File No: NA/512

Date: July 1997

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME**

# FULL PUBLIC REPORT

## Polymer B in Penguin Bond #1911 (Base)

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Director
Chemicals Notification and Assessment

# FULL PUBLIC REPORT

## Polymer B in Penguin Bond #1911 (Base)

### 1. APPLICANT

Mitsubishi Australia Ltd. has submitted a limited notification statement in support of their application for an assessment certificate for Polymer B in Penguin Bond #1911 (Base).

### 2. IDENTITY OF THE CHEMICAL

Polymer B in Penguin Bond #1911 (Base) is not considered to be hazardous based on the nature of the chemical and the data provided. Therefore the chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data, details of the polymer composition and details of exact use and customers have been exempted from publication in the Full Public Report and the Summary Report.

| | |
|---|---|
| **Trade Name:** | (Penguin Bond #1911 (Base) contains 1.7% notified polymer) |
| **Number-Average Molecular Weight (NAMW):** | > 1 000 |
| **Maximum Percentage of Low Molecular Weight Species** | |
| **Molecular Weight < 500:** | no data provided |
| **Molecular Weight < 1 000:** | 0.93% |
| **Method of Detection and Determination:** | unable to establish molecular weight using gel permeation chromatography (GPC); infrared (IR) used to confirm identity |

**Comments on Chemical Identity**

A gel permeation chromatogram was also provided which serves to characterise the low molecular weight components of the material (ie the unreacted monomer and intermediate reaction products) which constitute around 0.93% of the polymer. The major constituent of the material is a very large highly crosslinked macromolecule for which the molecular weight cannot be determined using GPC due to extremely low solubility in all classes of solvent.

The molecular weight was estimated from particle size distribution measurements, assuming one “particle” corresponds to one macromolecule.

The material is very highly crosslinked, and loss (via diffusion processes) of residual monomers and low molecular weight species would be slow.

## 3. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|---|
| **Appearance at 20°C and 101.3 kPa:** | white milky liquid (imported formulation, aqueous dispersion) |
| **Boiling Point:** | 100°C (imported formulation) |
| **Specific Gravity:** | 1.09 (estimated) |
| **Vapour Pressure:** | not available |
| **Water Solubility:** | water dispersible, water extractivity is 0.5 mg/g polymer |
| **Partition Co-efficient (n-octanol/water):** | not available |
| **Hydrolysis as a Function of pH:** | not available |
| **Adsorption/Desorption:** | not available |
| **Dissociation Constant:** | not available |
| **Flash Point:** | not flammable |
| **Flammability Limits:** | not flammable |
| **Autoignition Temperature:** | not flammable |
| **Explosive Properties:** | stable |
| **Reactivity/Stability:** | stable |

### Comments on Physico-Chemical Properties

The vapour pressure of the notified polymer is expected to be negligible due to its high NAMW. The polymer does not contain any groups that may undergo dissociation.

The polymer is an extremely large macromolecule with few polar groups and will not be water soluble, or dispersible in water. The pendant ester groups are potentially susceptible to hydrolysis, but this will be mitigated under usual environmental pH conditions by the near zero water solubility and steric protection given by the bulk of the polymer molecule.

The polymer contains a high proportions of aliphatic and aromatic groups and is ostensibly lipophilic and would therefore have a high octanol/water partition coefficient.

The high hydrocarbon content of the polymer should also confer an ability to adsorb into or be associated with sediments containing organic material.

## 4. PURITY OF THE CHEMICAL

**Degree of Purity:** high

**Toxic or Hazardous Impurities:** below the levels requiring a hazardous classification (1)

**Non-hazardous Impurities (> 1% by weight):**

**Additives/Adjuvants:** refer to section 5

## 5. USE, VOLUME AND FORMULATION

The notified polymer is a 1.7% component of Penguin Bond #1911, a two part formulation. The formulation will be used in motor vehicle manufacture. A second polymer in Penguin Bond #1911 has also been notified; refer to NA511 (2).

Less than one tonne/annum of the notified polymer will be imported over the next five years.

## 6. OCCUPATIONAL EXPOSURE

The notified polymer is imported as a component of Penguin Bond #1911. It is imported in 17 kg tins and is supplied to motor vehicle manufacturers without repackaging. It is unlikely for any occupational exposure to occur during warehousing and transport. It would only occur in the event of leakage or accidental damage to the product containers.

Occupational exposure will be greatest during use of the formulation. The formulation is mixed in tanks using both the product containing the notified polymer, Penguin Bond # 1911 and the hardener Penguin Hardener #28A. These are poured

directly into the tank by a materials handler. The formulation mix will then be applied by one or two spray applicators to motor vehicle components. An additional employee will be involved in maintenance and cleaning of the spray equipment. Once the formulation is set the polymer crosslinks in the matrix and is effectively unavailable. Motor vehicle components containing the formulation will be assembled by machines.

The numbers of employees potentially exposed to the notified polymer prior to setting is limited. The periods of exposure for material handlers, applicators and maintenance personnel will be approximately half to one hour/shift for 30 to 50 weeks/year. The possible routes of exposure are inhalational, dermal, ocular and via ingestion if hygiene is poor. The dermal exposure pathway is likely to be the most significant as inhalational exposure, most likely during spray application, will be reduced as this occurs in a designated enclosed area maintained at negative pressure and with exhaust ventilation to vent vapours. Maintenance personnel will clean equipment after each application, it is probable that a suitable solvent will be used during this operation.

## 7. PUBLIC EXPOSURE

The notified polymer will not be sold directly to the public and will only be available for use in industry. The polymer will enter the public domain through the use of motor vehicles which incorporate the formulation in their manufacture. Direct contact should not occur.

## 8. ENVIRONMENTAL EXPOSURE

### Release

Some release of the polymer is likely during spray application. However, the notifier estimates that a maximum of 26 kg/year of the polymer will be released as a result of overspray and other application related activities. This amounts to only 10% of the annual import quantity, and the notifier has explained that loss through overspray is minimised due to the manual nature of application of the formulation, and extra care exercised by operating personnel due to the expense of the formulated material.

Any material released as a result of overspray or accident will harden to a crosslinked polymer and be disposed of to landfill.

During the formulation process at end users factory, the residual polymer remaining in the 17 kg containers is to be mixed with the residuals of the Penguin Hardener #28A, thus producing a crosslinked polymer mass which would be placed into landfill.

Any spillage of material during the preparation or application of the polymer would be absorbed into sand or other suitable material, and disposed of into landfill. The Material Safety Data Sheet (MSDS) gives instructions for handling spills of the imported formulation containing the notified polymer.

**Fate**

Most of the polymer will be incorporated within plastic parts of motor vehicles, and consequently its fate will be that of the vehicle components. At the end of their useful lives, these would be disposal of to landfill or possibly incinerated.

Released material resulting from application of the polymer would also be placed into landfill.

Solvents used in cleaning up equipment and other activities connected with use of the polymer are likely to be recycled or disposed of to a liquid waste handling facility where the ultimate fate of any remaining polymeric material would presumably be incineration.

When disposed of to landfill, the highly crosslinked nature of the material will preclude significant leaching of low molecular weight species, but the polymer would be subject to the slow biodegradation processes operative in landfill situations.

Incineration of the polymer would result in the production of water and oxides of carbon and nitrogen.

The high hydrocarbon content of the polymer should confer an ability to adsorb onto or become associated with sediments containing organic material.

The very high molecular weight precludes any potential for bioaccumulation.

## 9. EVALUATION OF TOXICOLOGICAL DATA

No toxicological data were provided, which is acceptable for polymers of NAMW greater than 1 000 according to the Act.

## 10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicology data were provided, which is acceptable for polymers of NAMW greater than 1000 according to the Act.

## 11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The environmental hazard from the notified polymer is small when employed as a component of motor vehicles in the manner described in the notification.

The residuals resulting from use of the material would be disposed of to landfill where the crosslinked nature and very high molecular weight of the polymer macromolecule precludes significant leaching of low molecular weight impurities.

Similarly, if the manufactured articles are placed into landfill at the end of their service, then little hazard as a consequence of leaching is expected.

Due to its very high molecular weight the polymer is unlikely to be environmentally mobile and nor is it likely to have potential for bioaccumulation.

## 12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified polymer will only be imported as a component of an aqueous dispersion, Penguin Bond #1911 (Base) used in conjunction with a hardener to make a formulation for automotive applications. The notified polymer has a NAMW greater than 1 000 and is therefore unlikely to cross biological membranes. It contains hazardous residual monomers, however, these are at levels below the threshold requiring a hazardous classification according to Worksafe Australia's *List of Designated Hazardous Substances* (1). The imported formulation, Penguin Bond #1911 (Base) also contains a second polymer, Polymer A, which is the subject of another assessment, NA511 (2). No toxicity data was provided for the notified polymer or the second constituent polymer, Polymer A, however the composition of both the notified polymer and the imported product Penguin Bond #1911 (Base) would indicate that they would not be classified as hazardous according to the Worksafe Australia *Approved Criteria for Classifying Hazardous Substances* (3).

Occupational exposure will be unlikely during transport and warehousing as the product is supplied to the end user in the same containers in which it is imported. These containers are unlikely to leak unless damaged. There is limited potential for occupational exposure during handling, application and maintenance of the equipment used to apply the formulation to automotive components. Engineering controls during application will minimise inhalational exposure to the notified polymer however there is a significant likelihood of dermal exposure during handling, application and maintenance. The expected low volatility of the notified polymer will minimise inhalational exposure during handling and maintenance. Although the molecular weight of the notified polymer should preclude systemic effects through dermal exposure there may be some potential for both eye and skin irritation in sensitive individuals due to the second polymer, Polymer A in Penguin Bond #1191 (Base), impurities and residual monomers therefore it would be prudent to minimise dermal and ocular exposure to the notified polymer prior to setting.

Public exposure to the notified polymer is possible in the event of an accident during transport and storage. The likelihood of this occurring is low in view of the quality accredited transport and clean up and disposal protective measures. Public exposure may also occur through accidental exposure to the cured formulation. However, once the formulation cures, the polymer cross links in the matrix and will become less bioavailable. The high NAMW minimises its potential to cross biological membranes. Furthermore, because the product containing the polymer dries to a solid, it is anticipated to be non-volatile and because it is under a plastic sheath, the potential for public contact with the polymer is negligible. Based on the notified polymers intended use it does not appear to represent a significant hazard to public health.

## 13. RECOMMENDATIONS

To minimise occupational exposure to Polymer B in Penguin Bond #1911 (Base) the following guidelines and precautions should be observed, these recommendations take into account the other constituents of the imported formulation Penguin Bond #1911 (Base):

- Safety goggles should be selected and fitted in accordance with Australian Standard (AS) 1336 (4)to comply with Australian/New Zealand Standard (AS/NZS) 1337 (5);
- Industrial clothing should conform to the specifications detailed in AS 2919 (6);
- Impermeable gloves or mittens should conform to AS 2161 (7);
- All occupational footwear should conform to AS/NZS 2210 (8);
- Spillage of the notified chemical should be avoided, spillages should be cleaned up promptly with absorbents which should then be put into containers for disposal;
- Good personal hygiene should be practised to minimise the potential for ingestion;
- A copy of the MSDS should be easily accessible to employees.

## 14. MATERIAL SAFETY DATA SHEET

The MSDS for the product containing the notified chemical was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (9).

This MSDS was provided by the applicant as part of the notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of the applicant.

## 15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act, secondary notification of the notified chemical shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

## 16. REFERENCES


1. National Occupational Health and Safety Commission 1994, *List of Designated Hazardous Substances [NOHSC:10005(1994)]*, Australian Government Publishing Service, Canberra.

2. New Industrial Chemicals (Notification and Assessment) Scheme (N.I.C.N.A.S.) 1997, *Full Public Report, Polymer A in Penguin Bond #1191 (Base)*, Project no., File No. NA511, Sydney, Australia.

3. National Occupational Health and Safety Commission 1994, *Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]*, Australian Government Publishing Service, Canberra.

4. Standards Australia 1994, *Australian Standard 1336-1994, Eye protection in the Industrial Environment*, Standards Association of Australia, Sydney.

5. Standards Australia/Standards New Zealand 1992, *Australian/New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications*, Standards Association of Australia/Standards Association of New Zealand, Sydney/Wellington.

6. Standards Australia 1987, *Australian Standard 2919-1987, Industrial Clothing*, Standards Association of Australia, Sydney.

7. Standards Australia 1978, *Australian Standard 2161-1978, Industrial Safety Gloves and Mittens (excluding electrical and medical gloves)*, Standards Association of Australia, Sydney.

8. Standards Australia/Standards New Zealand 1994, *Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear*, Standards Association of Australia/Standards Association of New Zealand, Sydney/Wellington.

9. National Occupational Health and Safety Commission 1994, *National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]*, Australian Government Publishing Service, Canberra.