicity data were submitted. The notified polymer is cationic in the environment and the calculated charge density of the polymer is nominally indicative of a toxic hazard to the aquatic environment. However, due to its low water solubility and likelihood for adsorption to particulates, the notified polymer is not expected to be present in water at concentrations that are hazardous to aquatic organisms. The notified polymer is not anticipated to cross biological membranes due to its high molecular weight and is therefore not expected to bioaccumulate.

7.2.1 Predicted No-Effect Concentration

Since no ecotoxicity data were submitted the predicted no effect concentration (PNEC) could not be calculated.

7.3. Environmental risk assessment

The notified polymer is anticipated to be of concern to aquatic organisms due to its cationic functional groups. However, the potential for exposure of the notified polymer to the aquatic environment is low because the expectation is that there will be appropriate disposal of non-aqueous waste according to State/Territory regulations. The risk for harm to aquatic organisms due to washings to the sewer is mitigated by the notified polymer's insolubility in water and propensity to adsorb to particulate matter. Taking into account the low exposure to aquatic organisms, the notified polymer is therefore not expected to pose an unacceptable risk to the environment, based on its proposed use pattern.

8. CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification

In the absence of toxicity data, the notified polymer cannot be classified as hazardous according to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004).

Human health risk assessment

Under the conditions of the occupational settings described, the notified polymer is not considered to pose an unacceptable risk to the health of workers.

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

Environmental risk assessment

On the basis of the reported use pattern, the notified polymer is not considered to pose a risk to the environment.

Recommendations

CONTROL MEASURES

Occupational Health and Safety

- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer as introduced at <30% concentration, in the product BYK-LP N 21444 WS and during treatment and packaging of pigments:
 - Avoid contact with skin and eyes
 - Avoid inhaling dust during handling of treated pigments
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer as introduced at <30% concentration, in the product BYK-LP N 21444 WS and during treatment and packaging of pigments:
 - Chemical resistant gloves
 - Coveralls
 - Safety glasses
 - Respiratory protection if dust exposure is expected

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.
- Spray application should be carried out in accordance with the Safe Work Australia *National Guidance Material for Spray Painting*.

Disposal

- The notified polymer should be disposed of to landfill.

Emergency procedures

- Spills or accidental release of the notified polymer should be handled by physical containment, collection and subsequent safe 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(2) of the Act; if
 - the function or use of the polymer has changed from a component of surface coatings at <10% for industrial use, or is likely to change significantly;
 - the amount of polymer being introduced has increased from 3 tonnes, or is likely to increase, significantly;
 - the polymer has begun to be manufactured in Australia;
 - additional information has become available to the person as to an adverse effect of the polymer 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 a product containing the notified polymer provided by the notifier was reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.

BIBLIOGRAPHY

- NOHSC (1994) National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.
- NOHSC (2003) National Code of Practice for the Preparation of Material Safety Data Sheets, 2nd edition [NOHSC:2011(2003)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.
- NOHSC (2004) Approved Criteria for Classifying Hazardous Substances, 3rd edition [NOHSC:1008(2004)]. National Occupational Health and Safety Commission, Canberra, AusInfo.
- NTC (National Transport Commission) 2007 Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG code), 7th Edition, Commonwealth of Australia
- Rorije E, Hulzebos EM (2005) Evaluation of (Q)SARs for the prediction of Skin Irritation/Corrosion Potential. Physico-chemical exclusion rules. Report submitted by the National Institute of Public Health and Environment (RIVM) to the European Chemicals Bureau (ECB).
- Tsakovska I, Netzeva T & Worth AP (2005). Evaluation of (Q)SARs for the Prediction of Eye Irritation/Corrosion Potential -Physicochemical Exclusion Rules. EUR 21897 EN.
- United Nations (2009) Globally Harmonised System of Classification and Labelling of Chemicals (GHS), 3rd revised edition. United Nations Economic Commission for Europe (UN/ECE), <http://www.unece.org/trans/danger/publi/ghs/ghs_rev03/03files_e.html>.