File No: LTD/2032

July 2018

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

PUBLIC REPORT

DISPERBYK-2152

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:

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

TABLE OF CONTENTS

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/2032	ResChem Technologies Pty Ltd and Akzo Nobel Pty Ltd	DISPERBYK-2152	ND*	≤ 50 tonnes per annum	Component of industrial coatings, sealants and adhesives

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

Given the low end-use concentrations and infrequent use, the potential risk posed by the notified polymer to the public is not considered to be unreasonable.

Environmental risk assessment
On the basis of the assessed use pattern, the notified polymer is not expected 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 isolation and engineering controls to minimise occupational exposure to the notified polymer:
  - Enclosed, automated processes, where possible

- A person conducting a business or undertaking at a workplace should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer:
  - Avoid contact with skin and eyes
  - Avoid inhalation of aerosols

- 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:
  - Safety glasses
  - Imperative gloves
  - Protective clothing
  - Respirator if inhalation exposure is expected

  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 are 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 adequate ventilation, physical collection and subsequent 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 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 coatings, sealants and adhesives, 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 the notified polymer provided by the notifier was 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 2101

Akzo Nobel Pty Ltd (ABN: 59 000 119 424)
51 McIntyre Road
SUNSHINE NORTH VIC 3020

NOTIFICATION CATEGORY
Limited: Synthetic polymer with Mn ≥ 1,000 g/mol

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication: chemical name, other name(s), molecular and structural formulae, molecular weight, analytical data, degree of purity, polymer constituents, residual monomers, impurities, additives, import volume and identity of manufacturer.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed for melting point, boiling point, density, vapour pressure, hydrolysis as a function of pH, adsorption/desorption and dissociation constant, flash point, flammability, autoignition temperature, explosive properties and oxidising properties.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None

NOTIFICATION IN OTHER COUNTRIES
Canada, China, Korea and USA

2. IDENTITY OF CHEMICAL

MARKETING NAME
DISPERBYK-2152
DISPERBYK-2151 (product containing ~80% notified polymer)

MOLECULAR WEIGHT
> 1,000 g/mol

ANALYTICAL DATA
Reference IR and GPC spectra were provided.

3. COMPOSITION

DEGREE OF PURITY
> 80%

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20 °C AND 101.3 kPa: Dark brown viscous liquid

Property	Value	Data Source/Justification
Melting Point	< 0 °C	SDS
Boiling Point	> 200 °C	SDS
Density	1.082 kg/m^3 at 20 °C	SDS
Vapour Pressure	< 1 × 10^{-3} kPa at 20 °C	SDS
Water Solubility	6.4-25.2 mg/L at 20 ± 0.5 °C	Measured
Hydrolysis as a Function of	Stable at pH 4-9	The notified polymer contains

pH		hydrolysable functionality; but is expected to be stable in the environmental pH range (4-9) at ambient temperature.
Partition Coefficient (n-octanol/water)	log Pow < 0.3-2.68 at 25 ± 0.5 °C	Measured
Adsorption/Desorption	Not determined	Based on its expected low solubility in water and presence of cationic functionality, the notified polymer is expected to adsorb strongly to soil, sediment and sludge and has low mobility in the environment.
Dissociation Constant	Not determined	The notified polymer is expected to be ionised in the environmental pH range (4-9) based on the presence of a basic functional group in the polymer structure.
Flash Point	> 150 °C	SDS
Flammability	Not determined	Not expected to be highly flammable based on 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
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 conditions of use.

Physical hazard classification
Based on the submitted physico-chemical data depicted in the above table, the notified polymer is not recommended for hazard classification 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. It will be imported into Australia by ResChem Technologies Pty Ltd in the neat form (DISPERBYK-2152) or at ~80% concentration (DISPERBYK-2151) for reformulation into liquid coatings, paints, ambient curing systems, adhesives, sealants and composite coatings (such as gelcoats). The notified polymer may also be imported as a component of pigment concentrates or finished coatings at ≤ 80% concentration.

The notified polymer will also be imported into Australia by Akzo Nobel Pty Ltd as a component of stainer solutions at ≤ 5% concentration.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	10-50	10-50	10-50	10-50	10-50

PORT OF ENTRY
Sydney and Melbourne

TRANSPORTATION AND PACKAGING
The notified polymer will be imported in the neat form or as a component of pigment concentrates and finished coatings (at ≤ 80% concentration) in 25 kg or 200 kg steel drums.

Stainer solutions containing the notified polymer at ≤ 5% concentration will be imported in 5 L tinplate cans.

USE
The notified polymer will be used as a wetting and dispersing additive in industrial liquid coatings (at ≤ 3.2% concentration), ambient curing systems (at ≤ 3.2% concentration), adhesives and sealants (at 0.5-1.5% concentration), composite coatings (at ≤ 4% concentration) and stainer solutions (at ≤ 5% concentration).

OPERATION DESCRIPTION

Reformulation
The notified polymer or the formulation containing the notified polymer at ≤ 80% concentration will be transferred to the mixing vessel by gravity feed or low pressure pumps where it will be blended with other ingredients in the presence of local exhaust ventilation. Following blending, samples of the finished products will be taken for quality control testing. The finished products containing the notified polymer at ≤ 4% concentration will be filled into containers through gravity feed or low pressure pumps.

End Use
Finished products (liquid coatings, ambient curing systems, adhesives, sealants, composite coatings and stainer solutions) containing the notified polymer at ≤ 5% concentration will mainly be applied by spray and possibly be applied with brush or roller. The finished products will primarily be used in industrial and professional settings, with a small fraction (estimated to be < 1% of products) may be used by do-it-yourself (DIY) users.

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

6.1.1. Occupational Exposure

CATEGORY OF WORKERS

Category of Worker	*Number*	*Exposure Duration (hours/day)*	*Exposure Frequency (days/year)*
Waterside workers	10	4	50
Transport and storage	50	4	150
Reformulation	40	5	200
Quality control	10	2	100
End use	50	4	20

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

Reformulation processes
Dermal and ocular exposure of workers to the notified polymer may occur when connecting or disconnecting transfer hoses, cleaning or maintaining equipment and testing for quality control. Inhalation exposure to the notified polymer may also occur if aerosols are formed. Exposure will be minimised through the use of enclosed and automated systems, local exhaust ventilation and personal protective equipment (PPE: safety googles, respirators and impervious gloves and protective clothing) as stated by the notifier.

End-use
Dermal, ocular and inhalation exposure of workers to the notified polymer at ≤ 5% concentration may occur during application of the finished products. Applications will be primarily by spray, but potentially with brush and roller. As stated by the notifier, the potential for exposure should be minimised through the use of PPE (safety glasses, impervious gloves and protective clothing) by workers, including the use of respiratory protection during spray application. Inhalation exposure should be further mitigated through the use of exhaust ventilation and spray booths, where possible. Once the product is dried, the notified polymer will be bound into an inert solid matrix and will not be available for exposure.

6.1.2. Public Exposure
Finished products containing the notified polymer at low concentration may be applied by DIY users using brush and roller. Dermal and ocular exposure to the notified polymer at ≤ 5% concentration may occur in DIY users

but at low frequency. It is not known whether protective equipment would be used by DIY users during applications. DIY users are expected to avoid direct contact with the product, and wash any spills from the skin.

Once the product is dried, the notified polymer will be bound into an inert solid matrix and will not be available for further exposure.

6.2. Human Health Effects Assessment

No toxicity data were submitted. Based on the high molecular weight (> 1000 g/mol), low percentages of low molecular weight species, water solubility (6.4-25.2 mg/L at 20 °C) and partition coefficient (log Pow < 0.3-2.68 at 25°C) of the notified polymer, its potential to cross biological membranes is expected to be limited. Based on its structure, the potential for irritation cannot be ruled out.

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 applications, exposure of workers to the notified polymer is expected to be low given the use of engineering controls (such as enclosed and automated system, sufficient ventilation and spray booth) and PPE (including protective clothing, impervious gloves, safety glasses and respiratory protection). Once the product is dried, the notified polymer will be bound within an inert solid matrix and will not be available for exposure.

Under the conditions of the occupational settings and assessed use patterns, the risk to workers from use of the notified polymer is not considered to be unreasonable.

6.3.2. Public Health

Products containing the notified polymer may be used by DIY users on an infrequent basis. The potential of risk to the DIY users is expected to be minimised by following safe use practices. Once the product is dried, the notified polymer will be bound within an inert solid matrix and will not be available for exposure.

Given the low end-use concentrations and infrequent use, the potential risk posed by the notified polymer to the public 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. The release of the notified polymer to the environment during importation, storage, and transport is unlikely. The most likely source of a release to the environment during these activities will be a transport accident. Releases that do occur as a result of accidents are expected to be physically contained, absorbed on inert material, and either reused or sent for safe disposal.

An estimated 1% of annual import volume of the notified polymer may be lost as a result of spillages that occur during reformulation. The spillages are expected to be absorbed onto suitable materials and disposed of to landfill. Less than 1% of the notified polymer is estimated to remain as residues in import containers that will be collected by licensed waste contractors. The residues are expected to be cured prior to disposal to landfill. Equipment used to reformulate the notified polymer is washed with water and equipment washes are estimated to contain up to 1% of the notified polymer. These washes are expected to undergo a treatment whereby the notified polymer is removed and disposed of to landfill prior to release of the waste water to sewer.

RELEASE OF CHEMICAL FROM USE
Coating formulations containing the notified polymer are applied by spray techniques. It is anticipated that approximately 20-30% of the coating product will form overspray and be collected as waste material. As the application of coatings will be primarily conducted at industrial sites in designated spray booths, the overspray will be captured in the spray booth on Kraft paper or newspaper and is expected to be disposed of to landfill. Equipment used to apply the coating formulations may be rinsed with water. It is estimated that up to 1% of notified polymer used in coatings, may be released in equipment washings. These washes will undergo treatment to remove the notified polymer which, will be disposed of to landfill. During industrial use of the notified polymer, it is estimated that < 1% of the notified polymer will be spilt. These spills are expected to be contained and disposed of to landfill. Less than 1% of the notified polymer may remain as residues in the end-use containers. These 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 and is predominantly expected to be disposed of to landfill. Notified polymer in coatings applied to metal articles may be thermally decomposed during metal reclamation processes at the end of the article's useful life.

7.1.2. Environmental Fate
No environmental fate data were submitted. The majority of the notified polymer is expected to be cured within an inert polymer matrix adhering to articles following its use in liquid coatings (industrial, wood & furniture, protective and automotive), ambient curing systems, adhesives & sealants, and in composites. Notified polymer that is disposed of to landfill is expected to remain associated with the substrate to which it has been applied and in its cured form, it is not expected to be bioavailable or biodegradable. Notified polymer in solid waste disposed of to landfill is not likely to be mobile due to its expected limited water solubility. It is estimated that up to 1% of the notified polymer used in coatings, may be released in equipment washings. These washes will undergo treatment to remove the notified polymer, which will be disposed of to landfill. The notified polymer will eventually degrade in landfill, or by thermal decomposition during metal reclamation processes, to form water, oxides of carbon and nitrogen.

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. The cationic component of the notified polymer has a potential to be toxic to aquatic life. However, significant exposure of the notified polymer to aquatic organisms is unlikely based on the reported use pattern. Furthermore, the majority of the notified polymer will be bound within the inert matrix of cured paints and is not expected to be bioavailable.

7.2. Environmental Effects Assessment

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. The cationic component of the notified polymer has a potential to be toxic to aquatic life. However, significant exposure of the notified polymer to aquatic organisms is unlikely based on the reported use pattern.

7.3. Environmental Risk Assessment
A 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 automotive refinish paints and industrial paints for use on metal and wood substrates. The majority of the environmental release of the notified polymer will be disposal of as cured paints to landfill. In cured paints the notified polymer is bound within the inert paint matrix and is unlikely to leach or be bioavailable. Thermal decomposition of the notified polymer during metal reclamation will produce water and oxides of carbon and nitrogen. On the basis of the assessed use pattern which results in limited aquatic exposure, the notified polymer is not expected to pose an unreasonable risk to the environment.

APPENDIX A: PHYSICAL AND CHEMICAL PROPERTIES

Water Solubility 0.006 – 0.0252 g/L at 20 ± 0.5 °C

Method OECD TG 105 Water Solubility

Remarks Flask Method was used. As the measured solubility was loading dependent, different loading rates were chosen to study the effect on the measured water solubility. The concentration of the test substance was calculated from the measured dissolved organic carbon concentrations in the flasks. The study investigated pH dependency and found that water solubility increased with the pH decreasing from 5.5 to 4.8.

Test Facility LAUS (2014a)

Partition Coefficient (n-octanol/water) log Pow < 0.3 – 2.68 at 25 ± 0.5 °C

Method OECD TG 117 Partition Coefficient (n-octanol/water).

Remarks HPLC method was used. A solution was prepared by weighing 253.5 mg test substance into a 25 mL flask and filled up to 25.35 mL with methanol, resulting in a concentration of 10 g/L which was used for measurements of the main test. This solution had a pH of 6-7 (and no investigation into pH dependency was conducted).

Test Facility LAUS (2014b)

BIBLIOGRAPHY

LAUS (2014a) Determination of Water Solubility (Study No. 14062301G910, September, 2014). Germany, LAUS GmbH (Unpublished report submitted by the notifier).

LAUS (2014b) Determination of Partition Coefficient (Study No. 14062301G930, September, 2014). Germany, LAUS GmbH (Unpublished report submitted by the notifier).

SWA (2015) Code of Practice: Spray Painting and Powder Coating, Safe Work Australia, https://www.safeworkaustralia.gov.au/doc/model-code-practice-spray-painting-and-powder-coating.

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>