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

PUBLIC REPORT

Polymer in NeoCryl AF-10

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 Sustainability, Environment, Water, Population and Communities.

For the purposes of subsection 78(1) of the Act, this Public Report may be inspected at our NICNAS office by appointment only at Level 7, 260 Elizabeth Street, Surry Hills NSW 2010.

This 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:	Level 7, 260 Elizabeth Street, SURRY HILLS NSW 2010, 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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SUMMARY

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

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS SUBSTANCE	INTRODUCTION VOLUME	USE
LTD/1532	ResChem Technologies Pty Ltd	Polymer in NeoCryl AF-10	ND*	≤10 tonnes per annum	Component of anti-graffiti coatings for concrete and metal for industrial use

*ND = not determined

CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification

As no toxicity data were provided, the notified polymer cannot be classified 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 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 assessed use pattern and assumed low hazard, the notified polymer is not considered to pose an unreasonable risk to the environment.

Recommendations

CONTROL MEASURES

Occupational Health and Safety

- Employers should implement the following engineering controls to minimise occupational exposure to the notified polymer as introduced and as diluted for use:
 - Local exhaust ventilation
 - Enclosed and automated systems
 - Spray booths (or other ventilation) during application
- Spray applications should be carried out in accordance with the Safe Work Australia *National Guidance Material for Spray Painting* [NOHSC (1999)] or relevant State and Territory Codes of Practice.
- 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.

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

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 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 1000;or
- (2) Under Section 64(2) of the Act; if
 - the function or use of the polymer has changed from as a component of anti-graffiti coatings for concrete and metal for industrial use, or is likely to change significantly;
 - the amount of polymer being introduced has increased from ten tonnes per annum, 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.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

ResChem Technologies Pty Ltd (ABN 90 315 656 219)
6/56 Kalang Road
ELANORA HEIGHTS NSW 2101

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, molecular and structural formulae, molecular weight, analytical data, polymer constituents, residual monomers, impurities, additives/adjuvants, use details, import volume, and site of manufacture.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed for all the required physico-chemical properties.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None

NOTIFICATION IN OTHER COUNTRIES
EU

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
Polymer in NeoCryl AF-10 (product containing the notified polymer at <40%)

CAS NUMBER
Not assigned

MOLECULAR WEIGHT
Mn >1,000 Da

ANALYTICAL DATA
Reference GPC spectra were provided.

3. COMPOSITION

DEGREE OF PURITY >90%

HAZARDOUS IMPURITIES/RESIDUAL MONOMERS (>1% by weight)
All hazardous impurities and residual monomers are present at levels below the concentration cut-offs for classification.

NON HAZARDOUS IMPURITIES/RESIDUAL MONOMERS (>1% by weight)
None

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES
Stable under normal conditions of use.

DEGRADATION PRODUCTS
None under normal conditions.

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20 °C AND 101.3 kPa: The notified polymer is manufactured in a water based formulation and is never isolated from this medium. The formulation containing the notified polymer (<40%) is a milky white liquid.

Property	Value	Data Source/Justification
Melting Point	Not determined	The notified polymer is in a liquid formulation.
Boiling Point	100°C at 101.3 kPa	For the imported product.
Density	1030 kg/m ³ at 20°C	For the imported product.
Vapour Pressure	20 kPa at 25°C	Vapour pressure is expected to be that of water, as the imported product is in water based formulation.
Water Solubility	Not determined	The notified polymer is water dispersible, as indicated by the presence of polar subunits and its use in water-based formulations.
Hydrolysis as a Function of pH	Not determined	The notified polymer contains hydrolysable functionality but the rate of hydrolysis is expected to be slow in the environmental pH range.
Partition Coefficient (n-octanol/water)	Not determined	A low partition coefficient is likely on the basis of the water dispersability of the notified polymer.
Adsorption/Desorption	Not determined	The notified polymer is expected to adsorb to soil and sediment and be immobile in soil based on its

		high molecular weight and presence of ionic functionality.
Dissociation Constant	Not determined	The notified polymer contains functionality which has a typical pKa of ~ 5.
Particle Size	Not determined	The notified polymer is in liquid formulation.
Flash Point	Not determined	Flash point is expected to be > 150°C.
Flammability	Not determined	Not expected to be flammable, based on structural characteristics and experience in use.
Autoignition Temperature	Not determined	Not expected to auto-ignite at ambient temperatures, based on structural characteristics and experience in use.
Explosive Properties	Not determined	Not expected to have explosive properties, based on structural characteristics.

DISCUSSION OF PROPERTIES

For full details of tests on physical and chemical properties, refer to Appendix A.

Reactivity

The notified polymer is expected to be stable under normal handling conditions. However, heating the notified polymer to temperatures above 250°C will result in polymer degradation, releasing overall side-products like e.g. carbon dioxide, water, ethylene, ethanol, ethane and possibly traces of the original raw materials, such as hydrogen fluoride.

Dangerous Goods classification

Based on the submitted physical-chemical data 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 be imported as a component (<40%) of a water based formulation.

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

PORT OF ENTRY

Melbourne, Brisbane and Sydney

TRANSPORTATION AND PACKAGING

The notified polymer will be imported in 125 kg drums and transported by road from the dockside to the notifier's site for storage and for further transportation by road and rail to several sites around Australia for formulation into coatings.

USE

The notified polymer will be used as a component of anti-graffiti coatings for concrete and metal for industrial use.

OPERATION DESCRIPTION

Manufacture of coating

At the coating manufacturer, the product containing the notified polymer at <40% concentration will be typically pumped into a closed mixing vessel, to which other coating components will be added. The product in the mixing vessel will be blended using mechanical agitators under local exhaust ventilation to capture volatiles at source. Following dispersion, the coating (containing the notified polymer at <30%) will be pumped through automated filling lines for packaging. Transfer and packaging processes will be automated and enclosed.

End-use application of coatings

For end use applications, coatings containing the notified polymer (<30%) will be applied by spray (~75%), roller (~15%) or brush (~10%). Mixing of the finished formulation and spray application will be conducted in spray booths located in industrial sites. The components of the coating formulation are poured manually into a closed mixing system. The over spray 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.

Quality control, maintenance and cleaning of equipment

Laboratory technicians will also be involved in performing quality control tests on the coating formulation. Maintenance and cleaning of equipment used in blending the coating will occur on a regular basis. In this regard, the application equipment is expected to be washed using industrial solvent (such as mineral spirit) and disposed of via licensed waste contractors.

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 and warehouse Reformulation:	10	1	200
Mixing and dispersion	40	4	30
Make up	40	2	30
QC Testing	10	8	30
Filtering and Packaging	40	8	30
Cleaning of equipment	30	2	200

EXPOSURE DETAILS

Transport and storage workers are not expected to be exposed to the coating solution containing the notified polymer except in the unlikely event of an accident where the drums become breached. Workers are expected to wear gloves and safety goggles to minimise any exposure when handling the notified polymer as introduced.

Manufacture of coatings

There is potential for dermal, ocular and inhalation exposure to the notified polymer (<40%) during its reformulation into coating products. However, exposure is expected to be limited due to the use of: a pump to transfer the product containing the notified polymer at <40% concentration to the mixing vessel, a closed mixing vessel for mixing notified polymer with other ingredients, mechanical agitators under local exhaust ventilation for blending, automated and enclosed transfer and packaging processes, and personal protective equipment (PPE) such as gloves, coveralls, eyewear. There may be some exposure as a result of drips and spills during the connection and disconnection of transfer pipes, but exposure will be minimised by the use of PPE as stated above.

End-use application of coatings

Dermal, ocular and inhalation exposure to the notified polymer (at <30%) may occur during mixing and transfer of the coating to spraying equipment, and during application. However, exposure during spray application will be minimised by the use of ventilated spray booths at industrial manufacturing facilities. In addition, workers will wear, as a minimum, eye protection, coveralls, impermeable gloves and, if necessary, a respirator.

Dermal and ocular exposure to the notified polymer (<30%) may also occur during brush and roller applications, particularly during manual mixing, manual decanting and manual application. Dermal and ocular exposure is expected to be minimised by the use of PPE such as coveralls, eye protection and impermeable gloves. In addition, the finished coating is expected to be touch-dry within two hours after application, minimising the potential exposure duration. It is expected that workers will use, as minimum, PPE such as gloves, coveralls, and goggles for this purpose.

Quality control, maintenance and cleaning of equipment

Dermal, ocular and inhalation exposure to the notified polymer at <40% concentration may occur during quality control, maintenance and cleaning of equipment used in manufacturing of coating. These procedures will occur on a regular basis. Workers will wear gloves, safety glasses, apron, and respirator (if required) in order to minimise any possible exposure.

Overall, based on the use of engineering controls and PPE by workers, exposure during various procedures/processes involving the use of notified polymer is expected to be low.

6.1.2. Public Exposure

The product containing the notified polymer (<40%) is for industrial use only and will not be sold to the general public. Therefore, the general public will not be exposed to the notified polymer as such. There is potential for public exposure to the notified polymer after coming in contact with the anti-graffiti coatings on concrete and metal. However, once cured, the cross-linked coating containing the notified polymer is inert and highly resistant to water and organic solvents. As such, the notified polymer is not expected to be available for exposure after the end-use application. Therefore, exposure to the general public is not expected.

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.

Based on the high molecular weight (>1000 Da) of the notified polymer, the potential for the notified polymer to cross the gastrointestinal (GI) tract by passive diffusion or to be dermally absorbed after exposure is limited. Similarly, the high molecular weight (>1000 Da) of the notified polymer will also limit any potential health hazards due to the limited presence of some species with molecular weight <1000 Da. However, their effect cannot be entirely ruled out.

The notified polymer does not contain any structural alerts for toxicity and it is not expected to have irritation, sensitisation or genotoxic potential. However, it contains functionality that may slowly degrade to form potentially persistent degradation products in the environment. Given the very short chain length, the effect of these degradation products on human health may be limited. However, the effect cannot be entirely ruled out.

Health hazard classification

As no toxicity data were provided, 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

No toxicity data were provided for the notified polymer. However, based on the high molecular weight and the absence of structural alerts for toxicity, the notified polymer is not expected to pose a hazard to human health.

Limited exposure to the notified polymer may occur during various manufacturing, coating applications, quality control, and cleaning processes involving the notified polymer. This is likely to be further reduced due to the enclosed systems and PPE expected to be worn when handling the notified polymer during these processes.

Given the expected low hazardous nature of the notified polymer, the proposed use of PPE, and the engineering controls in place, the risk to workers using the notified polymer is not considered to be unreasonable.

6.3.2. Public Health

Given that the product containing the notified polymer (<40%) is for industrial use only and will not be sold to the general public, and that the general public will not be exposed to the notified polymer in a bioavailable form, the risk to public health is not considered to be unreasonable.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1. Environmental Exposure

RELEASE OF CHEMICAL AT SITE

The notified polymer is not manufactured in Australia; therefore there is no release from this activity. Accidental spills during transport should be prevented from entering drains and watercourses and are expected to be absorbed onto suitable material (such as vermiculite) and disposed of to landfill.

During reformulation, it is estimated that up to 1% of the annual import volume of the notified polymer may be spilt during mixing and a further 1% may be released as residues in equipment washings. Spills are contained by bunding and are expected to be disposed of by a licensed waste contractor in accordance with local regulations. Equipment washings are subject to flocculation processes for removal of the notified polymer which is subsequently disposed of to landfill. A further 1% of the notified polymer is estimated to adhere to import containers in residues and is expected to be disposed of to landfill.

RELEASE OF CHEMICAL FROM USE

The product containing the notified polymer is expected to be mixed and applied as a two-part coating in industrial or commercial settings to concrete and metal surfaces. Application will be typically by spray painting in spray booths in an industrial setting. Less frequently, application may occur on-site using brush and roller. Overspray is anticipated to be collected within the spray booth on protective materials (e.g. kraft paper or newspaper) and, after being allowed to cure, is expected to be disposed of to landfill. In outdoor settings, overspray is likely to be captured by paper, which will be disposed of to landfill, or caught in bunded areas. Application equipment will be cleaned using solvent, and it is expected that solvent washings containing the notified polymer will be collected and disposed of by licensed waste contractors in accordance with local regulations. Any residues in end-use containers are expected to be disposed of to landfill.

RELEASE OF CHEMICAL FROM DISPOSAL

Notified polymer in coatings is expected to share the fate of the substrate to which it has been applied. Notified polymer in coatings applied to metal articles will be either thermally decomposed during metal reclamation processes at the end of the articles useful life, or disposed of to landfill. Cured coating removed by physical means (e.g. sandpaper/scraping) and non-metal articles at the end of their useful life are expected to be disposed of to landfill.

7.1.2. Environmental Fate

The majority of the notified polymer is expected to be cured into an inert matrix as part of its normal use as a coating. The notified polymer is irreversibly bound into the matrix and, in this form, is not expected to be bioavailable or biodegradable. Notified polymer in solid waste disposed of to landfill is not expected to be mobile. The notified polymer will eventually degrade in landfill, or by thermal decomposition during metal reclamation processes, to form water, oxides of carbon and possibly hydrogen fluoride. The notified polymer contains functionality that may slowly degrade to form potentially persistent very short chain degradation products.

7.1.3. Predicted Environmental Concentration (PEC)

The predicted environmental concentration (PEC) has not been calculated for the notified polymer as, based on its reported use pattern, ecotoxicologically significant quantities are not expected to be released to the aquatic environment.

7.2. Environmental Effects Assessment

No ecotoxicological data were submitted. Anionic polymers are known to be moderately toxic to algae. The mode of toxic action is over-chelation of nutrient elements needed by algae for growth. The highest toxicity is when the acid is on alternating carbons of the polymer backbone. This does not apply to the notified polymer and it is therefore unlikely to be an over-chelation hazard to algae.

7.2.1. Predicted No-Effect Concentration

A predicted no-effect concentration (PNEC) has not been calculated for the notified polymer as, based on its reported use pattern, ecotoxicologically significant quantities are not expected to be released to the aquatic environment.

7.3. Environmental Risk Assessment

The risk quotient ($Q = PEC/PNEC$) for the notified polymer has not been calculated as release to the aquatic environment, in ecotoxicologically significant quantities, is not expected based on its reported use pattern as a component in concrete and metal anti-graffiti coatings. The majority of the notified polymer will eventually be disposed to landfill as cured coating. In its cured state, the notified polymer is irreversibly bound into an inert matrix and is unlikely to leach or be bioavailable. The notified polymer contains functionality that may slowly degrade to form potentially persistent very short chain degradation products. However, on the basis of the assessed use pattern and assumed low hazard, the notified polymer is not considered to pose an unreasonable risk to the environment.

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.