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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**Metablen S2001**

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Director  
Chemicals Notification and Assessment

**FULL PUBLIC REPORT****Metablen S2001****1. APPLICANT**

G E Plastics Australia of 175 Hammond Road DANDENONG VIC 3101 has submitted a notification statement accompanying their application for assessment of a synthetic polymer of low concern, Metablen S2001.

**2. IDENTITY OF THE CHEMICAL**

**Chemical name** methyl methacrylate, polymer with butyl acrylate and dimethylsiloxane

**CAS Registry Number** 143106-82-5

**Trade Name:** Metablen S2001

**Other Name:** Polymer in AS 4000

**Number-Average Molecular Weight (NAMW):** 14 410

**Maximum Percentage of Low Molecular Weight Species (Polymers and Oligomers)**

(Molecular Weight < 1 000): 0%

(Molecular Weight < 500): 0%

**Means of Identification (List of Spectral Data Available):** gel permeation chromatography (GPC), infrared (IR) spectroscopy

**3. PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance at 20°C and 101.3 kPa:** white powder

**Melting Point:** not determined

**Density:** 1 070 -1 090 kg/m<sup>3</sup>

<b>Water Solubility:</b>	< 1 mg/L
<b>Particle size</b>	99% > 10 µm
<b>Reactivity:</b>	stable

### **Comments on Physico-Chemical Properties**

Samples of the polymer were agitated in distilled water at 40°C for 1 hour. After agitation the suspension was cooled to 25°C for 24 h. As a result of this process, total organic carbon (TOC) levels of between 0.3 and 0.6 mg/L were measured on the filtrate.

The polymer contains ester groups which are potentially able to undergo hydrolysis within the environmental pH range. However, this is not anticipated due to the low water solubility of the polymer.

The data provided are acceptable for a polymer of low concern.

#### **4. PURITY OF THE CHEMICAL**

The maximum weight percentage of residual monomers is less than 0.2% for each monomer.

#### **5. USE, VOLUME AND FORMULATION**

The notified polymer is used to improve impact resistance in a range of engineering plastic masterbatches and articles. The notified polymer will be imported in a ready-to-use form and will be incorporated into masterbatches or in the manufacture of end-use articles. Estimated import volumes of the notified polymer are as follows:

<u>Year</u>	<u>Import Volume (tonnes)</u>
1	15-20
2	20-30
3	30-40
4	40-50
5	50

The polymer is already being used in USA, Europe and Singapore for the intended purpose.

#### **6. OCCUPATIONAL EXPOSURE**

The notified polymer will be imported in 25 kg bags. It will be transported from the wharf to the notifier's warehouse and then to the factory. A maximum of 4 people

would be involved. Exposure during transport and handling would only be likely in the event of an accident.

Masterbatching of Metablen S2001 for end-use formulations may occur initially at one site in Australia. The bags containing the notified polymer are weighed and charged to a hopper of a tumble blender. Weighing and introduction to the blender is carried out under local exhaust ventilation, to capture any fugitive dust. After blending with other components, the mixture is extruded as pellets and the notified polymer encapsulated in the polycarbonate matrix. A maximum of 3 people would be involved.

Exposure to dusts of the notified polymer may occur when workers are weighing and introducing the notified chemical to the blender. The majority of the particles (more than 99%) are greater than 10 µm in size, which exceeds the cut-off limit considered to be respirable (1). As described above, these operations will be conducted under local exhaust ventilation, thus minimising the potential for inhalational exposure.

There may be up to five downstream users of masterbatch products.

During production of end-use articles, the granules containing the notified polymer is dried and fed into a hopper of an injection moulding machine which is maintained at 250°C. The resulting liquid is injected to a mould under pressure and the polymer product is allowed to cool. The extruder is fitted with a local exhaust ventilation system to capture vapour emanating from the hot plastic or generated as decomposition products.

Maximum of 2 people will be involved in the above operation. As described above these operations will be conducted under local exhaust ventilation and at a processing temperature of 250°C (polymer decomposition temperature is 280°C), thus minimising the potential for inhalational exposure to the notified polymer.

## **7. PUBLIC EXPOSURE**

There is little potential for public exposure to the notified polymer during its importation, transport, storage or formulation, or through use of the end-product.

Minor public exposure to the notified polymer may result from accidental spillage during transport, but such exposure should be minimised by the containment and disposal procedures set out in the Material Safety Data Sheet (MSDS).

There will be negligible potential exposure of the public to the notified polymer from the finished articles, as the polymer will be incorporated into finished, solid moulded plastic articles. The notified polymer will be predominantly used in engineering articles which would be unlikely to be handled by the public.

Disposal of plastic articles in waste disposal facilities when they are finally disposed of is unlikely to involve any significant public exposure, as the notified polymer is insoluble, stable to hydrolysis, has a low vapour pressure, and will be

securely encapsulated within the plastic.

## **8. ENVIRONMENTAL EXPOSURE**

### **. Release**

Release to the environment of the notified polymer as a result of manufacturing is expected to be minimal. The polymer will be fed automatically into moulding machinery from a hopper. Sprue will be reground and reused. Contaminated polymer scraps will be deposited into municipal landfills. Overall, such waste streams could account for between 1% (large production runs) and 5% (small production runs) of the annual throughput (i.e. a maximum of 0.5 tonnes waste polymer to landfill is possible).

Used articles (e.g. laptop computer covers) containing the polymer will also eventually be deposited of in landfills.

### **. Fate**

In the case of accidental spillage, pellets of the polymer are expected to remain where they are deposited. Should a spill occur to water, the pellets should settle onto the bottom sediments, where they could be collected and landfilled, where contaminated scraps from the moulding process will also be disposed of to landfill. Due to the anticipated negligible solubility of the polymer, leaching from landfill is highly unlikely, and no movement from the landfill site is expected.

The majority of the polymer is not expected to be released to the environment until it has been moulded into components. Biodegradation is unlikely. The high molecular weight of the substance also means that bioaccumulation is not likely to occur (2), (3).

Surface photodegradation of the finished components is expected with sunlight, but this is only likely to occur after the product has been disposed of to landfill, or discarded inappropriately.

## **9. EVALUATION OF TOXICOLOGICAL DATA**

No toxicological data were provided which is acceptable for polymers of low concern.

## **10. ASSESSMENT OF ENVIRONMENTAL EFFECTS**

No ecotoxicological data were provided which is acceptable for polymers of low concern.

## **11. ASSESSMENT OF ENVIRONMENTAL HAZARD**

Disposal of the notified polymer to landfill is unlikely to present a hazard to the environment as it will be largely in a pellet form or as a finished product. Bioconcentration and leaching are both considered to be unlikely to occur due to the high molecular weight of the product and its insoluble nature. Biodegradation of the product is also considered unlikely.

The low environmental exposure of the polymer as a result of the proposed use, together with its expected negligible environmental toxicity, indicate that the overall environmental hazard should be negligible.

## **11. ASSESSMENT OF OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY EFFECTS**

Metablen S2001 has been notified as a synthetic polymer of low concern under section 23 for the purposes of section 24A of the Act. The polymer meets the criteria for a synthetic polymer of low concern specified in regulation 4A of the Act and can, therefore, be considered to be of low hazard to human health.

Inhalation exposure will be the most likely route of exposure for workers involved in the use of the notified polymer. The majority of exposure to dusts will occur during weighing of the notified polymer and introduction of the notified polymer to the blender. Since less than 1% of the dust is considered respirable, and operations will be conducted under local exhaust, the risk to these workers is likely to be minimal. Although emissions of methyl methacrylate and butyl acrylate monomers during processing at elevated temperatures may pose a health hazard to workers, the risk is likely to be minimised by ventilators attached to the extruder.

Public exposure to the notified polymer will be negligible since it will be incorporated into finished, solid moulded, plastic articles. Furthermore the notified polymer will be used only in specific engineering articles which would be unlikely to be handled by the public. Hence, the notified polymer poses minimal risk to public health.

## **12. RECOMMENDATIONS**

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

- It is good work practice to wear industrial clothing which conforms to the specifications detailed in Australian Standard (AS) 2919 (4) and occupational footwear which conforms to Australian and New Zealand Standard (AS/NZS) 2210 (5) to minimise exposure when handling any industrial chemical;
- Spillage of the notified chemical should be avoided, spillages should be cleaned up promptly and put into containers for disposal or recycling;

- Good personal hygiene should be practised to minimise the potential for ingestion;
- A copy of the relevant Material Data Safety Sheet (MSDS) should be easily accessible to employees.

### **13. MATERIAL SAFETY DATA SHEET**

The MSDS for the polymer solution to be imported was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (6).

This MSDS was provided by the notifier 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 notifier.

### **14. REQUIREMENTS FOR SECONDARY NOTIFICATION**

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

### **15. REFERENCES**

1. National Occupational Health and Safety Commission 1995, 'Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment, [NOHSC:1003(1995)]', in *Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards*, Australian Government Publishing Service, Canberra.
2. Anliker, R., Moser, P. & Poppinger, D. 1988, 'Bioaccumulation of dyestuffs and organic pigments in fish. Relationships to hydrophobicity and steric factors', *Chemosphere*, vol. 17, no. 8, pp. 1631-1644.
3. Gobas, F.A.P.C., Opperhuizen, A. & Hutzinger, O. 1986, 'Bioconcentration of hydrophobic chemicals in fish: relationship with membrane permeation', *Environmental Toxicology and Chemistry*, vol. 5, pp. 637-646.
4. Standards Australia 1987, *Australian Standard 2919-1987, Industrial Clothing*, Standards Association of Australia, Sydney.
5. 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.

6. 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.