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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in Beckopox® EH 613w/80WA

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 Full Public Report may be inspected at our NICNAS office by appointment only at Level 7, 260 Elizabeth Street, Surry Hills NSW 2010.

This Full Public Report is also available for viewing and downloading from the NICNAS website or available on request, free of charge, by contacting NICNAS. For requests and enquiries please contact the NICNAS Administration Coordinator at:

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Director
NICNAS

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Polymer in Beckopox® EH 613w/80WA

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Cytec Australia Holdings Pty Ltd (ABN: 45 081 148 629)
Suite 1, Level 1 Norwest Quay, 21 Solent Circuit, Norwest Business Park
Baulkham Hills, NSW 2153

NOTIFICATION CATEGORY
Limited: Synthetic polymer with Mn ≥ 1000 Da.

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, polymer constituents, purity, residual monomers/impurities, use details, import volume and site of reformulation.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)
Variation to the schedule of data requirements is claimed for physicochemical properties

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
None

NOTIFICATION IN OTHER COUNTRIES
None

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
Beckopox® EH 613w/80WA (<70% notified polymer)

MOLECULAR WEIGHT
>1,000 Da

ANALYTICAL DATA
Reference IR and GPC spectra were provided.

3. COMPOSITION

DEGREE OF PURITY >80%

HAZARDOUS IMPURITIES/RESIDUAL MONOMERS
Two hazardous impurities/residual monomers are present at levels above the concentration cut-offs for classification. The impurities are present at concentrations of <10% and may cause burns or result in sensitisation by skin contact (R34 and R43 classification).

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20°C AND 101.3 kPa: off-white milky dispersion.* The notified polymer is not isolated from dispersion.

Property	Value	Data Source/Justification
Boiling Point	60-100 °C at 101.3 kPa*	MSDS
Density	1100 kg/m^3 at 20 °C*	MSDS
Vapour Pressure	Not determined	Based on the high molecular weight, vapour pressure is expected to be low.
Water Solubility	< 0.2 g/L	Measured. Expected to be water dispersible based on the presence of

		hydrophilic moieties in the chemical structure.
Hydrolysis as a Function of pH	Not determined	Does not contain any readily hydrolysable functionality and is therefore expected to be hydrolytically stable
Partition Coefficient (n-octanol/water)	Not determined	A low partition coefficient is likely on the basis of the water dispersibility of the notified polymer.
Adsorption/Desorption	Not determined	Expected to adsorb to soil, sediment and sludge based on its high molecular weight and the presence of potentially cationic functional groups
Dissociation Constant	Not determined	Expected to be ionised in the environmental pH range of 4-9 based on the presence of potential cationic functional groups.
Particle Size	Not determined	Not isolated from aqueous dispersion
Flash Point	Not determined	Imported as an aqueous dispersion
Autoignition Temperature	Not determined	Imported as an aqueous dispersion
Explosive Properties	Not determined	Contains no functional groups that would imply explosive properties.

*Beckopox® EH 613w/80WA containing <70% notified polymer

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.

Dangerous Goods classification
Based on the limited 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 introduced as a component of Beckopox® EH 613w/80WA *(*<70% notified polymer) as an aqueous dispersion.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	<50	<50	<70	<80	<100

PORT OF ENTRY
Sydney or Melbourne

IDENTITY OF MANUFACTURER/RECIPIENTS
Following its introduction into Australia, the notified polymer will be reformulated at various sites across the country.

TRANSPORTATION AND PACKAGING
The notified polymer will be supplied in 200 L steel drums. Following reformulation, coatings containing the notified polymer will be packaged in containers ranging from 2 L metal cans to 200 L steel drums and will be transported within Australia by road.

USE

The notified polymer will be used as a component of industrial primer coatings for metal and concrete structures.

OPERATION DESCRIPTION
At reformulation sites, drums containing the notified polymer (at <70%) will be fitted to transfer lines (hose and pump) and the required amount of product directly fed to the mixing vessel, where it will be blended with other components. The transfer equipment and mixing vessel are an enclosed system. Quality control testing will then be manually conducted, before the reformulated product (containing 10-30% notified polymer) is transferred to bulk holding tanks for automated filling/packaging.

Commercial end-users will then prepare the final coating by combining the reformulated product with other components to give a final polymer concentration of ≤15%. The coating will be applied to metal and concrete structures primarily by spray, but also by brush and roller. Whilst spraying will typically be conducted within a spray booth, it may also occur outdoors.

6. HUMAN HEALTH IMPLICATIONS

6.1 Exposure assessment

6.1.1 Occupational exposure

NUMBER AND CATEGORY OF WORKERS

Category of Worker	*Number*	*Exposure Duration (hours/day)*	*Exposure Frequency (days/year)*
Transport and storage	10-20	4-8	200
Coating formulation	100	8	200
Coating application	200	8	200

EXPOSURE DETAILS
Transport and storage workers may come into contact with the imported solution (<70% polymer), or reformulated product (≤30% polymer) only in the event of accidental rupture of containers.

At reformulation sites, dermal or ocular exposure to the notified polymer (at <70% concentration as imported or ≤30% concentration following formulation) may occur whilst opening containers, during connection/disconnection of hoses, during quality control testing or packaging. The potential for dermal and ocular exposure should be minimised by the stated use of PPE (goggles, impervious gloves, coveralls) by workers. Given the expected low vapour pressure of the notified polymer, inhalation exposure to the notified polymer is only expected during blending where aerosols may be generated. The stated use of enclosed blending vessels should mitigate the potential for inhalation exposure under these circumstances.

At end-use sites, dermal, ocular or inhalation exposure to the notified polymer (at ≤30% concentration as supplied or ≤15% concentration following blending) may occur whilst opening containers, during connection/disconnection stages, during blending, application of coatings and cleaning processes. The coatings containing the notified polymer at ≤15% will primarily be applied by spray, but also via brush and roller. Spray applications may also be conducted in outdoor industrial settings. The potential for dermal, ocular and inhalation exposure should be minimised through the expected use of PPE (goggles, impervious gloves, coveralls) by all workers and use of respiratory protection during spray application. Inhalation exposure should be further mitigated when spraying is conducted in spray booths.

Once cured, the notified polymer is not expected to be bioavailable and further dermal contact should not lead to exposure.

6.1.2. Public exposure
The notified polymer is intended for industrial use only. Therefore, the public may be exposed to the imported product or reformulated products only in the event of a transport accident. The public will come into contact with manufactured products containing the cured coating. However, as the notified polymer will be cured and likely beneath additional top-coating layers, it will be unavailable for exposure.

6.2. Human health effects assessment

No toxicity data were submitted.

Toxicokinetics, metabolism and distribution.
Based on the high molecular weight (>1000 Da) of the notified polymer, the potential of the notified polymer to cross the gastrointestinal (GI) tract by passive diffusion or to be dermally absorbed after exposure is limited. However, the polymer contains a proportion (<10%) of low molecular weight species (<1000 Da) that may be absorbed.

Irritation and Sensitisation.
The notified polymer contains primary and secondary amines which are functional groups of concern for corrosion (Hulzebos *et al.*, 2005). Chemicals with MW <100 Da pose the greatest concern whereas chemicals with MW >200 Da do not have significant skin corrosion potential. Given the notified polymer only contains a small percentage of low molecular weight species <500 Da, the potential for the notified polymer to be corrosive is considered to be low.

The notified polymer may also contain tertiary amine groups which are functional groups of concern for irritation or corrosion (Hulzebos et al., 2005). The irritation potential is greatest for chemicals with MW <200 Da and log Pow of >2. Given the notified polymer contains a small percentage of low molecular weight species <500 Da and is expected to have a low log Pow, the potential for the notified polymer to be irritating is considered to be low.

In addition, the notified polymer contains two hazardous impurities/residual monomers that are present at concentrations of <10%, which may cause burns or result in sensitisation by skin contact.

Health hazard classification
As no toxicity data were provided for the notified polymer, it cannot be classified according to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004).

The notifier has classified the imported product containing the notified polymer in the MSDS based on residual monomers, with the following risk phrases:
C; R34 Causes burns.
Xn; R43 May cause sensitisation by skin contact.

6.3. Human health risk characterisation

6.3.1. Occupational health and safety
No toxicological data are provided for the notified polymer. However, due to the presence of residual monomers, the imported product (<70% notified polymer) may cause burns or result in sensitisation by skin contact. In addition, the reformulated products (≤30% notified polymer) may cause irritation to the eyes and skin and result in sensitisation by skin contact.

Due to the control measures in place to reduce exposure, including enclosed, automated processes, spray booths and the use of PPE, the overall risk of exposure to the notified polymer is expected to be low. In addition, outdoors spray application will only be conducted in industrial settings where workers will stand up-wind from the direction of spray and will not conduct spray applications during strong winds. Hence, provided these control measures are in place, the risk to the health of workers from use of the notified polymer is not considered to be unacceptable.

6.3.2. Public health
The notified polymer is intended for use in industrial applications by qualified operators. The public may come into contact with manufactured products containing the cured coating. However, as the notified polymer will be cured and likely beneath additional top-coating layers, it will be unavailable for exposure. Therefore, when used in the proposed manner, the risk to public health from the notified polymer is not considered to be unacceptable.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1 Environmental Exposure

RELEASE OF CHEMICAL AT SITE

The imported notified polymer will be reformulated and repackaged into containers in Australia for end-use as a component of industrial primer coatings. The notified polymer is anticipated to be released to the environment from accidental spills (<1% of annual import volume), or as residue (2%) remaining in transport containers and reformulation equipment. Approximately 0.1% of the annual import volume of the notified polymer may be released to sewer from the cleaning of equipment. However, the majority of notified polymer will be collected with solvent and recycled into subsequent batches. Notified polymer residue in empty import containers is likely to be thermally decomposed during metal reclamation processes.

Accidental spills during transport or reformulation are expected to be collected with inert material and sent to landfill.

RELEASE OF CHEMICAL FROM USE

The end-use product containing the notified polymer is expected to be applied in industrial settings to primarily metal and concrete articles for above-ground use. Application will typically be by spray painting in spray booths and outdoor settings, although brush and roller may be used. Overspray is anticipated to account for up to 50% of the annual import volume, depending on the size and shape of the article being sprayed. In the spray booths, overspray is likely to be captured by standard engineering controls and recycled into the next batch or, after being allowed to cure, disposed of to landfill. In outdoor settings, overspray is likely to be caught in bunded areas or captured by paper, which will be disposed of to landfill. Application equipment will be cleaned using solvent, and it is expected that the solvent will be recycled into the next batch, and the solid waste will be disposed of to landfill. Residual product in end-use containers is expected to be thermally decomposed during metal reclamation processes or disposed of to landfill with the empty containers.

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

No environmental fate data were submitted. The majority of the notified polymer is expected to be cured into an inert matrix as part of its normal use pattern as a primer 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, or in primer coating spilt to the ground during application, is not expected to be mobile and will slowly degrade *in situ*, primarily by abiotic processes. The notified polymer will eventually degrade in landfill, or by thermal decomposition during metal reclamation processes, to form water and oxides of carbon and nitrogen.

Significant amounts of notified polymer are not expected to be released to the aquatic environment. In the event that minor amounts of uncured notified polymer are disposed of to sewer from the cleaning of equipment, it is expected that it will be removed from influent by up to 90% through adsorption to sludge during sewage treatment processes (Boethling & Nabholz, 1997). Bioaccumulation of the notified polymer is unlikely due to its high molecular weight and its limited release to surface waters.

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 ecotoxicity data were submitted. Water dispersible polymers that are anticipated to become cationic in water may pose a concern for the aquatic environment. However, the notified polymer is not expected to be released to aquatic environments in ecotoxicologically significant quantities and the notified polymer is therefore not expected to pose a concern to the aquatic compartment.

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 an industrial primer coating. The majority of the notified polymer will be disposed to landfill as cured primer. In its cured state the notified polymer is irreversibly bound into the inert primer matrix and is unlikely to leach or be bioavailable. Due to its limited environmental exposure, the risk of the notified polymer to the environment is expected to be low based on its reported use pattern.

8. CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification

As no toxicity data were provided for the notified polymer, it 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 unacceptable risk to the health of workers.

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

Environmental risk assessment

On the basis of the reported use pattern, the notified polymer is not expected to pose a 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 at <70% and as diluted for use at ≤30%):
  - Enclosed, automated processes during blending
  - Spray booths during application

- Due to the presence of residual monomers, employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer (as introduced at <70% and as diluted for use at ≤30%):
  - Avoid skin and eye contact
  - Avoid inhalation of aerosols during blending and spray application
  - Outdoor spray applications should not be conducted in strong winds

- Due to the presence of residual monomers, employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer (as introduced at <70% and as diluted for use at ≤30%):
  - Coveralls, gloves, goggles
  - Respiratory protection during outdoor spray application, if there is a possibility of inhaling aerosols

  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 *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.

Disposal

- The notified polymer should be disposed of to landfill.

Emergency procedures

- Spills or accidental release of the notified polymer should be handled by physical containment, collection and subsequent safe disposal.

Regulatory Obligations

Secondary Notification
This risk assessment is based on the information available at the time of notification. The Director may call for the reassessment of the chemical under secondary notification provisions based on changes in certain circumstances. Under Section 64 of the *Industrial Chemicals (Notification and Assessment) Act (1989)* the notifier, as well as any other importer or manufacturer of the notified chemical, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified chemical is listed on the Australian Inventory of Chemical Substances (AICS).

Therefore, the Director of NICNAS must be notified in writing within 28 days by the notifier, other importer or manufacturer:

(1) Under Section 64(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 industrial primer coatings for metal and concrete structures (at ≤30%), or is likely to change significantly;
  - the amount of polymer being introduced has increased from 100 tonnes, or is likely to increase, significantly;
  - the polymer has begun to be manufactured in Australia;
  - additional information has become available to the person as to an adverse effect of the polymer on occupational health and safety, public health, or the environment.

The Director will then decide whether a reassessment (i.e. a secondary notification and assessment) is required.

No additional secondary notification conditions are stipulated.

Material Safety Data Sheet
The MSDS of a product containing the notified polymer provided by the notifier was reviewed by NICNAS. The additional risk and safety phrases assigned based on the concentration of hazardous impurities/residual monomers were noted. The accuracy of the information on the MSDS remains the responsibility of the applicant.

APPENDIX A: PHYSICAL AND CHEMICAL PROPERTIES

Water Solubility < 0.2 g/L

Method	The water solubility was determined via measurement of the transmission of visible light for a series of dilutions of the test material. The highest concentration that reached about 100% transmission of visible light at 620 nm wavelength was determined to be the solubility according to the test report.
Remarks	Complete transmission of light (99%) was achieved at a test material concentration of 200 mg/L. The test substance was a waterborne emulsion product containing the notified polymer and unreacted monomers. The notified polymer is expected to be water dispersible based on the presence of hydrophilic moieties in the chemical structure.
Test Facility	Cytec (2010)

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