File No: NA/109

Date: February 10, 1994

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

# Polymer in Setalux AA 8502 BX 60

This Assessment has been compiled in accordance with the provisions of *the Industrial Chemicals (Notification and Assessment) Act 1989, as amended* 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 Human Services and Health.

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 hours of 10.00 a.m. and 12.00 noon and 2.00 p.m. and 4.00 p.m. each week day except on public holidays.

For Enquiries please contact Ms Tina Anderson at:

*Street Address*: 92 Parramatta Rd Camperdown, NSW 2050, AUSTRALIA
*Postal Address:* GPO Box 58, Sydney 2001, AUSTRALIA
*Telephone:* (61) (02) 565-9466 **FAX (61) (02) 565-9465**

Director
Chemicals Notification and Assessment

# FULL PUBLIC REPORT

## Polymer in Setalux AA 8402 XS 55

## 1. APPLICANT

Amcor Trading Ltd, 1st Floor, 484 St Kilda Rd, Melbourne Vic 3004.

## 2. IDENTITY OF THE CHEMICAL

Based on the nature of the chemical and the data provided, the notified polymer in Setalux AA 8502 BX 60, is considered to be non-hazardous. Therefore, the chemical name, CAS No, molecular weight, molecular formula, structural formula, spectral data and monomer composition have been exempted from publication in the Full Public Report and the Summary Report.

**Trade name:** Setalux AA 8502 BX 60 (product containing ~60% notified polymer)

**Number-average molecular weight:** >1000

**Maximum percentage of low molecular weight species (molecular weight < 1000):** ~7

**Method of detection and determination:** Setalux AA 8502 BX 60 may be identified by infra red spectroscopy.

## 3. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer will be imported in the product Setalux AA 8502 BX 60 (containing ~60% notified polymer in solvent blend), and will never be isolated. The following physico-chemical properties relate to the product.

**Appearance at 20°C and 101.3 kPa:** almost colourless clear viscous liquid

**Melting Point:** <-20°C (based on solvents)

| | |
|---|---|
| **Boiling Point:** | 118°C |
| **Density:** | 1010 kg/$m^3$ |
| **Vapour Pressure:** | 800 Pa (based on solvents) |
| **Water Solubility:** | solubility of the polymer estimated at 0.05 - 0.5% based on the solubility of the polymer solvent blend |
| **Flash Point:** | 26°C (closed cup; based on solvents) |
| **Flammability Limits:** | lower limit 1 vol %limit 6 vol % (based on solvents) |
| **Combustion Products:** | water, carbon oxides and nitrogen oxides |
| **Autoignition Temperature:** | 340°C |
| **Explosive Properties:** | does not detonate as a result of heat, shock or friction |
| **Reactivity/Stability:** | no dangerous reactions are expected under normal conditions |
| **Particle size distribution:** | not required as Setalux AA 8502 BX 60 is a liquid |

**Comments on physico-chemical data:**

Hydrolysis as a function of pH was not determined due to difficulties associated with the low water solubility of the polymer solution and the presence of solvents. The polymer contains both epoxy and ester groups which are potentially hydrolysable. However hydrolysis is not expected under environmentally relevant conditions.

No partition coefficient or adsorption/desorption data were provided. This is acceptable due to the expected low water solubility. The solid residue left after evaporation of the solvent would be expected to be immobile in soils.

## 4. PURITY OF THE CHEMICAL

**Degree of purity:** >99%

**Toxic or hazardous impurities:**

A number of hazardous impurities are present in the notified chemical. Their identities have been exempted from publication in the Full Public Report and Summary Report as they are present below the cut-off concentration for classifying the notified chemical as a hazardous substance (1).

See Internal Report for hazardous impurities

**Non-hazardous impurities** (> 1% by weight): none

**Maximum content of residual monomers:** 1%

**Additives/Adjuvants:** none

## 5. INDUSTRIAL USE

The notified polymer will be imported in the formulation Setalux AA 8502 BX 60, which contains ~60% of the notified polymer in the solvents xylene (27.8%), ethyl benzene (9.2%) and butanol (3.0%). The polymer in Setalux AA 8502 BX 60 is an epoxy-functional acrylic resin intended to be used together with an amine-functional acrylic resin as a vehicle for a two-pack surface coatings system. Approximately 75 tonnes will be imported per annum.

## 6. OCCUPATIONAL EXPOSURE

Setalux AA 8502 BX 60 will be imported in 216.5 L drums and road transported to Amcor's Store in Laverton, Victoria (with possible future warehousing in Sydney, Brisbane and Adelaide). After the drums are checked and re-labelled with the importer's label, the product will be palletised and road transported to approximately

10 paint manufacturers throughout Australia (the majority located in NSW and Victoria), where it will be reformulated into a two pack air drying paint. The paint will be distributed to approximately 50 applicators, who will apply the paint by spray to metal, fibreglass, wood and plastic products. The paints will be used for industrial, and not domestic applications.

It is difficult to estimate the exact number of workers involved in reformulation of the notified chemical or application of the paint. At each paint manufacturing plant, at least one operator will be required to unload the steel drums, blend the paint ingredients and package the finished paint. It is estimated that approximately 1 or 2 paint batches will be manufactured per month at each site (each batch ~5000 L) and that finished product will be packaged into 20 L pales or in some cases smaller containers (4 L or 1 L cans). Paint mixing will take place in enclosed vessels equipped with air extraction, and the finished product will be pumped directly into packaging.

The two resins will be combined by each applicator to form the finished paints. Mixing will be conducted under controlled conditions in areas equipped with adequate air ventillation. The notifier advises that spraying will be conducted in spray booths which have the required air extraction and waste control facilities. The maximum total resin concentration will be 35% in top coats and 16% in primers.

## 7. PUBLIC EXPOSURE

Under normal conditions of use, public exposure to the notified polymer is expected to be negligible. The application of Setalux AA 8502 BX 60 will be restricted to industry and the paint product containing Setalux AA 8502 BX 60 will not be available to the public.

There is potential for widespread public exposure to the notified polymer on painted articles. However, by this stage the resin will have cured and skin absorption of the notified polymer from dry paint will be negligible.

## 8. ENVIRONMENTAL EXPOSURE

### . Release

The polymer will be formulated into an air cured two-pack surface coating by an estimated 10 paint companies. This is likely to occur in Sydney and Melbourne where the majority of paint manufacturers are located. The end use product is expected to be distributed nationally for use by commercial applicators only. It is estimated that application may occur at up to 50 sites. Given a maximum estimated import quantity of 75 tonnes per annum of the notified polymer solution, the average annual usage per site is an estimated 7.5 tonnes of the solution or 4.5 tonnes of the notified polymer.

A typical paint manufacturer will produce a bulk batch (1000 - 5000 kg) containing the notified polymer 1-2 times per month. The expected total polymer wastage resulting from unused residues in polymer containers, equipment washings, batch residues and spillage is estimated at < 1%. This equates to a maximum average annual disposal volume of 45 kg at each production site. These residues will be treated with solvent wastes or consigned to secure landfill depending on the nature of the waste stream.

The notifier has indicated that the two pack coating will only be applied using spray applicators. However, estimates of resultant waste have not been provided in the submission. The literature (2) indicates conventional liquid spray technology relies on air-pressurised sprayers and is usually conducted in a horizontal or downdraft spray booth. Transfer efficiencies are typically rather poor (in the order of 50%) and overspray in the air is often exhausted through an aqueous scrubber, which removes the waste paint as a sludge. Scrubber water tends to be recycled, and solids are drummed for disposal as hazardous waste, either through incineration or secure landfill.

After application, release of the notified substance to the environment is not expected until it has been fully cured. Two methods of release have been identified :

- gradual weathering of coatings containing the notified substance; and
- discard of coated materials to landfill.

The notified substance is expected to remain encapsulated within polymer matrices of the surface coating.

**. Fate**

Setalux AA 8502 BX 60 is a polymer which is expected to have low water solubility. Therefore leaching from landfill sites is not expected. Incineration of the notified substance is expected to produce oxides of carbon, and nitrogen.

The notified polymer is not expected to be released to the environment until it has been fully cured into a solid polymer matrix. The polymer is not expected to undergo biodegradation at significant rates due to its encapsulation within the matrix structure formed during the curing process. Bioaccumulation of the polymer is unlikely due to the relatively high molecular weight of the polymer even before curing.

## 9. EVALUATION OF TOXICOLOGICAL DATA

No toxicological data are required according to the *Industrial Chemicals (Notification and Assessment) Act 1989, as amended* (the Act) for polymers with number-average molecular weight (NAMW) > 1000. However, two genotoxicity studies were submitted, and are assessed below.

### 9.3 Genotoxicity

#### 9.3.1 *Salmonella typhimurium* Reverse Mutation Assay (3)

Setalux AA 8502 BX 60 was used in a *Salmonella typhimurium* reverse mutation assay using the plate incorporation procedure in the test strain TA 1535, with and without metabolic activation. The test substance (in dimethyl sulphoxide) was tested at concentrations of 0, 23, 37, 111, 333 or 1000 µg/plate in two tests (two experiments/test, 3 plates/experiment). The reference mutagens were 2-aminoanthracene in presence of metabolic activation, and N-ethyl-N'-nitro-N-nitrosoguanidine in absence of metabolic activation.

No dose-dependant increase in the number of revertant colonies was observed in the strain TA 1535 exposed to Setalux AA 8502 BX 60, both in the presence or absence of microsomal activation.

Marked increases in the number of revertant colonies were induced by the positive controls.

The results of this study suggest that Setalux AA 8502 BX 60 is not mutagenic under the experimental conditions reported.

It should be noted that this study was not conducted according to OECD guideline No: 471 (4), which stipulates at least four strains of *Salmonella typhimurium* should be tested.

### 9.3.2 Micronucleus Assay in the Bone Marrow Cells of the Mouse (5)

This study was conducted in accordance with OECD guideline No: 474 (6).

Three groups of 10 test animals (5 male and 5 female CDI-1 outbred mice) were given a single oral dose of 5000 mg/kg Setalux AA 8502 BX 60 (10 ml/kg in aqueous 1% methylcellulose). Control animals were given vehicle alone. Bone marrow cells were collected for micronuclei analysis from each group at either 24, 48 or 72 hours after treatment. The reference mutagen mitomycin C (12 mg/kg dosed at 20 ml/kg) was used as a positive control.

One thousand polychromatic erythrocytes (PCE) were scored per animal, and the number of micronucleated PCEs recorded. The frequency of micronucleated cells was expressed as percent of total PCEs scored per animal. Cytotoxic effects were described by the ratio of polychromatic to normochromatic erythrocytes in at least 1000 erythrocytes for each animal.

A small, but significant, enhancement of micronucleated PCEs was shown in treated animals at the 48 hour sampling time when compared to the concurrent controls. However, these controls showed an unusually low incidence of micronuclei when compared to historical controls, and the frequency of micronuclei reported in the treated animals was within the range exhibited by historical controls. No significant increases in micronucleated PCEs was shown at any other sampling time. No cytotoxic responses were observed in the erythrocytes of the treated animals at the dose studied. Mitomycin C produced a significant increase in the micronuclei frequency.

The results of this study indicate that Setalux AA 8502 BX 60 does not cause chromosomal damage *in vivo*.

### 9.4 Overall Assessment of Toxicological Data

Genotoxicity studies indicate that the chemical is not mutagenic towards *Salmonella typhimurium* strain TA 1535 and does not show clastogenic effects *in vivo* in the mouse.

## 10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No aquatic toxicity data were provided for Setalux AA 8502 BX 60, which is acceptable according to the Act for polymers with NAMW > 1000.

Due to its high NAMW the polymer is not expected to cross biological membranes.

## 11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The polymer is unlikely to present a hazard to the environment at any stage of its use. The ultimate fate of all cured polymer is landfill. Leaching of the cured polymer from landfill is not expected due to the chemical and physical bonding which occurs during the surface coating process.

Polymer residues from the formulation and coating operations will be incinerated or consigned to landfill. The potential for release to the aquatic compartment is minimal.

The low level environmental exposure of the polymer as a result of normal use indicate that the overall environmental hazard should be negligible.

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

The notified polymer in Setalux AA 8502 BX 60 has a NAMW > 1000 and is therefore unlikely to cross biological membranes and cause systemic effects. The genotoxicity data available, show no evidence of mutagenic effects towards *Salmonella typhimurium* strain TA 1535 or clastogenic effects *in vivo* in the mouse. The polymer, contains low levels (~7% w/w) of low molecular weight (<1000) species, including 1% of residual monomers. Most of the residual monomers have hazardous properties, however, they are

present below the cut-off concentration for classifying the polymer as a hazardous substance (1).

As the notified polymer is always present in hazardous solvents, workers handling the polymer solution (or paint containing it) will be required to implement appropriate control measures and/or precautions to minimise their exposure. Consequently, exposure to the notified polymer will be low.

Under normal use conditions, the notified polymer is not expected to present any significant health or safety hazard to workers.

Due to the low potential for public exposure to the notified polymer during its application, or in cured paint, there should be negligible risk to public safety.

## 13. RECOMMENDATIONS

To minimise occupational exposure to the notified polymer the following guidelines and precautions should be observed:

- If engineering controls are insufficient to reduce exposure to a safe level during paint mixing processes or filling and transfer operations, as well as during product application, the following personal protection equipment should be worn:
    - goggles conforming to AS 1336 (7) and AS 1337 (8);
    - impervious gloves conforming to AS 2161 (9); and
    - protective clothing conforming to AS 3765.1 (10) or AS 3765.2 (11).
- Good work practices should be implemented to avoid spillages or splashings.
- Any spillages should be promptly cleaned up and disposed according to local or state regulations.
- Good personal hygiene practices, such as washing of hands prior to eating food, should be observed.
- A copy of the Material Safety Data sheet for Setalux AA 8502 BX 60 and products containing it should be easily accessible to workers.

## 14. MATERIAL SAFETY DATA SHEET

The Material Safety Data Sheet (MSDS) for the product Setalux AA 8502 BX 60 (Attachment 1), containing the notified polymer, was provided in Worksafe Australia format (12). This MSDS was provided by Amcor Trading Ltd as part of their notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of Amcor Trading Ltd.

## 15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act), secondary notification of the new polymer in Setalux AA 8502 BX 60 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, *Guidance Note for Determining and Classifying a Hazardous Substance*, Australian Government Publishing Service Publ., Canberra, 1991.

2. Randall P.M., Journal of Hazardous Materials, **29**, p275, 1992.

3. HRC Report No. STE/15. *Bacterial Mutation Assay on EPL 88/1/24*. Huntingdon Research Centre, Huntingdon, England, 1991.

4. OECD Guidelines for Testing of chemicals - Salmonella typhimurium, *Reverse Mutation Assay* No:471, 1983.

5. HRC Report No. STE 17/891913. *Mouse Micronucleus Test on EPL 88/1/24*. Huntingdon Research Centre, Huntingdon, England, 1991.

6. OECD Guidelines for Testing of chemicals - *Micronucleus Test* No:474, 1983.

7. Australian Standard 1336-1982 *Eye protection in the Industrial Environment*, Standard Association of Australia Publ., Sydney, 1982.

8. Australian Standard 1337-1984 *Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, 1984.

9. Australian Standard 2161-1978 *Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ., Sydney, 1978.

10. Australian Standard 3765.1-1990 *Clothing for Protection against Hazardous Chemicals Part 1 Protection against General or Specific Chemicals* Standards Association of Australia Publ., Sydney, 1990.

11. Australian Standard 3765.2-1990 *Clothing for Protection against Hazardous Chemicals Part 2 Limited protection against specific chemicals*. Standards Association of Australia Publ., Sydney, 1990.

12. National Occupational Health and Safety Commission, *Guidance Note for Completion of a Material Safety Data Sheet*, 3rd Edition, Australian Government Publishing Service Publ., Canberra, 1991.