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

PUBLIC REPORT

Polymer in Efka 4401 and Efka 4403

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

This 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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SUMMARY

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

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS SUBSTANCE	INTRODUCTION VOLUME	USE
LTD/1568	BASF Australia Ltd	Polymer in Efka 4401 and Efka 4403	ND*	≤ 10 tonnes per annum	Component of industrial paints

*ND = not determined

CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification

Based on the available data the notified polymer cannot be classified according to the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(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.

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 its limited aquatic exposure and assessed use pattern, the notified polymer is not considered to pose an unreasonable risk to the environment.

Recommendations

CONTROL MEASURES

Occupational Health and Safety

- 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 /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 paint for industrial use, or is likely to change significantly;
 - the amount of polymer being introduced has increased from 10 tonnes per annum, 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 MSDS of the product containing the notified polymer provided by the notifier was reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

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

NOTIFICATION CATEGORY

Limited: Synthetic polymer with $M_n \geq 1000$ 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, analytical data, degree of purity, polymer constituents, residual monomers, impurities, additives/adjuvants, use details, import volume, and identity of recipients.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed for all physicochemical properties except water solubility and partition coefficient.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

China

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Efka 4401 (contains < 60% notified polymer)
Efka 4403 (contains < 40% notified polymer)

OTHER NAME(S)

Modified polyacrylate

3. COMPOSITION

DEGREE OF PURITY > 99%

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20 °C AND 101.3 kPa: Yellowish liquid*

Property	Value	Data Source/Justification
Melting Point/Freezing Point	Not determined	Will only be introduced as a solvent solution.
Boiling Point	Not determined	Polymer with NAMW > 1,000 Da.
Density*	950-960 kg/m ³ at 20°C	MSDS
Vapour Pressure	< 1.3x10 ⁻⁹ kPa	Estimated based on high molecular weight (US EPA, 2010).
Water Solubility	0.046 g/L – 0.377 g/L at 20 °C and pH 6	Measured
Hydrolysis as a Function of pH	Not determined	Contains functional groups that are expected to hydrolyse very slowly in the environmental pH range.
Partition Coefficient (n-octanol/water)	log Pow \geq 3.4 at 20 °C	Measured
Adsorption/Desorption	Not determined	Expected to adsorb to soil, sediment and sludge based on its high molecular

Dissociation Constant	Not determined	weight and low water solubility Contains basic functionality (pKa ~ 7) which has the potential to be cationic under environmental conditions (pH 4-9)
Particle Size	Not determined	Introduced as a solvent solution.
Flash Point	Not determined	Polymer with NAMW > 1,000 Da.
Flammability	Not determined	Not expected to be flammable.
Autoignition Temperature	Not determined	Not expected to autoignite.
Explosive Properties	Not predicted to be explosive	Estimated based on chemical structure.

*For imported products containing the notified polymer in solvent solution up to 60% concentration.

DISCUSSION OF PROPERTIES

Reactivity

The notified polymer is expected to be stable under normal conditions of use. The MSDS of the imported product Efka® 4401 (at < 60% concentration) and Efka® (< 40% concentration) notes that strong acids, bases and oxidising agents should be avoided.

Dangerous Goods classification

Based on the 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 imported as a solvent solution as a component of Efka 4401 (at < 60% concentration) and Efka 4403 (at < 40% concentration).

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>	1-10	1-10	1-10	1-10	1-10

PORT OF ENTRY

Melbourne by wharf

IDENTITY OF MANUFACTURER/RECIPIENTS

BASF Australia Ltd

TRANSPORTATION AND PACKAGING

The notified polymer will be imported as a component of Efka 4401 (at < 60% concentration) and Efka 4403 (at < 40% concentration) in 18 kg and 190 kg UN approved steel drums. These steel drums will be packed on wooden pallets and bound with a plastic shrink wrap. The plastic shrink wrapped pallets holding the container of the sales products will be transported by road from the wharf to the third party warehouse for storage.

The finished paints containing the notified polymer (at < 3% concentration) will be stored and transported in steel 1 L, 4 L, 10 L paint cans and 210 kg steel drums.

USE

The imported products containing the notified polymer (at concentrations up to 60%) will be used as a pigment dispersing agent in the manufacture of industrial paints. The end-use paints will contain < 3% notified polymer and will be applied to metal substrates.

OPERATION DESCRIPTION

Formulation of paints

The imported products containing the notified polymer at concentrations up to 60% will be added by gravity feed and low pressure pump to a paint mixer and combined with resin, solvent and pigments. Once mixing is complete, samples will be taken for quality control testing and the finished paint product will be transferred to steel containers by a gravity feed and low pressure pump. The finished paints containing < 3% of the notified polymer will then be stored at the paint manufacturer's warehouse and then distributed to end users. Paint mixing and packaging will be conducted in a ventilated room under local exhaust ventilation.

The paint manufacturing equipment will be cleaned by flushing with hydrocarbon solvents. The washings will be either recycled for reuse in the paint manufacturing facility or disposed of in accordance with local regulations.

End use

The finished paints containing the notified polymer at < 3% will be applied by brush, roller and spray in predominantly industrial areas. Application equipment will be cleaned with hydrocarbon solvents and washings will be disposed of in accordance with local regulations.

6. HUMAN HEALTH IMPLICATIONS**6.1. Exposure Assessment****6.1.1. Occupational Exposure**

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration (hours/day)</i>	<i>Exposure Frequency (days/year)</i>
Transport and storage	5	1	4
Warehouse	2	1	4
Process operator	2	2.5	40
Quality control	1	0.5	40
Packaging	4	2	40
End use	200	1	60

EXPOSURE DETAILS

Transport and storage workers may come into contact with the imported product containing the notified polymer Efka 4401 (at up to 60%) and Efka 4403 (at up to 40%), only in the unlikely event of an accident.

During paint formulation processes, including transfer, quality control and cleaning and maintenance tasks, dermal and ocular exposure to the notified polymer may occur. Exposure is expected to be minimised through the use of ventilation and the use of personal protective equipment (PPE), including chemical goggles, impervious gloves and appropriate industrial clothing. Due to the nature of the processes and the expected low volatility of the notified polymer, inhalation exposure during reformulation is not anticipated.

At end-use sites, dermal, ocular and/or inhalation exposure to the paint containing the notified polymer (at < 3% concentration) may occur during transfer, application and cleaning processes. The potential for exposure is expected to be minimised through the use of PPE (goggles, impervious gloves, appropriate clothing) by workers and use of respiratory protection during spray application. 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

Paints containing the notified polymer at < 3% are intended for industrial use only and will not be sold to the public. Furthermore, once the paints have cured and dried, the notified polymer will be bound within the polymer matrix and will not be bioavailable.

6.2. Human Health Effects Assessment

No toxicity data was submitted.

The notified polymer is of high molecular weight ($M_n > 1000$ Da) with only a low percentage of low molecular weight species present (i.e. < 2% with a molecular weight less than 1000 Da); hence absorption across biological

membranes and systemic toxicity is not expected. Furthermore, the notified polymer does not contain any structural alerts of concern and is therefore expected to be of low hazard to human health.

Health hazard classification

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

6.3. Human Health Risk Characterisation

6.3.1. Occupational Health and Safety

Based on the high molecular weight ($M_n > 1000$ Da) and absence of structural alerts of concern, the notified polymer is expected to be of low hazard to human health.

During reformulation workers will handle the notified polymer at concentrations up to 60%; however exposure is expected to be low given the control measures in place (i.e. PPE and largely enclosed, automated processes) to minimise exposure to the hazardous substances in the formulation containing the notified polymer. During end use, there is potential for inhalation, dermal and ocular exposure to paints containing the notified polymer at concentrations $< 3\%$. However, exposure to the notified polymer during end use applications is expected to be low due to the reduced concentration and control measures in place (i.e. PPE including respiratory protection during spray application) to minimise exposure to the hazardous substances in the paint formulation containing the notified polymer. Given the expected low hazardous nature of the notified polymer and the control measures in place to minimise exposure involved in handling the hazardous substances present in the formulation containing the notified polymer, the risk to workers to the notified polymer is not considered to be unreasonable.

6.3.2. Public Health

Paint products containing the notified polymer will not be sold to the public. The public may experience dermal exposure to metal substrates to which paint containing the notified polymer at $< 3\%$ has been applied. However, exposure is not expected as the notified polymer will be bound within the paint. 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 not be manufactured in Australia; therefore, there will be no release from this activity. Environmental release during importation, transport and distribution may occur as a result of accidental spills. In the event of a spill, the notified polymer is expected to be contained and collected with an inert absorbent material and disposed of in accordance with local regulations.

Reformulation of the notified polymer occurs in a closed system and release to atmosphere is expected to be negligible. Solvent used for equipment washing containing residues of the notified polymer are expected to be recycled for reuse on site or disposed of via accredited waste disposal contractors. Wastes and spills (1% of annual import volume) during reformulation activities are expected to be contained on-site and disposed of in accordance with local regulations. Residues in import containers are expected to be disposed of via the trade waste stream of the formulator in accordance with local regulations.

RELEASE OF CHEMICAL FROM USE

Paint products containing the notified polymer are expected to only be used in industrial facilities for metal coating. Therefore, any losses from overspray (estimated at 30% of annual import volume) during industrial use are expected to be collected using standard engineering controls such as spray booths. These losses, together with other wastes generated during use, including residues in application equipment washings and empty paint containers (estimated at up to 5% and 2.5%, respectively, of the annual import volume), are expected to be disposed of in accordance with local regulations, namely to landfill.

RELEASE OF CHEMICAL FROM DISPOSAL

The notified polymer in paints is expected to share the fate of metal structures to which it has been applied. The notified polymer is likely to be either thermally decomposed during metal reclamation processes or disposed of to landfill at the end of the useful life of the article to which it has been applied.

7.1.2. Environmental Fate

No environmental fate data were submitted. The majority of the notified polymer is expected to be bound within an inert matrix of cured paints as part of its normal use pattern as a component in industrial paints. The majority of notified polymer in wastes disposed of to landfill is expected to be in solid cured paint and it is not expected to be bioavailable, biodegradable nor mobile in this form. Based on the high molecular weight of the notified polymer, it is not likely to cross biological membranes, hence bioaccumulation is not expected. Furthermore, bioaccumulation of the notified polymer is unlikely due to limited bioavailability in its solid form in landfill and its limited release to surface waters during use. 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.

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. The notified polymer contains basic functionality which has the potential to become cationic under environmental conditions (pH 4-9). The cationic charge density is <5000 Da and thus the notified polymer has the 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.

7.2.1. 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 ($Q = \text{PEC}/\text{PNEC}$) for the notified polymer has not been calculated as release to the aquatic environment in ecotoxicologically significant quantities is not expected based on its reported use pattern as a component in industrial paints for use on metal substrates. The majority of the environmental release of the notified polymer will be disposal of the cured paints to landfill and by thermal decomposition during metal reclamation processes. In cured paints the notified polymer is bound within the inert paint matrix and is unlikely to leach or be bioavailable. On the basis of its limited aquatic exposure and assessed use pattern, the notified polymer is not expected to pose an unreasonable risk to the environment.

APPENDIX A: PHYSICAL AND CHEMICAL PROPERTIES

Water Solubility 0.046 g/L (loading rate 1 g/L) and 0.377 g/L (loading rate 10 g/L) at 20 °C, pH 6

Method OECD TG 105 Water Solubility.
Remarks Flask method with determination by total organic carbon content.
Test Facility BASF (2012)

Partition Coefficient (n-octanol/water) log Pow \geq 3.4 at 20 °C

Method In-house.
Remarks Estimated from the water solubility (0.377 g/L) and solubility in n-octanol (\geq 900 g/L). The test substance (solvent free notified polymer) was determined to be completely miscible in n-octanol in ratios ranging 1:9 to 9:1. The solubility of the test substance in n-octanol was \geq 900 g/L.
Test Facility BASF (2012)

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