File No: LTD/1932

October 2016

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

PUBLIC REPORT

Borchi® Gen 0755

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

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/1932	Cathay Industries Australasia Pty Ltd	Borchi® Gen 0755	ND	≤ 1 tonne per annum	Component of 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, or 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.

Environmental risk assessment
On the basis of the low expected aquatic release 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

- No specific engineering controls, work practices or personal protective equipment are required for the safe use of the notified polymer itself. However, these should be selected on the basis of all ingredients in the formulation.

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

- 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 (M)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 physical containment, collection and subsequent safe disposal. Prevent spillage from entering drains or water courses.

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 a component of 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.

(Material) Safety Data Sheet
The (M)SDS of the notified polymer provided by the notifier was reviewed by NICNAS. The accuracy of the information on the (M)SDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Cathay Industries Australasia Pty Ltd (ABN: 23 081 186 174)
18-20 Ventura Place
DANDENONG SOUTH VIC 3175

NOTIFICATION CATEGORY
Limited: Synthetic polymer with Mn ≥ 1,000 Da.

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication: chemical name, CAS number, molecular and structural formulae, analytical data, degree of purity, polymer constituents, residual monomers and use details.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
LVC/976 (2014)

NOTIFICATION IN OTHER COUNTRIES
USA (2009)
Korea (2013)

2. IDENTITY OF CHEMICAL

MARKETING NAME(S):
Borchi® Gen 0755

MOLECULAR WEIGHT

Number Average Molecular Weight (Mn)	2,254 Da
Weight Average Molecular Weight (Mw)	3,360 Da
Polydispersity Index (Mw/Mn)	1.49
% of Low MW Species <1,000 Da	1.8
% of Low MW Species <500 Da	0.04

ANALYTICAL DATA
Reference NMR, 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: Yellow/orange highly viscous liquid.

Property	Value	Data Source/Justification
Melting Point (pour point)	12.0 ± 3 °C	Measured
Boiling Point	Decomposed prior to boiling ca. 165 °C at 101.3 kPa	Measured
Density	1,090 kg/m^3 at 20 °C	Measured
Vapour Pressure	< 1.4 x 10^{-6} kPa at 25 °C	Measured
Water Solubility	< 2.55 × 10^2 g/L at 20 °C	Measured
Hydrolysis as a Function of pH	Not determined	Contains hydrolysable functionalities; however, not expected to rapidly hydrolyse under environmental conditions (pH 4-9)
Partition Coefficient (n-octanol/water)	Log P_{OW} = 0.67 to > 6.5	Measured

Adsorption/Desorption	Log K_{OC} > 5.63	Measured
Dissociation Constant	pKa = 13.1 (deprotonated amide) pKa = 8.3 (dimethylamine) pKa = 1.1 (protonated amide)	Calculated using ACD/I-Lab v2.0
Flash Point	171 ± 2 °C at 101.3 kPa	Measured
Flammability	Not determined	
Autoignition Temperature	416 ± 5 °C	Measured
Explosive Properties	Negative	Estimated based on chemical structure
Oxidising Properties	Negative	Estimated based on chemical structure

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 be imported into Australia in the neat form at > 95% concentration.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	1	1	1	1	1

PORT OF ENTRY
Melbourne and Sydney

TRANSPORTATION AND PACKAGING
The neat notified polymer will be imported by sea or air in 60 L HDPE drums and transported by road to paint manufacturing facilities. The notified polymer may also be imported in 150/500/1000 mL PA-PE sample bottles.

USE
The notified polymer will be used as a component of paints and coatings at ≤ 3% concentration for industrial and automotive applications.

OPERATION DESCRIPTION
After importation, the notified polymer will be reformulated into paints and coatings. At the paint/coating manufacturing facilities, a pigment milling operation will be performed using the notified polymer as a dispersion aid of pigments to produce a variety of pigment preparations containing the notified polymer at < 5% concentration. The pigment preparations will then be used for the formulation of paints and coatings containing the notified polymer at < 3% concentration. The finished paints and coatings will be then packaged and sent to end users, typically the automotive or industrial sectors. Typically the reformulation processes will be undertaken under highly automated conditions but will involve some manual transfer steps. The paints and coatings will be applied by spray application in spray booths.

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

6.1.1. Occupational Exposure

CATEGORY OF WORKERS

Category of Worker	*Exposure Duration (hours/day)*	*Exposure Frequency (days/year)*
Transport and Storage	1	200
Paint Manufacture	4	200
Paint Testing	4	200
Paint Filling	4	200
Colour mixing/dispensing	8	200

EXPOSURE DETAILS

Transport and storage workers

Transport and storage workers will only come into contact with the notified polymer (at > 95% concentration) in the unlikely event of an accident.

Reformulation

During pigment preparation and formulation of finished paints and coatings, workers may be exposed to the notified polymer at < 5% concentration when manually transferring the notified polymer to the mixing vessel, during sampling and testing, and filling operations. Exposure during other lifecycle steps during reformulation is not anticipated. Exposure may occur by either dermal, ocular or inhalation routes. Exposure should be minimised through the stated use by the notifier of PPE (impermeable gloves, eye protection and coveralls) and local exhaust ventilation.

End-use

Dermal, ocular or inhalation exposure to the notified polymer at < 3% concentration may occur during mixing and spray application, and during cleaning and maintenance of equipment. Exposure should be minimised through the stated use by the notifier of ventilated spray booths and PPE (impermeable gloves, eye protection, coveralls and respiratory protection).

Workers may come into contact with substrates coated with the notified polymer after application. Once the paints and coatings have dried, the notified polymer will be bound within a solid matrix and will be unavailable for further exposure.

6.1.2. Public Exposure

The notified polymer will not be sold to the public. The public may come into contact with substrates coated with the notified polymer after application. However, once the paints or coatings have dried, the notified polymer will be bound within a solid matrix and will not be available for exposure.

6.2. Human Health Effects Assessment

No toxicity data were submitted. The notified polymer contains no functional groups of concern and is therefore not predicted to be hazardous. In addition, the notified polymer is not expected to be absorbed across biological membranes, based on the high molecular weight and low percentage of low molecular weight (< 1,000 Da) species.

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, or the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004).

6.3. Human Health Risk Characterisation

6.3.1. Occupational Health and Safety

The notified polymer is expected to be of low hazard, therefore the risk to workers from use of the notified polymer is not considered to be unreasonable.

To minimise exposure to aerosols, spraying should be carried out according to the Safe Work Australia Code of Practice for *Spray Painting and Powder Coating* (SWA, 2015).

6.3.2. Public Health

The notified polymer will not be sold to the public. The public may come into contact with substrates coated with the notified polymer after application. However, once the paints or coatings have dried, the notified polymer will be bound within a solid matrix and will not be available for exposure. Therefore, the risk to the public from the notified polymer 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 will be imported neat for reformulation into finished industrial and automotive paints and coatings. No significant release of the notified polymer is expected from transportation and storage, except in the unlikely event of accidental spills or leaks. In the event of spills, the notified polymer is expected to be collected with adsorbents, and disposed of to landfill in accordance with local government regulations.

The reformulation process will involve blending operations that will be highly automated, and is expected to occur within a fully enclosed environment. Therefore, significant release of the notified polymer to the environment from this process is not expected. The reformulation process will be followed by automated filling of the formulated paints and coatings into containers suitable for end use. Wastes containing the notified polymer generated during reformulation include equipment washings and spilt materials. These are expected to be collected and disposed of to licensed trade waste management services or to landfill, in accordance with local government regulations. Residues of the notified polymer in import containers are expected to be disposed of via the trade waste stream of the formulator in accordance with local government regulations. Empty import containers are expected to be recycled or disposed of through licensed waste management services.

RELEASE OF CHEMICAL FROM USE

Industrial and automotive paints and coatings containing the notified polymer will be used by professional users in industrial settings only. During use, paints and coatings containing the notified polymer are expected to be applied by spray techniques. Spray applications are expected to occur within spray booths with engineering controls to collect particulate overspray.

Overspray and solid wastes from application of the industrial and automotive paints and coatings containing the notified polymer will be collected and disposed of to landfill. Residues containing the notified polymer in application equipment are expected to be rinsed into containers, and then allowed to cure before disposal as solid wastes to landfill. During use, the notified polymer may also be released to the environment as accidental spills and container residues. It is estimated by the notifier that a maximum of 10% of the import volume of the notified polymer (or up to 100 kg) may be released as wastes from application and container residue. These releases are expected to be collected and disposed of to landfill in accordance with local government regulations.

RELEASE OF CHEMICAL FROM DISPOSAL

The notified polymer in industrial and automotive paints and coatings is expected to share the fate of the substrate to which it has been applied. These are predominantly expected to be disposed to landfill, or thermally decomposed during metal reclamation.

7.1.2. Environmental Fate

No environmental fate data were submitted for the notified polymer. The majority of the notified polymer is expected to be cured within an inert coating matrix, and is expected to share the fate of the articles to which it has been applied. These will involve eventual disposal to landfill, or undergo thermal decomposition during

metal reclamation. The notified polymer is also expected to enter landfill as collected wastes and residues. Once cured, the notified polymer is not expected to be bioavailable or biodegradable. The uncured notified polymer is expected to adsorb strongly to soil and sediment and is unlikely to be mobile, due to its low water solubility, high adsorption coefficient (log K_{OC} > 5.63) and cationicity. Based on its high molecular weight, the notified polymer is not expected to cross biological membranes, and is therefore unlikely to be bioaccumulative. In landfill and during thermal decomposition, the notified polymer is expected to eventually degrade via biotic and abiotic processes to form water and oxides of carbon and nitrogen.

7.1.3. Predicted Environmental Concentration (PEC)

The predicted environmental concentration (PEC) has not been calculated, as significant release of the notified polymer to the aquatic environment is not expected, based on its reported use pattern in industrial and automotive paints and coatings.

7.2. Environmental Effects Assessment

No ecotoxicity data were submitted for the notified polymer. Ecotoxicological endpoints for aquatic organisms for the notified polymer were calculated based on structure-activity relationship (SAR) equations, assuming a worst case cationic charge density for the polymer (Boethling and Nabholz, 1997). The acute and chronic endpoints are summarised in the table below.

Endpoint	*Result*	*Assessment Conclusion*
Acute Toxicity		
Fish Toxicity	96 h LC50 = 6.04 mg/L	Predicted to be toxic to fish (acute)
Daphnia Toxicity	48 h EC50 = 101.92 mg/L	Not predicted to be harmful to aquatic invertebrates (acute)
Algal Toxicity	96 h EC50 = 7.27 mg/L	Predicted to be toxic to algae (acute)
Chronic Toxicity		
Fish Toxicity	ChV = 0.34 mg/L	Predicted to be toxic to fish (chronic)
Daphnia Toxicity	ChV = 5.66 mg/L	Not predicted to be harmful to aquatic invertebrates (chronic)
Algal Toxicity	ChV = 2.15 mg/L	Not predicted to be harmful to algae (chronic)

The notified polymer is predicted to be toxic to fish and algae, but is not predicted to be harmful to aquatic invertebrates on an acute basis. The notified polymer is also predicted to be toxic to fish on a chronic basis. The SAR estimation procedure used here is a standard approach, and is considered reliable to provide general indications of the likely environmental effects of a chemical. However, this method is not considered sufficient to formally classify the acute and chronic hazards of the notified polymer to aquatic life under the Globally Harmonised System of Classification and Labelling of Chemicals (GHS) (United Nations, 2009).

7.2.1. Predicted No-Effect Concentration

The predicted no-effects concentration (PNEC) has been calculated from the most sensitive endpoint for fish. A safety factor of 1,000 was used given only modelled endpoints are available.

Predicted No-Effect Concentration (PNEC) for the Aquatic Compartment		
ChV (Fish)	0.34	mg/L
Assessment Factor	1,000	
Mitigation Factor	1.00	
PNEC:	0.34	µg/L

7.3. Environmental Risk Assessment

The Risk Quotient (Q = PEC/PNEC) of the notified polymer has not been calculated as a PEC is not available. It is not expected to be present at ecotoxicologically significant concentrations in the aquatic environment, due to the low potential for release based on its assessed use pattern in industrial and automotive paints and coatings. Once cured within an inert coating matrix, the notified polymer is not expected to be bioavailable or bioaccumulative. On the basis of the maximum annual importation volume, low expected aquatic exposure and assessed use pattern in industrial and automotive paints and coatings, the notified polymer is not expected to pose an unreasonable risk to the environment.

APPENDIX A: PHYSICAL AND CHEMICAL PROPERTIES

Pour Point 12 ± 3 °C

Method: OECD TG 102 Melting Point/Melting Range, 27 July 1995.
EC Commission Regulation No 440/2008, 30 May 2008 A.1 Melting/Freezing Temperature.
Remarks: As the test item was a complex mixture with high viscosity, it was considered that the pour point method was the most appropriate test method.
Test Facility: Envigo (2016a)

Boiling Point 165 °C at 101.3 kPa

Method: OECD TG 103 Boiling Point 27 July 1995.
EC Commission Regulation No 440/2008, 30 May 2008 A.2 Boiling Temperature.
Remarks:
Test Facility: Envigo (2016a)

Density 1,090 kg/m^3 at 20 °C

Method OECD TG 109 Density of Liquids and Solids, 2 October 2012.
EC Commission Regulation No 440/2008, 30 May 2008 A.3 Relative Density.
Remarks Pycnometer method
Test Facility Envigo (2016a)

Vapour Pressure < 1.4 x 10^{-6} kPa at 25 °C

Method OECD TG 104 Vapour Pressure, 23 March 2006.
EC Commission Regulation No 440/2008, 30 May 2008 A.4 Vapour Pressure.
Remarks Vapour pressure balance method
Test Facility Envigo (2016b)

Water Solubility < 2.55 × 10^2 g/L at 20 °C

Method OECD TG 105 Water Solubility.
EC Council Regulation No 440/2008 A.6 Water Solubility.
Remarks Flask Method
Test Facility Envigo (2016a)

Partition Coefficient (n-octanol/water) Log P_{OW} = 0.67 to > 6.5

Method OECD TG 117 Partition Coefficient (n-octanol/water).
EC Council Regulation No 440/2008 A.8 Partition Coefficient.
Remarks HPLC Method
Test Facility Envigo (2016a)

Adsorption/Desorption log K_{oc} > 5.63

Method OECD TG 121 Estimation of the Adsorption Coefficient (K_{OC}) on Soil and on Sewage Sludge using High Performance Liquid Chromatography (HPLC)
EC Council Regulation No. 440/2008 C.19 Estimation of the Adsorption Coefficient (K_{OC}) on Soil and on Sewage Sludge using High Performance Liquid Chromatography (HPLC)
Remarks HPLC method.
Test Facility Envigo (2016a)

Flash Point 171 ± 2 °C at 101.3 kPa

Method: EC Commission Regulation No 440/2008, 30 May 2008 A.9 Flash Point.
Remarks: Closed cup method
Test Facility: Envigo (2016c)

Autoignition Temperature 416 ± 5 °C

Method EC Commission Regulation No 440/2008, 30 May 2008 A.15 Auto-Ignition Temperature (Liquids and Gases).
Test Facility Envigo (2016c)

Explosive Properties Predicted negative

Method: EC Commission Regulation No 440/2008, 30 May 2008 A.14 Explosive Properties.
Remarks: The prediction for explosive properties was made by assessing the test item for chemical groups that imply explosive properties (structural alerts). No structural alerts were observed within the chemical structure of the test item.
Test Facility: Envigo (2016c)

Oxidizing Properties Predicted negative

Method: EC Council Regulation No 440/2008, 30 May 2008 A.21 Oxidizing Properties (Liquids).
Remarks: The prediction for oxidising properties was made by assessing the test item for chemical groups that imply oxidising properties (structural alerts). No structural alerts were observed within the chemical structure of the test item.
Test Facility: Envigo (2016c)

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Envigo (2016b) Borchi Gen 0755: Determination of Vapour Pressure (Study No. FL71CQ, April, 2016). Derbyshire, U.K., Envigo Research Limited (Final unpublished report submitted by the notifier).

Envigo (2016c) Borchi Gen 0755: Determination of Hazardous Physico-Chemical Properties (Study No. XR78XC, April, 2016). Derbyshire, U.K., Envigo Research Limited (Final unpublished report submitted by the notifier).