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

FULL PUBLIC REPORT

Polymer in Ethacryl Dispersants

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 the Environment and Water Resources.

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 334-336 Illawarra Road, Marrickville NSW 2204.

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 Ethacryl Dispersants**1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

Tradechem Pty Ltd (ABN 50 052 234 438)
5 Farleigh St
Ashfield NSW 2131

NOTIFICATION CATEGORY

Polymer of Low Concern

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, Residual Monomers/Impurities, Import Volume

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

No variation to the schedule of data requirements is claimed.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

No

NOTIFICATION IN OTHER COUNTRIES

No

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Ethacryl HF
Ethacryl M
Ethacryl SCC

MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn) >10000

3. PLC CRITERIA JUSTIFICATION

<i>Criterion</i>	<i>Criterion met (yes/no/not applicable)</i>
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	N/A
Low Charge Density	Yes
Approved Elements Only	Yes
Stable Under Normal Conditions of Use	Yes
Not Water Absorbing	Yes
Not a Hazard Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

4. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	Clear to turbid colourless to slight orange liquid solution (solution containing notified polymer)
Melting Point/Glass Transition Temp	Not applicable as polymer is never isolated from solution.
Density	1050-1100 kg/m ³ at 25°C – information from MSDS for all imported polymer solutions
Water Solubility	429 g/L at 20°C based on solutions containing 40 % by weight
Dissociation Constant	pKa = 4.63 by ACD/pKa Predictor v8.02
Reactivity	Stable under normal environmental conditions
Degradation Products	None under normal conditions of use

5. INTRODUCTION AND USE INFORMATION

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>	500-2500	500-2500	500-2500	2000-4000	2000-4000

USE AND MODE OF INTRODUCTION AND DISPOSAL

Mode of Introduction

The notified polymer will be introduced into Australia via major ports as ~40% aqueous solution in 1040L intermediate bulk containers (IBC). The containers will be transported to consumers by road.

Reformulation/manufacture processes

The notified polymer will not be manufactured or reformulated in Australia. The imported aqueous solution of the notified polymer will be used in formulation of concrete and in the production gypsum wallboard.

During formulation of concrete, the notified polymer solution will be further diluted with water and additional concrete formulation components in a ready-mix concrete truck. The final concentration of the notified polymer in the formulated concrete will be approximately 0.2%. The freshly mixed concrete will then be delivered to the end-use site for production of solid concrete.

During wallboard production, the notified polymer solution would be mixed with processed gypsum, water and other additives to create plaster. The plaster containing typically 0.2-0.5% of the notified polymer is then extruded and sandwiched between two moving sheets of cover paper. The plaster sheets are rehydrated and they set up as they move up the production line. They are then cut, dried and packaged before distribution to customers.

Use

The notified polymer is used as a dispersant in concrete and in production of gypsum wallboard.

6. HUMAN HEALTH IMPLICATIONS**6.1. Exposure Assessment****OCCUPATIONAL EXPOSURE**

Dermal and ocular exposure is possible during mixing of the aqueous solution of the notified polymer with the other concrete and/or gypsum wallboards formulation components.

However exposure to significant amounts of the notified polymer is limited because personal protective equipment, overalls, gloves and protective footwear, is worn during mixing and application of the concrete.

Inhalation exposure to dust particles containing the notified polymer is possible during installation of wallboard, which includes cutting/sawing of the boards. However, exposure is expected to be minimal due to the low amount of notified polymer used that is also bound to the wallboard matrix. In addition PPE will be used to prevent exposure to the calcium dusts of the gypsum (i.e. respiratory protection, goggles, and gloves).

PUBLIC EXPOSURE

The notified polymer is intended only for use in industry and as such public exposure to the notified chemical during processing is not expected. In addition the notified polymer will be incorporated into the matrix of the gypsum and the concrete so public is not expected to be exposed to the notified polymer except in the case of accidental spillage of the imported material.

Some dermal, ocular and inhalation exposure is possible during processing of gypsum sheets during home renovations. However, this is not expected to be significant due to the low concentration (<1%) of the notified polymer in the gypsum mixtures, which is also bound in the gypsum matrix and is not expected to be bioavailable.

6.2. Toxicological Hazard Characterisation

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard. This is supported by the summary of toxicological data for the ~40% aqueous solution of the notified polymer, Ethacryl HF.

<i>Endpoint</i>	<i>Result</i>	<i>Classified?</i>	<i>Effects Observed?</i>	<i>Test Guideline</i>
1. Rat, acute oral	LD50 >2000 mg/kg bw	no	yes ¹	Method not specified.
2. Rat, acute dermal	LD50 >2000 mg/kg bw	no	yes ²	Method not specified.
4. Rabbit, skin irritation	non-irritating	no	no	Method not specified. Scoring of skin reactions by Draize method
5. Rabbit, eye irritation	slightly irritating	no	yes ³	Method not specified. Scoring of eye reactions by Draize method
6. Skin sensitisation - non-adjuvant test	no evidence of sensitisation.	no	no	Modified Buehler Method
8. Genotoxicity - bacterial reverse mutation	non mutagenic	no	no	Method not specified. Similar to OECD TG 471 – 472

¹ Dark red discoloration of the right mandibular lymph node was observed macroscopically in one out of 5 animals and is not expected to be treatment related.

² Yellow material was observed on the hindlimbs and/or urogenital area of unspecified number of animals. This finding is not expected to be treatment related.

³Conjunctival irritation was noted 1-hour after treatment in 3/3 animals. This irritation subsided 24h after treatment.

All results were indicative of low hazard.

6.3. Human Health Risk Assessment

OCCUPATIONAL HEALTH AND SAFETY

Although dermal and ocular exposure to the notified polymer could occur during mixing of the aqueous solution of the notified polymer with the other concrete and/or gypsum wallboards formulation components, the risk to workers is considered to be low due to the intrinsic low hazard of the notified polymer. However, use of PPE for work with other materials that will be mixed with the notified polymer should be used as appropriate.

Inhalation exposure to dust particles containing the notified polymer is also possible during installation of wallboard, which includes cutting/sawing of the boards. However, exposure is expected to be minimal due to the low amount of notified polymer used that is also bound to the wallboard matrix. In addition PPE will be used to prevent exposure to the calcium dusts of the gypsum (i.e. respiratory protection, goggles, and gloves).

Overall, considering the exposure patterns and the low toxicity of the notified polymer no special controls are required related to the use of notified polymer.

PUBLIC HEALTH

The notified polymer will not be available for use by the public. In addition the notified polymer will be incorporated into the matrix of the gypsum and the concrete so public is not expected to be exposed to the notified polymer except in the case of accident or processing of gypsum sheets. Considering this low likelihood of exposure and the low toxicity of the notified polymer, there is a negligible risk for the public from the use of the notified polymer.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Exposure Assessment

ENVIRONMENTAL RELEASE

The notified polymer will not be manufactured in Australia.

During concrete additive blending, the notified polymer will be stored in a dedicated storage tank. The notified polymer will be batch blended with water, defoamers, preservatives and other minor ingredients before being added to the ready-mix concrete truck, along with cement, sand, water and stone. The maximum concentration of the notified polymer in the concrete mixture will be 0.2 %. After the concrete is poured and hardened, the notified polymer will be inextricably bound within the concrete mix.

Concrete trucks are usually rinsed at the end of the day after several batches. Approximately 1-4% (Abdol Chini and Mbwambo, 1996) of the concrete adheres to the inside of the drums. If four batches are assumed between rinses then the amount of notified polymer in the excess concrete and water amounts to less than 1% (<40 tonnes per annum). These washings from delivery trucks on return to batch plant are expected to be contained in a wash water system, which is recycled for future concrete manufacture to the extent practicable. Some of the wastewater may be associated with the waste concrete and be allowed to evaporate as the concrete cures, with the notified polymer becoming associated with the waste concrete. Any excess concrete is expected to be transferred to dumpsters where the concrete is allowed to cure with subsequent disposal in authorised landfill.

During blending for the wallboard use, release will be limited to making and breaking transfer connections. Release to land will be contained within secondary containment. After curing, the notified polymer will be bound within concrete matrix or the gypsum matrix.

ENVIRONMENTAL FATE

The vast majority of the notified polymer will be bound in the concrete or gypsum matrix and will not be released to the environment in any significant quantity. At the end of the concrete's useful life, it is likely to be landfilled or used as low-grade construction material such as road base. It is therefore expected that the notified polymer will eventually degrade by biotic and abiotic processes to oxides of

carbon, water vapour and sodium salts.

7.2. Environmental Hazard Characterisation

No ecotoxicological data were submitted. However, anionic polymers are known to be moderately toxic to algae. The mode of toxic action is overchelation of nutrient elements needed by algae for growth. The highest toxicity is when the acid is on alternating carbons of the polymer backbone. This could apply to the notified polymer. The notified polymer's toxicity to algae is likely to be reduced due to the presence of calcium ions, which will bind to the functional groups.

7.3. Environmental Risk Assessment

Although most water during reformulation and use in concrete batching will be recycled, small amounts (<0.1%) of the notified polymer (<4000 kg per annum) may be released to sewer from concrete batching and polymer admixture plants. This will result in a worst-case predicted environmental concentration (PEC) of 3.7 µg/L at sewage outfall ($4000 \text{ kg per annum} \div (20.5 \text{ million persons} \times 200 \text{ L per day per person} \times 260 \text{ working days})$).

A predicted no effect concentration (PNEC) cannot be calculated, as no ecotoxicity data are available.

Although the notified polymer may show moderate toxicity to algae, the majority of it will be used in environments where calcium ions will be present in vast excess. During use, it is expected to bond strongly to these calcium ions. It is therefore unlikely that it will chelate further calcium ions in the environment, thus greatly reducing the risk to the aquatic environment. Furthermore, the notified polymer is unlikely to be released from the matrix of set concrete. Accordingly, exposure of the notified polymer to the aquatic environment is expected to be minimal. The notified polymer is unlikely to pose an unacceptable risk to the environment.

8. CONCLUSIONS

8.1. Level of Concern for Occupational Health and Safety

There is Low Concern to occupational health and safety under the conditions of the occupational settings described.

8.2. Level of Concern for Public Health

There is Negligible Concern to public health when used in the proposed manner.

8.3. Level of Concern for the Environment

The polymer is not considered to pose a risk to the environment based on its reported use pattern.

9. MATERIAL SAFETY DATA SHEET

9.1. Material Safety Data Sheet

The notifier has provided MSDS as part of the notification statement. The accuracy of the information on the MSDS remains the responsibility of the applicant.

10. 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.
- 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.

Environment

Disposal

- The notified polymer should be disposed of by authorised landfill.

Storage

- Opaque materials should be used to store the notified polymer. Translucent or transparent containers should be avoided for outdoor storage. IBCs containing the notified polymer should not be stored outside. Store away the notified polymer from strong oxidiser/strong acids. Store away from heat.

Emergency procedures

- May contaminate water supplies/pollute public waters. Evacuate/limit access. Stop release; prevent flow to sewers/public waters. Notify fire and environmental authorities. Restrict water use for cleanup. Soak up small spills with inert solids; use suitable disposal containers. On water, the notified polymer is soluble and may float or sink. Contain/collect rapidly to minimize dispersion.

11. 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 notified polymer is introduced in a chemical form that does not meet the PLC criteria.or
- (2) Under Section 64(2) of the Act; if
 - the function or use of the chemical has changed from a dispersant in concrete and in production of gypsum wallboard, or is likely to change significantly;
 - the amount of chemical being introduced has increased from 4000 tonnes, or is likely to increase, significantly;
 - if the chemical has begun to be manufactured in Australia;
 - additional information has become available to the person as to an adverse effect of the chemical 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 the notified chemical and products containing the notified chemical provided by the notifier were reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.

12. BIBLIOGRAPHY

- S. Abdol Chini and William J. Mbawambo, Environmentally Friendly Solutions for the Disposal of Concrete Wash Water from Ready Mixed Concrete Operations, CIB W89 Beijing International Conference, 21-24 October, 1996.