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

PUBLIC REPORT

BYK-LP G 21313

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (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 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 Energy.

This 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:

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**Director
NICNAS**

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SUMMARY

The following details will be published in the NICNAS *Chemical Gazette*:

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS CHEMICAL	INTRODUCTION VOLUME	USE
LTD/2000	ResChem Technologies Pty Ltd	BYK-LP G 21313	ND*	≤ 6 tonne per annum	Component of industrial paints and coatings

*ND = not determined

CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification

As no toxicity data were provided, the notified polymer cannot be classified according to the *Globally Harmonised System of Classification and Labelling of Chemicals* (GHS), as adopted for industrial chemicals in Australia.

Human health risk assessment

Provided that the recommended controls are being adhered to, under the conditions of the occupational settings described, the notified polymer is not considered to pose an unreasonable risk to the health of workers.

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

Environmental risk assessment

On the basis of the assumed low hazard and the reported use pattern, the notified polymer is not considered to pose an unreasonable risk to the environment.

Recommendations

CONTROL MEASURES

Occupational Health and Safety

- A person conducting a business or undertaking at a workplace should implement the following engineering controls to minimise occupational exposure to the notified polymer:
 - Automated and enclosed systems during reformation and packaging
 - Spray booth during spray application
 - Local exhaust ventilation if formation of dust, mist or aerosol is expected
- A person conducting a business or undertaking at a workplace should implement the following safe work practices to minimise occupational exposure to the notified polymer:
 - Avoid contact with skin and eyes
 - Avoid inhalation of dusts, aerosols or mists
- A person conducting a business or undertaking at a workplace should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer:
 - Impervious gloves
 - Protective clothing
 - Eye protection
 - Respiratory protection

Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- Spray applications should be carried out in accordance with the Safe Work Australia Code of Practice for *Spray Painting and Powder Coating* (SWA, 2015) or relevant State or Territory Code of Practice.
- A copy of the SDS should be easily accessible to employees.
- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS)* as adopted for industrial chemicals in Australia, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation should be in operation.

Disposal

- Where reuse or recycling is not appropriate, dispose of the notified polymer in an environmentally sound manner in accordance with relevant Commonwealth, state, territory and local government legislation.

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 polymer 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 polymer has a number-average molecular weight of less than 1,000 g/mol;

or

- (2) Under Section 64(2) of the Act; if
 - the function or use of the polymer has changed from a component of industrial paints and coatings, or is likely to change significantly;
 - the amount of polymer being introduced has increased, 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.

Safety Data Sheet

The SDS of products containing the notified polymer provided by the notifier were reviewed by NICNAS. The accuracy of the information on the SDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

ResChem Technologies Pty Ltd (ABN: 90 315 656 219)
Suite 1103
4 Daydream Street
WARRIEWOOD NSW 2102

NOTIFICATION CATEGORY

Limited: Synthetic polymer with $M_n \geq 1,000$ g/mol

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, analytical data, degree of purity, polymer constituents, residual monomers, impurities, additives/adjuvants, use details and import volume.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed for all physical and chemical properties.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

USA (2008)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

BYK-LP G 21313

MOLECULAR WEIGHT

Number Average Molecular Weight (M_n) is $> 1,000$ g/mol

ANALYTICAL DATA

Reference IR and GPC, spectra were provided.

3. COMPOSITION

DEGREE OF PURITY

$> 95\%$

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20 °C AND 101.3 kPa: Light brown liquid

Property	Value	Data Source/Justification
Melting Point	< -15 °C	SDS
Boiling Point	175 °C at 101.3 kPa	SDS
Density	970 kg/m ³ at 20 °C	SDS
Vapour Pressure	0.4 kPa at 20 °C	SDS
Water Solubility	Insoluble	SDS
Hydrolysis as a Function of pH	Not determined	Contains hydrolysable functionalities, however, due to its insolubility in water, significant hydrolysis is not expected in the environmental pH range (4 – 9) at ambient temperature
Partition Coefficient (n-octanol/water)	Not determined	Expected to be insoluble in both water and n-octanol

Property	Value	Data Source/Justification
Adsorption/Desorption	Not determined	Expected to be immobile in soil based on its insolubility in water
Dissociation Constant	Not determined	Contains no dissociable functionality
Flash Point	> 100 °C	SDS
Flammability	Not determined	Not a flammable liquid based on the flash point
Autoignition Temperature	> 200 °C	SDS
Explosive Properties	Not determined	Contains no functional groups that would imply explosive properties
Oxidising Properties	Not determined	Contains no functional groups that would imply oxidising properties

DISCUSSION OF PROPERTIES

Reactivity

The notified polymer is expected to be stable under normal conditions of use. The notified polymer contains reactive alkoxysilane groups.

Physical hazard classification

Based on the limited physico-chemical data submitted, the notified polymer cannot be classified according to the *Globally Harmonised System of Classification and Labelling of Chemicals* (GHS), as adopted for industrial chemicals in Australia.

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. The notified polymer will be imported into Australia as a component of pigment additive products at < 5% concentration and reformulated into industrial paint and coating products at concentrations of < 2%. The notified polymer may also be imported as a component of finished industrial coating products (at < 2% concentration).

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

Year	1	2	3	4	5
Tonnes	≤ 2	≤ 3	≤ 4	≤ 5	≤ 6

PORT OF ENTRY

Sydney/Melbourne

TRANSPORTATION AND PACKAGING

The notified polymer will be imported into Australia, as a component of pigment additive products or in reformulated paints and powder coatings, in 25 kg cans or 200 kg sealed steel drums. The imported products containing the notified polymer will be transported in original containers by road and rail for further distribution.

USE

The notified polymer will be used as a component of pigment additive products (at < 5% concentration). The pigment additive products will be further reformulated into industrial paint and powder coating products that contain the notified polymer at < 2% concentration.

OPERATION DESCRIPTION

Manufacture of the notified polymer will not occur in Australia. Reformulation and repackaging of the products containing the notified polymer will occur in Australia at various sites.

Reformulation

At reformulation sites, factory operators will be involved in transferring the pigment additive products containing the notified polymer at < 5% concentration from imported containers (25 kg cans or 200 kg drums) into blending tanks under local exhaust ventilation. The transfer operation will involve manually measuring and pouring the pigment additive products. High speed mixing will be used to blend the paint components. During mixing, the tanks will be in an enclosed environment. The final use concentration of the notified polymer in finished paint products will be < 2%.

For powder coatings, the pigment additive products containing the notified polymer (at < 5% concentration) will be mixed in industrial mixers with other basic powder coating ingredients at $\leq 10\%$ concentration of the final products. The resulting powder coatings will be sieved to remove coarse particles, forming fine powder products to be used as industrial coatings. The final use concentration of the notified polymer in finished powder coating products will be < 2%.

End Use

Finished paint products containing the notified polymer will be used in a wide range of industrial coating applications, including household appliances, automotive parts and architectural structures. The paint products will be applied by brush, roller or spray.

Application of finished powder coatings containing the notified polymer will be completed by spray. The powder coatings will be applied either through fully automated processes, or by manual spray. In some cases, a combination of both automatic and manual touch-up will be required.

Equipment used for applying the paint or coating products will be cleaned using a cloth or newspaper to remove the majority of the residues and then rinsed with water.

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

6.1.1. Occupational Exposure

CATEGORY OF WORKERS

<i>Category of Worker</i>	<i>Exposure Duration (hours/day)</i>	<i>Exposure Frequency (days/year)</i>
Dockside	4	50
Transport and storage	4	150
Reformulation		
paint and coating production	5	200
quality assurance (QA)	2	100
Application	1	20

EXPOSURE DETAILS

Transport and Storage

Transport and storage workers are not expected to be exposed to the notified polymer except in the unlikely event of an accident as the products containing the notified polymer will be sealed in containers during operations.

Reformulation

During reformulation operations, dermal and ocular exposure of workers to the notified polymer at < 5% concentrations is possible when weighing and transferring the pigment additive products from imported containers into blending tanks. The loading operation will be carried out under a fume extractor and blending will occur in a closed mixing tank under local exhaust ventilation. The notifier stated that personal protective equipment (PPE), such as coveralls, gloves, suitable respirators, and eye protection, will be required when carrying out these activities.

During filling operations, potential exposure of workers to the notified polymer in finished paint products (at < 2% concentration) will likely be through dermal or ocular routes. In addition, inhalation exposure to dust from powder coatings containing the notified polymer may occur. However, the exposure is expected to be minimal due to the use of automated/enclosed systems and appropriate PPE.

Quality assurance (QA) staff will wear appropriate PPE to minimise exposure to the notified polymer during QA testing.

Paint and Coating Applications

The coating products containing the notified polymer will be used at industrial facilities. Dermal and ocular exposure of workers to the notified polymer at < 2% concentration may occur during opening cans of the coating and manually pouring the contents into application equipment. In addition, exposure can occur during connecting and disconnecting transfer hoses, and handling rollers and brushes. If leakages happen, workers may also be exposed to the notified polymer at < 2% concentration.

Spray applications will be performed within spray booths. Workers may be exposed to the notified polymer at < 2% concentration by inhalation of the aerosolised coatings. Inhalation is expected to be minimal as the coatings will be applied in specially designed spray booths and workers are expected to use appropriate PPE, including full-face breathing apparatuses, disposable overalls, impervious gloves and safety boots.

Dermal, ocular and inhalation exposure to the notified polymer at < 2% concentration can also occur during the cleaning of the equipment. Workers are expected to wear appropriate PPE including overalls, safety glasses or goggles, impervious gloves and respirators during the cleaning procedure.

6.1.2. Public Exposure

The products containing the notified polymer will only be used by industrial users and will not be sold to the public for do-it-yourself (DIY) use. Direct exposure to the notified polymer by the public is not expected.

Once applied, the coating containing the notified polymer will be cured and the notified polymer is expected to be trapped within the inert coating matrix. It is not expected to be available for further exposure after curing.

6.2. Human Health Effects Assessment

No toxicological data were submitted for the notified polymer. The notified polymer is not expected to be readily absorbed across biological membranes, based on the high molecular weight of > 1,000 g/mol with < 1% species having molecular weight below 500 g/mol.

The notified polymer contains reactive alkoxysilanes functional groups which are of concern for lung toxicity from inhalation of vapours or aerosols. The degree of concern depends on the relative abundance of lower molecular weight species (US EPA 2010). The notified polymer also contains polydimethylsiloxane (PDMS) segments. PDMS has been shown to cause ocular lesions in test animals (WHO 2011).

Health hazard classification

As no toxicity data were provided, the notified polymer cannot be classified according to the *Globally Harmonised System of Classification and Labelling of Chemicals (GHS)*, as adopted for industrial chemicals in Australia.

6.3. Human Health Risk Characterisation

6.3.1. Occupational Health and Safety

During reformulation and end use of the notified polymer, workers may come into contact with the polymer at up to 5% concentration through dermal, ocular or inhalation routes. The potential for toxic effects to the lungs and eyes cannot be ruled out if inhalation and ocular exposure occurs. The proposed use of appropriate PPE including eye protection, and respiratory protection is expected to minimise the exposure and hence reduce the risk. The proposed use of engineering controls during reformulation and end use, including enclosed/automated processes, spray booths and local exhaust ventilation, is anticipated to further minimise the potential for exposure.

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

6.3.2. Public Health

Paint and coating products containing the notified polymer will only be used by industrial workers in areas which will not be accessible to the general public.

Members of the public may come into contact with articles coated with products containing the notified polymer. However, the notified polymer is expected to be cured and cross-linked to form an inert matrix and will not be available for further exposure.

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

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1. Environmental Exposure

RELEASE OF CHEMICAL AT SITE

The notified polymer will be imported into Australia either in finished industrial paint and coating products, or in pigment additive formulations for reformulation into the finished products. For industrial paints, the reformulation process will involve manually adding the pigment additive formulations to the mixing tank, where it will be blended with other ingredients in an enclosed environment, followed by automated filling of the finished products into end-use containers. For powder coatings, the pigment additive products will be mixed in industrial mixers with other basic powder coating components. The resulting powder coating products containing the notified polymer will be sieved to remove coarse particles forming fine powders to be used as industrial coatings.

Up to 1% of the imported volume of the notified polymer, as estimated by the notifier, from liquid waste of reformulation equipment cleaning is expected to be disposed of in accordance with local government regulations. Release of products containing the notified polymer to the environment in the event of accidental spills or leaks during reformulation, storage and transport is expected to be absorbed on suitable materials and disposed of to landfill in accordance with local government regulations. Empty import containers containing $\leq 1\%$ of the imported volume of the notified polymer, as estimated by the notifier, will be collected by an approved waste contractor for reuse or disposal in accordance with local government regulations.

RELEASE OF CHEMICAL FROM USE

Finished paint products containing the notified polymer will be used in a wide range of industrial coating applications, including household appliances, automotive parts and architectural structures. The paint products will be applied primarily through spraying, but could also involve brush and roller application. Application of finished powder coatings containing the notified polymer will be done by spray. The powder coatings will be applied either through fully automated processes, or by manual spray. In some cases, a combination of both automatic and manual touch-up will be required.

The main release of the notified polymer is likely from overspray during use. The overspray containing $\leq 30\%$ of the imported volume of the notified polymer, as estimated by the notifier, is expected to be collected using standard engineering controls such as spray booths before disposal to landfill in accordance with local government regulation. The losses incurred by roller application are expected to be much smaller and generally the environmental exposure will be minimised by use of adsorbent materials that catch droplets and minor spills to be disposed of to landfill in accordance with local government regulations. Wastewater from application equipment cleaning containing $\leq 1\%$ of the imported volume of the notified polymer, as estimated by the notifier, will be disposed of in accordance with local government regulations.

RELEASE OF CHEMICAL FROM DISPOSAL

Most of the notified polymer is expected to share the fate of the articles to which it has been applied, either subjected to metal reclamation or being disposed of to landfill at the end of their useful lives. Residual notified polymer in empty end-use containers is expected to be cured into an inert solid matrix and be disposed of to landfill along with the empty containers.

7.1.2. Environmental Fate

As a result of its use pattern, the majority of the notified polymer is expected to be either subjected to metal reclamation or disposed of to landfill at the end of their useful lives. During metal reclamation, the notified polymer will thermally decompose to form water vapour and oxides of carbon and silicon. In landfill, the notified polymer will be present as cured solids and will be neither bioavailable nor mobile. Thus, release of the notified polymer from the assessed use pattern is not expected to lead to ecotoxicologically significant concentrations in the aquatic environment. The notified polymer is not expected to be bioaccumulative due to its high molecular weight. In landfill, the notified polymer is expected to eventually degrade via biotic and abiotic processes to form water and oxides of carbon and silicon.

7.1.3. Predicted Environmental Concentration (PEC)

The predicted environmental concentration (PEC) has not been calculated as release of the notified polymer to the aquatic environment will be limited based on its reported use pattern.

7.2. Environmental Effects Assessment

No ecotoxicity data for the notified polymer were submitted by the notifier. Polymers without significant ionic functionality are generally of low concern to the environment (Boethling & Nabholz, 1997).

7.2.1. Predicted No-Effect Concentration

The Predicted No-Effect Concentration (PNEC) has not been calculated as release of the notified polymer to the aquatic environment will be limited based on its reported use pattern.

7.3. Environmental Risk Assessment

The Risk Quotient (PEC/PNEC) for the aquatic compartment has not been calculated as release of the notified polymer to the aquatic environment will be limited based on its reported use pattern.

On the basis of the assumed low hazard and the reported use pattern as a component of industrial paints and coatings, the notified polymer is not considered to pose an unreasonable risk to the environment.

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