

File No: NA/511

Date: July 1997

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer A in Penguin Bond #1911 (Base)

This Assessment has been compiled in accordance with the provisions of *the Industrial Chemicals (Notification and Assessment) Act* 1989 (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 Worksafe Australia which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment, Sport, and Territories and the assessment of public health is conducted by the Department of Health and Family Services.

For the purposes of subsection 78(1) of the Act, copies of this full public report may be inspected by the public at the Library, Worksafe Australia, 92-94 Parramatta Road, Camperdown NSW 2050, between the following hours:

Monday - Wednesday	8.30 am - 5.00 pm
Thursday	8.30 am - 8.00 pm
Friday	8.30 am - 5.00 pm

For Enquiries please contact the Administration Coordinator at:

Street Address: 92 Parramatta Rd Camperdown, NSW 2050, AUSTRALIA

Postal Address: GPO Box 58, Sydney 2001, AUSTRALIA

Telephone: (61) (02) 9577-9466 *FAX* (61) (02) 9577-9465

Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**Polymer A 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 A in Penguin Bond #1911 (Base).

2. IDENTITY OF THE CHEMICAL

Polymer A 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.

Other Names: none

Trade Name: (Penguin Bond #1911 (Base) contains 40% notified polymer)

**Number-Average
Molecular Weight (NAMW):** > 1 000

**Weight-Average
Molecular Weight:** > 1 000

**Maximum Percentage of Low
Molecular Weight Species**
Molecular Weight < 500: 0%
Molecular Weight < 1 000: 0.5%

**Method of Detection
and Determination:** molecular weight established using gel permeation chromatography (GPC); infrared (IR) used to confirm identity

Comments on Chemical Identity

The highly crosslinked nature of the hardened polymer indicates there would be little loss of low molecular weight monomers and oligomers from the material.

3. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance at 20°C
and 101.3 kPa:**

white milky liquid (imported formulation, an aqueous dispersion)

Boiling Point:

100°C (imported formulation)

Specific Gravity:

1.05 (estimated)

Vapour Pressure:

pKa 4.9 (based on propionic acid)

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 notified polymer is expected to be surface active as it is of high NAMW and consists of both hydrophilic and hydrophobic regions.

The polymer is said to be dispersible in water but the relatively low content of ionisable carboxylate groups together with the high molecular weight preclude true solubility, which is expected to be low.

The polymer contains carbonate and urethane linkages which are potentially susceptible to hydrolysis under certain pH conditions, but this is unlikely to be pronounced in the environmental pH region and would also be strongly mitigated by the low water solubility.

No data on oil/water partitioning was provided. However, the polymer contains a high proportions of lipophilic and urethane linkages which will detract from water solubility. Consequently this polymer is expected to have a relatively large octanol/water partition coefficient, and in common with most polyurethane materials is expected to partition into the oil phase.

The hydrocarbon content of the polymer should confer an ability to adsorb onto sediments containing organic material. However, the presence of the carboxylate groups may detract from adsorbability depending on the soil/sediment characteristics and ambient pH.

The pKa value supplied is an estimate and based on that for propionic acid. The polymer contains a small proportion of free carboxylic acid groups which could confer slight acidity to the material, and give the polymer a low anionic charge density under usual environmental pH conditions.

4. PURITY OF THE CHEMICAL

Degree of Purity: high

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

Additives/Adjuvants: refer to section 5

5. USE, VOLUME AND FORMULATION

The notified polymer will be imported as an aqueous dispersion, Penguin Bond #1911, the polymer will comprise 40%. The adhesive is a two part product requiring a second compound, Penguin Hardener #28A to be mixed with Penguin Bond #1911. The resultant formulation will be used in motor vehicle manufacturing. A second polymer in Penguin Bond #1911, Polymer B, has also been notified; refer to NA512 (2)

Less than 10 tonnes/annum of the notified polymer will be imported into Australia.

6. OCCUPATIONAL EXPOSURE

The notified polymer is imported as a component of Penguin Bond #1911. It is imported in 17kg tins and used by 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. This is undertaken by a materials handler. The resultant formulation 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 adhesive 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 per shift for 30 to 50 weeks per 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 adhesive in the manufacture. Direct contact with the polymer should not occur.

8. ENVIRONMENTAL EXPOSURE

Release

Some release of the polymer is likely during spray application. However, the notifier estimates that release of the material from overspray and other application related activities will be less than 1 tonne per year.

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. The released material will harden to a crosslinked polymer and be disposed of to landfill.

During the formulation process at the 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 dealing with spills of the imported product containing the notified polymer.

Fate

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

Released material resulting from application of the polymer would probably 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, and 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 NAMW indicates the polymer would have little 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 ecotoxicological data were provided, which is acceptable for polymers of NAMW greater than 1 000 according to the Act.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The environmental hazard from the notified polymer is small when used in the indicated manner as a component of motor vehicles. The residuals resulting from use of the material would be disposed of to landfill where the crosslinked nature precludes significant leaching.

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

The high molecular weight of the polymer indicates little potential for bioaccumulation, and the overall chemical constitution suggests that the material would be adsorbed onto or become associated with sediments in the event of any release into the aqueous compartment.

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 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 that 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 B, which is the subject of another assessment, NA512 (2). No toxicity data were provided for the notified polymer or the second constituent polymer, Polymer B. 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. There is limited potential for occupational exposure during handling, application and maintenance of the equipment used to apply the adhesive 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 impurities and residual monomers. Therefore, it would be prudent to minimise dermal and ocular exposure to the formulation 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 adhesive. However, once the adhesive cures, the polymer cross links in the matrix and will become unavailable, and 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 as it is under a plastic sheath, the potential for public contact with the polymer is negligible. Based on the notified polymer's intended use it does not appear to represent a significant hazard to public health.

13. RECOMMENDATIONS

To minimise occupational exposure to Polymer A 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 B in Penguin Bond #1911 (Base)*, Project no., File No. NA512, Sydney.
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.