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

PUBLIC REPORT

Polymer in R+D SPC 2017 L/30% N.D.

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act) and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the Department of Health, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Department of the Environment and Energy.

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

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**Director
NICNAS**

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SUMMARY

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

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS CHEMICAL	INTRODUCTION VOLUME	USE
LTD/2010	BASF Australia Ltd	Polymer in R+D SPC 2017 L/30% N.D.	ND*	< 400 tonnes per annum	Additive in concrete

*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.

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 reported use pattern, the notified polymer is not considered to pose an unreasonable risk to the environment.

Recommendations

CONTROL MEASURES

Occupational Health and Safety

- A person conducting a business or undertaking at a workplace should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer as introduced:
 - Avoid skin and eye contact
- 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 during handling of the notified polymer as introduced:
 - Coveralls
 - Eye protection
 - Impervious gloves

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

- 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 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 g/mol;or
- (2) Under Section 64(2) of the Act; if
 - the function or use of the polymer has changed from additive in concrete, 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

BASF Australia Ltd (ABN: 62 008 437 867)
Level 12, 28 Freshwater Place,
SOUTHBANK VIC 3006

NOTIFICATION CATEGORY

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

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication: chemical name, other names, CAS number, molecular and structural formulae, molecular weight, analytical data, degree of purity, polymer constituents, residual monomers, impurities, additives/adjuvants, use details, 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 all physico-chemical endpoints.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT

None

NOTIFICATION IN OTHER COUNTRIES

None

2. IDENTITY OF CHEMICAL

MARKETING NAME

R+D SPC 2017 L/30% N.D. (product containing the notified polymer at < 30% concentration)

MOLECULAR WEIGHT

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

ANALYTICAL DATA

Reference GPC spectra were provided.

3. COMPOSITION

DEGREE OF PURITY

> 70%

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20 °C AND 101.3 kPa: Light amber liquid*

Property	Value	Data Source/Justification
Melting Point/Freezing Point	Not determined	Introduced in aqueous solution
Boiling Point	Not determined	Introduced in aqueous solution
Density	1,090 – 1,130 kg/m ³ at 20 °C	(M)SDS*
Vapour Pressure	Not determined	Based on the high molecular weight of the notified polymer, the vapour pressure is expected to be low
Water Solubility	Not determined	The notified polymer is expected to be at least water dispersible based on its hydrophilic functionalities
Hydrolysis as a Function of pH	Not determined	The notified polymer contains hydrolysable functionalities which are expected to hydrolyse slowly in the environmental pH range (4 - 9) at ambient

Property	Value	Data Source/Justification
Partition Coefficient (n-octanol/water)	Not determined	temperatures The notified polymer is likely to partition to water based on its water dispersibility
Adsorption/Desorption	Not determined	The notified polymer is expected to partially adsorb to soil, sediment and sludge based on ion exchange mechanism
Dissociation Constant	Not determined	The notified polymer contains multiple anionic functionalities and is expected to be ionised in the environmental pH range (4 – 9)
Flash Point	Not determined	Introduced in aqueous solution
Flammability	Not determined	Introduced in aqueous solution
Autoignition Temperature	Not determined	Introduced in aqueous solution
Explosive Properties	Not determined	The notified polymer contains no functional groups that would imply explosive properties
Oxidising Properties	Not determined	The notified polymer contains no functional groups that would imply oxidative properties

* For the product containing the notified polymer at < 30% concentration in aqueous solution.

Reactivity

The notified polymer is expected to be stable under normal conditions of use.

Physical hazard classification

As no physico chemical 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.

5. INTRODUCTION AND USE INFORMATION

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

The notified polymer will be imported as an aqueous solution at < 30% concentration.

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

Year	1	2	3	4	5
Tonnes	< 10	< 100	< 200	< 300	< 400

PORT OF ENTRY

Brisbane, Sydney, Melbourne, Adelaide and Fremantle

TRANSPORTATION AND PACKAGING

The notified polymer (at < 30% concentration in aqueous solution) will be imported in 1000 L intermediate bulk containers or in 10 L plastic jerricans. The imported solution containing the notified polymer will be transported within Australia by road.

USE

The notified polymer will be used as an additive in the preparation of concrete admixtures which will be used in ready-mix concrete preparation and pre-cast moulded concrete. The final concrete will contain < 1% of the notified polymer.

OPERATION DESCRIPTION

The notified polymer will not be manufactured in Australia. It will be imported in aqueous solution at < 30% concentration and delivered to concrete admixture plants for reformulation. The solution containing the notified polymer will be pumped from the containers into a storage tank then blended with other components to produce a concrete admixture product containing the notified polymer at < 30% concentration.

The admixture containing the notified polymer at < 30% concentration will be repackaged into 1000 L bulk containers, 200 L drums or 20 L cubes and sold to concrete manufacturers.

At the concrete production plant, the admixture (containing the notified polymer at < 30% concentration) will be pumped from its container into a storage tank. The admixture will then be automatically transferred into a concrete mixer and blended with other ingredients. The final concrete product will contain < 1% of the notified polymer which will be transferred into ready-mix concrete trucks for transport to construction sites or into pre-cast concrete moulds. Transfer will occur via automated pumping of the concrete product through a hose system. Construction workers will handle the final concrete product containing the notified polymer (at < 1% concentration) using mechanised methods.

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

6.1.1. Occupational Exposure

CATEGORY OF WORKERS

<i>Category of Worker</i>	<i>Exposure Duration (hours/day)</i>	<i>Exposure Frequency (days/year)</i>
Transportation and storage	2	4 - 6
Production operators	0.5	90 - 100
Bulk transport loading/unloading	2 - 3	90 - 100
Concrete manufacturing	8	220
Construction workers	8	240

EXPOSURE DETAILS

Transport and storage

Dermal and ocular exposure of transport and storage workers to the notified polymer at < 30% concentration is not expected except in the event of accidental spill or breach of packaging.

Concrete admixture formulation

Dermal and ocular exposure to the notified polymer at < 30% concentration may occur during transfer and blending stages, and during the rinsing of empty containers and reformulation equipment. Exposure to the notified polymer will be minimised through the use of personal protective equipment (PPE) including gloves, goggles and coveralls. Inhalation exposure to the notified polymer it is not expected given the expected low vapour pressure of the polymer and aerosols are not expected to be generated.

Concrete manufacturing

Dermal and ocular exposure to the notified polymer at < 30% concentration may occur during pumping, mixing, transfer and cleaning stages of concrete manufacture. Exposure to the notified polymer at < 30% concentration will be mitigated by the use of automated systems and equipment, as well as PPE such as gloves, goggles and coveralls.

Construction Workers (end users)

During construction, workers may be exposed to the concrete containing the notified polymer at < 1% concentration via dermal and ocular routes. Exposure to the notified polymer by end users would be limited due to the exclusive use of mechanised methods for handling the final concrete product, its low concentration and by the use of PPE including goggles, gloves and coveralls. Construction workers may experience extensive dermal exposure to solidified concrete or cement. At this stage, the notified polymer will be bound within a hardened matrix within the concrete and is not expected to be bioavailable.

6.1.2. Public Exposure

The notified polymer will be for industrial use only and will not be sold to the public. Though public exposure to solidified concrete or cement containing the notified polymer at < 1% concentration is likely to occur, the notified polymer will be bound within the hardened concrete matrix and is not expected to be bioavailable.

6.2. Human Health Effects Assessment

No toxicity data were submitted.

Based on the high molecular weight ($> 1,000$ g/mol) of the notified polymer and no significant amounts of low molecular weight species < 1000 g/mol, the potential for the notified polymer to cross the gastrointestinal tract by passive diffusion or to be dermally absorbed after exposure is limited. Although chemicals with similar functional groups have been reported to have corrosion/irritation properties, potential for these effects is expected to be reduced by the high molecular weight of the notified polymer.

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

No toxicity data were provided for the notified polymer. Based on chemical structure, the notified polymer may have corrosive/irritant properties; however, the potential for these effects is expected to be reduced by the high molecular weight of the polymer.

Workers may be at risk of irritation effects when handling the notified polymer at $< 30\%$ concentration during concrete admixture formulation and concrete manufacturing. However the expected use of PPE by workers including coveralls, goggles and gloves should minimise the risk.

Therefore, given the expected use of PPE by workers, the notified polymer is not considered to pose an unreasonable risk to the health of workers.

6.3.2. Public Health

Given that the notified polymer is for industrial use only and 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 will be imported into Australia as a component of an aqueous solution for reformulation into finished construction products for industrial applications only. The reformulation process will involve pumping the aqueous solution containing the notified polymer from its container into a storage tank where it will be blended with other components. The finished products will then be filled into end-use containers. The washings from cleaning of the reformulation equipment will be collected for reuse. Accidental spills of the notified polymer during reformulation, transport or storage are expected to be adsorbed onto a suitable material and disposal of in accordance with local government regulations.

RELEASE OF CHEMICAL FROM USE

At the concrete production plant, the finished product containing the notified polymer will be pumped from its container into a storage tank and then automatically transferred into a concrete mixer for blending with other ingredients. The final concrete product containing $< 1\%$ of the notified polymer will be automatically pumped into ready-mix concrete trucks for transport to construction sites or into pre-cast concrete moulds. The washings from cleaning of the delivery trucks are expected to be contained in a holding tank and recycled. A very small proportion of the notified polymer may be released to sewers from cleaning of the application equipment. Any excess concrete is expected to be transferred to dumpsters and cured before disposal of to landfill in accordance with local government regulations.

RELEASE OF CHEMICAL FROM DISPOSAL

The notified polymer is expected to share the fate of the concrete and is expected to be disposed of to landfill at the end of its life cycle. Residues of notified polymer in empty containers are expected to be disposed of to landfill in accordance with local government regulations.

7.1.2. Environmental Fate

No environmental fate data were submitted for the notified polymer. The majority of the notified polymer is expected to share the fate of the concrete and be disposed of to landfill at the end of its life cycle. The notified polymer is also expected to enter landfill as collected wastes and residues. In landfill, the notified polymer will be cured within an inert concrete matrix and will be neither bioavailable nor mobile. A very small proportion of the notified polymer may be released to sewers from cleaning of the application equipment. In landfill and water, the notified polymer is expected to eventually degrade via biotic and abiotic processes to form water and oxides of carbon, phosphorous and sodium ions.

7.1.3. Predicted Environmental Concentration (PEC)

The predicted environmental concentration (PEC) has not been calculated since significant release of the notified polymer to the aquatic environment is not expected from the reported use pattern.

7.2. Environmental Effects Assessment

No ecotoxicological data for the notified polymer were submitted. Anionic polymers are generally of low toxicity to fish and daphnia, however they can 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. However, this does not apply to the notified polymer and it is therefore not considered to be an over-chelation hazard to algae.

7.2.1. Predicted No-Effect Concentration

The Predicted No-Effect Concentration (PNEC) has not been calculated since no ecotoxicological data were submitted and no significant release of the notified polymer to the aquatic environment is expected from the reported use pattern.

7.3. Environmental Risk Assessment

The risk quotient ($Q = \text{PEC}/\text{PNEC}$) for the notified polymer has not been calculated as release to the aquatic environment in ecotoxicologically significant quantities is not expected based on its likely low toxicity and reported use pattern as an additive in concrete products. The notified polymer is expected to be neither bioavailable nor mobile. On the basis of the assessed use pattern, the notified polymer is not considered to pose an unreasonable risk to the environment.

BIBLIOGRAPHY

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