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

# FULL PUBLIC REPORT

## Polymer in Disparlon KS-873N

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 Heritage.

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|---|---|
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**Director**
**NICNAS**

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### 1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Chemiplas Australia Pty Ltd (ABN 29 003 056 808)
3/112 Wellington Parade
East Melbourne Vic 3002

BASF Coatings Australia Pty Ltd (ABN 91 092 127 501)
51 McIntyre Road
Sunshine Vic 3020

Akzo Nobel Pty Ltd (ABN 000 017 354)
51 McIntyre Road
Sunshine Vic 3020

NOTIFICATION CATEGORY
Limited-small volume: Polymer with NAMW < 1000 (1 tonne or less per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication:
Chemical name
Molecular formula
Structural formula
Monomeric constituents (and their percentages)
Spectral data and GPC report
Confidential details of manufacture and use
Import volume
Percentage in final product
Customers

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)
None

NOTIFICATION IN OTHER COUNTRIES
USA TSCA

### 2. IDENTITY OF CHEMICAL

MARKETING NAME(S)
Polymer in Disparlon KS-873N

### 3. COMPOSITION

DEGREE OF PURITY
>80%

## 4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS
The notified polymer will be imported into Australia as a component of the product Disparlon KS-873N, in 200 L steel drums. Disparlon KS-873N contains 30-60% notified polymer in solution with a mixture of xylenes, ethylbenzene and 3-dimethylaminopropylamine.

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

| *Year* | *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|---|
| *Tonnes* | up to 1 | up to 1 | up to 1 | up to 1 | up to 1 |

USE
Ingredient in paint formulations for the automotive industry.

## 5. PROCESS AND RELEASE INFORMATION

### 5.1. Distribution, transport and storage

PORT OF ENTRY
Victoria, by Sea

IDENTITY OF MANUFACTURER/RECIPIENTS
The notified chemical is manufactured in Japan. It will be imported into Victoria by sea, and delivered to the formulation plant, also in Victoria. It will be formulated into coating products, which will be sold to Victorian automotive manufacturers.

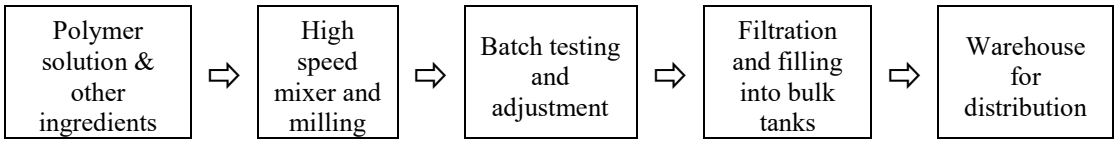
TRANSPORTATION AND PACKAGING

The notified polymer will be imported in 200 L steel drums, and these are transported by road from the port of entry to the formulation site. After formulation, the coatings are stored on-site in drums until they are transported to the customer by road.

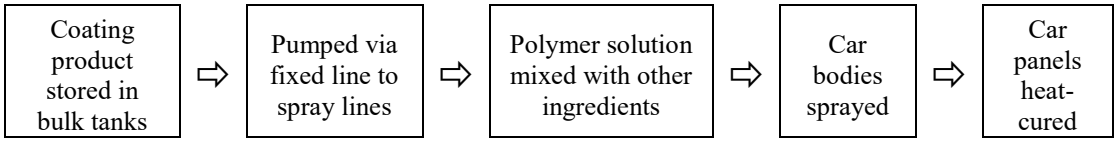
The solution of the notified polymer (Disparlon KS-873N) is not classified as hazardous, but is classified as a Dangerous Good Class 3: Flammable Liquid under the Australian Code of Practice for the Transport of Dangerous Goods by Road and Rail (ADG 6). This is due to the presence of >50% of the solvents ethylbenzene and xylene. Licensed transport carriers will carry out transportation of the polymer solution from the wharf to the formulation site. On-site storage facilities are designed for the storage of flammable liquids; measures include bunding for spill containment and control of ignition sources.

### 5.2. Operation description

The imported solution of the notified polymer (Disparlon KS-873N) will be delivered to the formulation plant where it will be re-formulated with other ingredients (polymers, pigments, solvents, and other additives) into coating products. Finished coating products will contain <2% notified polymer. A process flow diagram of the formulation of the notified chemical into coatings is shown:




Automotive manufacturers will apply these coatings to car bodies using automated spray coating equipment. A process flow diagram of the kind of operations that will take place is shown:




### 5.3. Occupational exposure

*Number and Category of Workers*

| *Category of Worker* | *Number* | *Exposure Duration (hrs/day)* | *Exposure Frequency (days/year)* |
|---|---|---|---|
| **Import** | | | |
| Unloading at wharf | 4 | 4 | 20 |
| Delivery to formulation plant | 4 | 4 | 20 |
| **Formulation** | | | |
| Mixer operators | 25 | 8 | 80-100 |
| Maintenance personnel | 2 | 1-2 | 80-100 |
| Laboratory personnel | 5 | 8 | 80-100 |
| Storage & internal transport personnel | 4 | 2-4 | 100-130 |
| **Delivery of product** | 10 | 1-2 | 40-50 |
| **Application** | | | |
| Application operators | 10 | 1-2 | 20 |
| Maintenance personnel | 2 | 1-2 | 20 |
| Laboratory personnel | 5 | 1-2 | 20 |

*Exposure Details*

Two main groups of workers will be potentially exposed to the notified polymer:

1. Those involved in the formulation of the coating.
2. Those involved in the application of coating during automotive manufacture.

The minimum personal protective equipment (PPE) required in situations where the notified polymer solution will be handled will include coveralls, impervious gloves and goggles. The formulation process and the majority of the subsequent handling procedures are performed in closed vessels, in fixed areas of the site(s), reducing the potential for worker's exposure to the notified chemical. The addition of materials during formulation is an automatic process. The notified polymer is pumped from the import container, through fixed transfer lines, to the high-speed mixer. Other ingredients are added in a similar fashion, reducing the likelihood of worker exposure during formulation.

Volatile components of the formulations such as solvents require workers to wear organic vapour respirators under some circumstances. In addition, engineering controls, such as exhaust ventilation, are applied during the formulation process, to capture vapours at their source and reduce the possibility of worker exposure.

When handling open cans of notified chemical-containing coating products, the customer's workers will wear flame retardant coveralls, rubber footwear, impervious gloves, and eye and respiratory protection. Engineering controls during coating application include the use of robotics to apply the coating and local exhaust ventilation. Spraying will take place in a well-ventilated down-spray booth with four air changes per minute, and any overspray will be captured on the filter system or on masking areas.

Workers involved in storage, transport and delivery are unlikely to be exposed to the notified chemical except in the unlikely event of an accidental spill. Under these circumstances, these workers will use the same PPE as recommended for other workers.

## 5.4. Release

RELEASE OF CHEMICAL AT SITE

After manufacture overseas, the notified polymer is imported as a component of Disparlon KS-873N in 200 L steel drums. Once in port, the notified polymer is transported to the reformulation facility. Environmental release at this stage is expected to only arise from spills during transport and handling.

On arrival the reformulation facility, the notified polymer is transferred from the steel drums to a mixing vessel, where it is incorporated with other ingredients to form the final end use product(s). Environmental release is expected to be limited to arising from accidental spills, and from routine cleaning of equipment. This is expected to account for approximately 1% of the total imported volume of notified polymer. Wastewater streams deriving from process areas of the plant (including cleaning operations) pass first through interceptor pits, where any polymer is collected. It is then disposed of to landfill. The remaining wastewater is released to the sewer according to the statutory requirements for the site. Residual notified polymer remaining within the import containers is expected to be removed

during drum recycling and may be disposed of either by thermal decomposition in incinerators or to secure landfill.

RELEASE OF CHEMICAL FROM USE

Formulations containing the notified polymer will only be supplied to industrial customers for automotive manufacturing. These formulations will be supplied to customers in bulk, and customers will transfer the emulsion into bulk storage tanks. When required, the formulations will be pumped to an application tank and mixed with other coating ingredients for ultimate spray application onto car bodies.

Potential releases of the notified polymer to the environment during mixing would be limited to accidental spills and leaks that will be contained by existing bunding. This may account for up to 1% of the total imported volume. It is expected that overspray and cleaning of application equipment will account for up to 20% of the total imported volume. This will be captured, collected and after drying, will be disposed of to landfill by a licensed waste management company.

### 5.5. Disposal

It is expected that up to 22% of the total imported volume of notified polymer will be disposed of directly, the majority going to secure landfill. In landfill, the notified polymer is expected to be entrapped within a stable coating matrix and should associate with soil and sediments. Overtime, the notified polymer is expected to degrade via biotic and abiotic processes to form simple carbon and nitrogen based compounds. Notified polymer that is disposed of by incineration is expected to be thermally decomposed.

The fate of notified polymer that is applied to automobiles is linked to that of the automobile. It is expected that the notified polymer will eventually be thermally decomposed during metal reclamation processes, or will be dispose of to landfill.

### 5.6. Public exposure

The notified polymer is incorporated into coating formulations for use on the exterior of car bodies. Coatings are applied under controlled conditions in a manufacturing plant. After curing, the coatings form an inert, cross-linked film that is not considered be bioavailable. In addition, the notified polymer is used in a coating covered by several other layers of film in the final car panel. In this state, exposure to the notified polymer is not possible.

## 6. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is never isolated from the imported polymer solution, Disparlon KS-973N, in which it is imported. Consequently, much of the physicochemical data provided is for this solution.

| | |
|---|---|
| **Appearance at 20ºC and 101.3 kPa** | Disparlon KS-973N is a brown liquid with a solvent odour |
| **Melting Point/Boiling Point** | Boiling Point is 140ºC for Disparlon KS-973N |
| Remarks | The melting point of the notified polymer is not available, as it is never separated from the polymer solution. |
| **Density** | 910 kg/m$^3$ at 20ºC |
| Remarks | The density value provided is for the polymer in solution. |
| **Vapour Pressure** | Between 0.896 and 1.333 kPa at 26ºC, depending on the solvent used. |
| Remarks | The values provided are for the solvent used in the polymer solution. The notified polymer itself is a salt of relatively high molecular weight and is therefore likely to have a high boiling point and be non-volatile. |

**Water Solubility** Not measured

Remarks The notified polymer is expected to be insoluble and poorly miscible with water, due to the majority of the polymer being comprised of hydrophobic hydrocarbon chains. However, it is a salt and also contains a water soluble functionality that would help increase water solubility.

**Hydrolysis as a Function of pH** Not determined

Remarks No hydrolysis data are available due to the fact that the notified polymer is said to be insoluble in water. While there is a hydrolysable functionality, it is unlikely to hydrolyse under normal environmental conditions and in the range of pH 4-9.

**Partition Coefficient (n-octanol/water)** Not measured

Remarks The notified polymer is expected to be insoluble in water, so a study of the partition coefficient between n-octanol and water is unlikely to yield useful information due to its surfactant nature. The notified polymer would be expected to stay primarily in the organic phase.

**Adsorption/Desorption** Not measured

Remarks The hydrophobic nature of the polymer and its low water solubility suggest that it would have high affinity for the organic component of soils and sediments. It is therefore not expected to be mobile in these media.

**Dissociation Constant** Not determined

Remarks The notified chemical consists of a mixed weak acid/weak base salt, and has low water solubility. The dissociation constants (Ka) of its acid/base groups are therefore likely to be typical for an organic acid. It will remain ionised except at low pH.

**Flash Point** 25ºC for the polymer solution using the closed cup method.

Remarks The notified polymer is never separated from the polymer solution.

**Flammability Limits** The solution of the notified polymer is not self-igniting, but is flammable.

Remarks The notified polymer is never separated from the polymer solution.

**Autoignition Temperature** 463ºC (xylene)

Remarks The notified polymer is never separated from the polymer solution.

**Explosive Properties** Lower explosive limit: 1.0% (xylene)
Upper explosive limit: 7.0% (xylene)

Remarks The solution of the notified polymer is not explosive, but the formation of explosive air/solvent mixtures is possible.

**Reactivity**

Remarks The notified polymer and its solution are stable to water and air under normal conditions of use.

No detailed examination of degradation products has been carried out. As a part of the thermosetting process during automotive coating, the polymer will be fully cross-linked and no depolymerisation is expected. In addition, several layers of surface coatings will cover the coating that contains the notified polymer in practice. No losses due to volatility, exudation or leaching are expected.

Degradation of the notified polymer would only be expected during combustion in the event of fire. Products of pyrolysis under limited oxygen conditions are likely to include miscellaneous hydrocarbons, carbon monoxide, carbon dioxide, nitrogen dioxide and water. Complete combustion would result in carbon dioxide, nitrogen dioxide and water.

## 7. TOXICOLOGICAL INVESTIGATIONS

No toxicity data were submitted.

## 8. ENVIRONMENT

### 8.1. Environmental fate

No environmental fate data were submitted.

### 8.2. Ecotoxicological investigations

No ecotoxicity data were submitted.

## 9. RISK ASSESSMENT

### 9.1. Environment

#### 9.1.1. Environment – exposure assessment

Environmental exposure will only occur due to use of the notified polymer, as it will not be manufactured in Australia. It will be reformulated into paints that will be used by specialist technicians in the automotive industry, i.e. it will not be available for general consumer use. The proposed use pattern and waste management indicate that solid wastes (containing up to 22% of the annual imported quantity of the notified polymer) resulting from the paint manufacture and paint use including overspray will be collected and sent to landfill or incineration.

The notified polymer will interact with other paint components to form a stable chemical matrix and, once dry, is expected to be immobile and pose little risk to the environment. After the useful life of painted article, the notified polymer will suffer the same fate as the article. If the article is recycled then the notified polymer will be destroyed during the heating process to release water vapour and oxides of carbon.

#### 9.1.2. Environment – effects assessment

No ecotoxicity data were provided.

The notified polymer is an anionic surfactant, which are known to display toxicity to aquatic organisms (Nabholz *et al* 1993). Following application and curing, the notified chemical will be within an inert matrix and be unavailable to organisms.

There is potential for bioaccumulation due to its molecular weight. However, this is unlikely since given its expected lack of solubility in water and that it will adsorb to suspended organic material, sediments and soil due to the charged nature and will not be available for bioaccumulation.

#### 9.1.3. Environment – risk characterisation

The notified polymer contains functional groups that have the potential to hydrolyse in extreme pH conditions. However, in the environmental pH range of 4-9, it is expected to be hydrolytically stable. The notified polymer is not expected to be readily biodegradable. Due to its water solubility, it is expected that the notified polymer will adsorb to soil and sediments. Over time the polymer should slowly degrade in landfill to water and simple carbon compounds via abiotic and biotic means. During automobile recycling the polymer will be destroyed.

Any potential adverse toxicological effects to aquatic organisms are not expected due to the low level of aquatic exposure. Minimal exposure to the aquatic compartment resulting from the proposed use pattern indicates that the overall environmental hazard should be low. The notified chemical is not likely to present a risk to the environment when it is stored, transported, used, recycled and disposed of in the proposed manner.

## 9.2. Human health

### 9.2.1. Occupational health and safety – exposure assessment

The minimum PPE required in situations where the notified polymer solution will be handled will include coveralls, impervious gloves and goggles. Many of the formulation processes are automated, making worker exposure unlikely through these stages.

At the end use site the primary route of worker exposure to the notified polymer would be expected to be dermal. When handling open cans of coating products containing the notified polymer, the customer's workers will wear flame retardant coveralls, rubber footwear, impervious gloves, and eye and respiratory protection. Additionally, the use of robotics during coating application will reduce the potential of exposure for application operators. All of these measures should ensure that dermal exposure to the notified chemical is minimal.

Inhalation exposure to volatile notified polymer is unlikely, as it is of high molecular weight. Inhalation of aerosolised notified polymer is possible during spray-painting operations. However, given the use of appropriate respiratory protective equipment, the inhalation exposure of workers to the notified polymer should be negligible.

There is also some possibility of inhalation exposure to volatile components of the formulations such as solvents, and for this reason under some circumstances workers will wear organic vapour respirators. In addition, exhaust ventilation is applied during the formulation process to reduce the possibility of vapour inhalation exposure to workers.

### 9.2.2. Public health – exposure assessment

The notified polymer is incorporated into an inert, cross-linked film coating on the exterior of car bodies. Within these cured coatings, the notified polymer is not considered to be bioavailable to expose the public. In addition, several film coatings will cover the coating containing the notified polymer in the final car panel. In this state, members of the public cannot be exposed to the notified polymer.

Exposure to the public resulting from accidents during the transport of the notified chemical, or from industrial accidents at the reformulation or end use sites, is highly unlikely.

### 9.2.3. Human health – effects assessment

No toxicological data were submitted.

Based on the chemical structure of the notified polymer, its lack of water solubility and high molecular weight, it is unlikely to be absorbed following ingestion or dermal exposure. Therefore, the notified polymer itself is unlikely to have significant adverse health effects beyond localised irritation at the site of contact.

However, the notified polymer is formulated with solvents that are significantly hazardous to human health, and the effects of these should be considered where the potential effects of products containing the notified chemical are assessed. These solvents are harmful by inhalation and following skin contact, irritating to eyes and skin, and are potential sensitisers.

### 9.2.4. Occupational health and safety – risk characterisation

The notified polymer has not been studied for any potentially hazardous toxicological properties.

It should be noted that the notified polymer is never isolated from a number of hazardous solvents. Therefore, workers should use products containing the notified polymer with caution, as the risk of harm to human health following exposure is potentially high. Therefore, the recommended PPE for hazardous solvents should be used at all times to prevent inhalation, dermal and/or ocular exposure. The use of these PPE measures are far greater than any that would be recommended for the notified polymer, and hence should prevent any unforseen toxic

effects that might arise as a result of worker exposure to the notified polymer.

Given the appropriate use of PPE, the OHS risk presented by the notified polymer is low.

### 9.2.5. Public health – risk characterisation

The main public exposure to the notified polymer, in a cured film on the exterior of car bodies, presents no risk to public health.

In the event of exposure of members of public to the notified chemical during an industrial accident, a significant level of toxicity is not expected.

## 10. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS

### 10.1. Hazard classification

Due to the lack of toxicological and ecotoxicity information, this polymer is not able to be classified.

### 10.2. Environmental risk assessment

The chemical is not considered to pose a risk to the environment based on its use as an ingredient in paint formulations for the automotive industry.

### 10.3. Human health risk assessment

### 10.3.1. Occupational health and safety

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

### 10.3.2. Public health

There is Negligible Concern to public health when used as an ingredient in paint formulations for the automotive industry.

## 11. MATERIAL SAFETY DATA SHEET

### 11.1. Material Safety Data Sheet

The MSDS of the product containing the notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 2003). It is published here as a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

### 11.2. Label

The label for the product containing the notified chemical provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994). The accuracy of the information on the label remains the responsibility of the applicant.

## 12. RECOMMENDATIONS

CONTROL MEASURES

Occupational Health and Safety

- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to formulations containing the notified polymer:
  - Coveralls, impervious gloves and safety glasses, face shield or goggles.
  - Respiratory protection should be also used where spray mists of the polymer are present, and spraying should only be carried out in enclosed booths with separate ventilation systems.

- 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 chemical are classified as hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances*, 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 secure landfill or by thermal decomposition in an incinerator.

Emergency procedures

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

### 12.1. Secondary notification

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

(1) Under Section 64(2) of the Act:
  - if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

## 13. BIBLIOGRAPHY

Nabholz J V, Miller P and Zeeman M, Environmental Risk Assessment of New Chemicals Under the Toxic Substances Control Act TSCA Section Five, in *Environmental Toxicology and Risk Assessment*, W.G. Landis, J.S. Hughes and M.A. Lewis (Eds), pp 40-55.

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