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

FULL PUBLIC REPORT

Polymer in DESMOLAC 4340

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, Water, Heritage and the Arts.

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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FULL PUBLIC REPORT**Polymer in DESMOLAC 4340****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

Bayer Australia Limited (Bayer MaterialScience) ABN: 22 000 138 714
391 - 393 Tooronga Road
Hawthorn East
Victoria 3123

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, Use Details, Import Volume, and Site of Reformulation.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

None

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

DESMOLAC 4340

MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn) >1000 Da

REACTIVE FUNCTIONAL GROUPS

The notified polymer contains only low concern functional groups.

3. PLC CRITERIA JUSTIFICATION

Criterion	Criterion met
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	Yes
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:	Yellow liquid
Melting Point	The notified polymer exists in solvent and is never isolated.
Density	Boiling point: ~ 110°C*
Water Solubility	940 kg/m ³ at 20°C*
Dissociation Constant (delete if no acid or base groups are present)	Insoluble in water. Polyester/polymethane with limited polar groups.
Reactivity	Not determined. However, the notified polymer contains a small amount of carboxylic acid functional groups, which are expected to have a pKa of 3-5.
Degradation Products	Contains hydrolysable functionalities but is expected to be stable under normal environmental conditions (pH 4-9).
* For DESMOLAC 4340 X/iB (product containing the notified polymer).	

5. INTRODUCTION AND USE INFORMATION

Maximum Introduction Volume of Notified Chemical (100%) Over Next 5 Years

Year	1	2	3	4	5
Tonnes	10-30	10-30	10-30	10-30	10-30

Use

The notified polymer will be used as an additive in coatings for moulded plastic articles for the automotive manufacturing industry.

Mode of Introduction and Disposal

The notified polymer will be imported as a $\leq 40\%$ solution in solvent (DESMOLAC 4340) in 200 L stainless steel drums. It will be transported from the wharf in Melbourne to Bayer Australia for warehousing before it is on sold to paint formulators for formulation into finished paint product.

Operation Description

Transport and Storage:

Truck drivers will transport the sealed DESMOLAC 4340 drums by road both from the wharf to Bayer Australia warehouse and to the paint formulator's warehouse. Two incoming goods receiving personnel will unload the drums of DESMOLAC 4340 and store them in designated storage areas.

Paint formulation:

Formulation of the notified polymer into paint products will involve transfer of the solution containing it by metered dosing to a 1000 kg stainless steel mixing vessel and mixing the notified polymer and other ingredients in a sealed vessel fitted with a high-speed mixer and local ventilation system. Each batch will be quality checked and adjustments made as required. The resultant paint will be filtered prior to being dispensed into 20 L closed head drums under exhaust ventilation for supply to customers. The concentration of the notified polymer in the finished paint products will be $< 18\%$. Paint products containing the notified polymer will be warehoused at the paint formulator's site before being distributed by road to end-user.

End-use:

At the customer site, spray painting will be conducted in the body shop inside a down draft spray booth fitted with filters and water scrubbers. Spray painters will wear personal protective equipment (PPE) including overalls, chemical resistant gloves, goggles (or face shield) and safety shoes. All areas of the body shops are fitted with local and general exhaust ventilation.

Once spraying is completed or the paint has been exhausted, the equipment will be drained and cleaned using solvents and rags. Approximately 10 workers will be involved in the cleaning of equipment and workers are expected to use PPE including overalls, chemical resistant gloves, goggles (or face shield) and safety shoes. The rinsates and used rags are collected for disposal. Empty cans will be drained onto absorbent material and the cans disposed of to landfill. Spray booth filters will be removed by workers for disposal every 2-4 months.

6. HUMAN HEALTH IMPLICATIONS

Hazard Characterisation

No toxicological data were submitted. The notified polymer meets the PLC criteria and is therefore assumed to be of low hazard.

Occupational Health and Safety Risk Assessment

The solution containing the notified polymer (DESMOLAC 4340) is a hazardous substance due to the presence of aromatic solvents and is classed as a Class 3 dangerous good (flammable liquid) because of the solvent content. Therefore, exposure to the notified polymer will be limited by the measures taken for the other components in the solution.

Transport and Storage:

Exposure to the notified polymer at a concentration of < 40% is unlikely during transportation and storage. Exposure may result in the case of an accidental spill or leak in the drums containing the notified polymer. Gloves, coveralls and goggles are available if required.

The risk presented by the notified polymer to the health of transportation and storage workers is considered to be low due to the low probability of exposure and the assumed low hazard of the notified polymer.

Paint formulation:

Dermal and ocular exposure to the notified polymer at a concentration of < 40% by workers due to drips, spills and splashes may occur during the charging of mixer, blending, connecting the filling lines and when taking and testing samples. Dermal exposure may also occur during equipment maintenance. Dermal and ocular exposure will be minimised through the use of overalls, goggles and impervious gloves by workers.

Aerosols may be released during blending, but any inhalation exposure is expected to be low due to the use of an exhaust ventilation system.

The risk to workers from the notified polymer during paint formulation is considered to be low, due to its assumed low hazard.

End-use:

Skin contamination and intermittent eye and inhalation exposure to the notified polymer at a concentration of < 18% may occur when opening paint containers, and when measuring and loading to spray equipment, prior to application by spray painting. Skin, eye and inhalation exposure to the notified polymer by workers is possible during spray application but will be limited through the down draft spray booth fitted with filters and water scrubbers and the use of PPE by workers.

Limited dermal and eye exposure is possible when carrying out maintenance work and cleaning of equipment after spray painting, but should be minimised through the use of PPE by workers.

The risk to workers from the notified polymer during end use is considered to be low, due to the assumed low hazard of the notified polymer.

Public Health Risk Assessment

Products containing the notified polymer will not be available for sale to the public and will only be used by professional spray painters. Members of the public may make dermal contact with automobiles coated with products containing the notified polymer. However, exposure will be negligible because the notified chemical is largely bound within a cured paint film.

Therefore, the risk to the public from the notified polymer during is considered to be low due to the negligible exposure and the assumed low hazard of the notified polymer.

7. ENVIRONMENTAL IMPLICATIONS

Environmental Hazard Characterisation

No ecotoxicological data were submitted.

Anionic polymers are known to 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. This is unlikely to apply to the notified polymer. However, the toxicity to algae is likely to be further reduced due to the presence of calcium ions, which will bind to the functional groups.

ENVIRONMENTAL RELEASE

Release of Chemical at Site

The notified polymer will not be manufactured in Australia. Local operations will include transport and storage, formulation, filling and packaging and application by end-users using spray gun in spray booths.

The notified polymer will be transported to Australia by ship in 200 L stainless steel drums as a < 40% concentration. It will be transported to notifier's warehouse for storage before it is on sold to paint formulators. The finished paint products will be drummed into 20 L closed head drums.

Release at paint formulator's site to the environment may occur in the unlikely event of an accident during transport or an accidental leak. It is estimated that a maximum of 1% of the notified polymer (< 300 kg per year of notified polymer) would be lost during spillage. Spills are contained and soaked up with inert absorbent material (sand, diatomite, acid binders, universal binders or sawdust) and placed in a sealable container and disposed of to landfill.

The washings from the mixing vessel and process line will be collected and reused. Residues remaining in the empty drum are estimated to be 0.5% (< 150 kg per year of the notified polymer). The empty drums will be collected by a licensed waste contractor for disposal to landfill. There will be no release of the notified polymer to sewer during formulation.

Release of Chemical from use

Release of the notified polymer to the environment may occur at the automobile manufacturing site during preparation and application of the primer.

Overspray

A loss of 30% of the ready-for use material is achieved by the use of HVLP spray guns and slightly higher loss with the more outdated high pressure guns. The engineering controls for over-spray are typically spray booth filters and water scrubbers. The spray booth filters are usually renewed every 2-4 months. The filters and scrubber waters are disposed of according to Local, State, National EPA regulations generally via a licensed waste contractor. Usually, the filters will ultimately be disposed of to landfill.

Based on 30% (worst case) over-spray losses during application procedures, and an annual import volume of 30,000 kg, it is expected that approximately 9000 kg of notified polymer per annum would be lost via overspray.

A small amount of waste may also be generated as a result of residues remaining in empty containers. It is estimated that 0.5% (approximately 150 kg per year of notified polymer) may remain in containers. The drums are rinsed with suitable solvent before being collected by waste disposal contractors. The rinsate is reused in painting.

Minor spills and cleaning of equipment

Minor losses of the notified chemical may occur as a result of incidental spills during loading of primer into spray equipment. Based on 5% losses from cleaning of equipment after application procedures, and incidental spills it is expected that approximately 1500 kg of notified chemical per annum would be lost via cleaning of equipment and spills. The notified polymer in waste from spills and equipment cleaning will be treated by a distillation process whereby the solvent is reclaimed and the remaining solid containing the notified polymer will be disposed of in landfill

In summary a maximum of 10650 kg (< 9000+150+1500kg) of notified polymer wastes could be generated in automobile manufacturing site each year as a result of vehicle spray-painting. It is expected that the primer will be used in various manufacturing plants throughout Australia and therefore waste generation and disposal will occur in a diffuse manner.

There will be no release to sewer during end-use the products containing the notified polymer.

ENVIRONMENTAL FATE

The majority of the polymer in the notified polymer will be cross linked with other paint components to form a very high molecular weight and stable paint film. It is expected that deterioration of the paint formulation will be negligible over the average life (20 years) of a motor vehicle.

Therefore, once incorporated into the paint formulation, the polymer is expected to be immobile and pose little risk to the environment. As the coating degrades over time, any fragments, chips and flakes of the coating will be of little concern as they are expected to be inert. The plastic panels and car bodies coated with the notified polymer are likely to be either recycled for plastic reclamation or be placed into landfill at the end of their useful life.

The polymer in waste from spills and equipment cleaning will be treated by a distillation process whereby the solvent is reclaimed and the remaining solid containing the notified polymer will be disposed of in landfill. The polymer in overspray will also be disposed of in landfill. The notified polymer is not expected to be water soluble and therefore will not be mobile in either the terrestrial or aquatic compartments. As a consequence of its low water solubility, the notified polymer is expected to associate with the soil matrix and sediments. The notified polymer is not expected to cross biological membranes due to its high molecular weight and low water solubility and is therefore not expected to bioaccumulate.

Environmental Risk Assessment

The majority of the notified polymer will be cross linked with other paint components to form a very high molecular weight and stable paint film. Therefore, once incorporated into the paint formulation, the notified polymer is expected to be immobile and pose minimum risk to the environment. As the coating degrades over time, any fragments, chips and flakes of the coating will be of little concern as they are expected to be inert. The plastic panels and car bodies coated with the polymer are likely to be either recycled for plastic reclamation or be placed into landfill at the end of their useful life. The notified polymer in waste from spills and equipment cleaning will be treated by a distillation process whereby the solvent is reclaimed and the remaining solid containing the polymer will be disposed of in landfill. The polymer in overspray will also be disposed of in landfill.

The notified polymer is not expected to be water soluble and therefore will not be mobile in either the terrestrial or aquatic compartments. As a consequence of its low water solubility, the notified polymer is expected to eventually associate with the soil matrix and sediments. Due to its high molecular weight and low water solubility the notified polymer is not expected to bioaccumulate.

The polymer is not likely to present a hazard to the environment when it is stored, transported and used in the proposed manner.

8. CONCLUSIONS AND RECOMMENDATIONS

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

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

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.
- Use of spray paints containing the notified polymer should be in accordance with the *National Guidance Material for Spray Painting* [NOHSC (1999)].
- 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

- The following control measures should be implemented by paint manufacturers and warehouse sites to minimise environmental exposure during paint formulation and storage of the notified polymer:
 - All process equipment and storage areas should be bunded.

Disposal

- The notified polymer should be disposed of to landfill.

Emergency procedures

- Spills/release of the notified polymer should be contained by soaking up with inert absorbent material and dispose of as special waste in compliance with local and State regulations as recommended in the MSDS.

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 polymer 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 polymer has changed from an additive in coatings for moulded plastic articles for the automotive manufacturing industry, or is likely to change significantly;
 - the amount of polymer being introduced has increased from 30 tonnes, or is likely to increase, significantly;
 - if 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 a 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.