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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**Polymer in Solution X980-217**

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

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Director  
Chemicals Notification and Assessment

**FULL PUBLIC REPORT****Polymer in Solution X980-217****1. APPLICANT**

Dulux Australia of McNaughton Rd, Clayton VIC 3168 has submitted a limited notification for the assessment of the new synthetic polymer in Solution X980-217.

**2. IDENTITY OF THE CHEMICAL**

The polymer in Solution X980-217 is not considered to be hazardous based on the nature of the chemical and the data provided. Therefore the chemical name, CAS number, molecular formula, structural formulae, molecular weight, monomer composition and spectral data have been exempted from publication in the Full Public Report and the Summary Report.

**Trade name:** Solution X980-217

**Maximum percentage of low molecular weight species (molecular weight < 1000):** 2.6% <1000  
1.1% <500

**3. PHYSICAL AND CHEMICAL PROPERTIES**

The notified polymer is prepared as a 45% solution in water and is never isolated. The following data were provided for the polymer solution.

**Appearance at 20°C and 101.3 kPa:** The polymer solution is a thick yellow solution with the consistency of honey

**Boiling Point:** 100°C (water)

**Specific Gravity:** 1.035 (estimated to be 1.22 for the polymer)

**Vapour Pressure:** Expected to be that of water (the polymer itself is not expected to be volatile based on analogy with similar polymers)

**Water Solubility:** Completely soluble

**Partition Co-efficient (n-octanol/water):** Not provided

**Hydrolysis as a function of pH:** Not provided

**Adsorption/Desorption:** Not provided

**Dissociation Constant:** Not provided

**Flash Point:** Not provided

<b>Flammability Limits:</b>	Not flammable
<b>Combustion Products:</b>	The polymer would be combustible if the water is evaporated from the solution. Combustion products will be carbon dioxide and water.
<b>Explosive Properties:</b>	The solution will not detonate as a result of heat, shock or friction
<b>Reactivity/Stability:</b>	May react with strong oxidisers
<b>Comments on Physico-Chemical Properties:</b>	

The polymer is never isolated and is manufactured as a 45% solution in water.

Based on the monomer composition the chemical is expected to be soluble.

With regard to hydrolysis, the notifier maintains that "by analogy with similar polymers, the polymer is soluble in water and is not subject to hydrolysis. However, it cannot be measured as the chemical is never isolated from its solvent". Although water soluble, lack of hydrolysis is a functional requirement of the water based paint component.

No data on partition coefficient (n-octanol/water) was provided as this polymer is not anticipated to cross biological membranes because of its high molecular weight.

No data was supplied on adsorption/desorption. However, as the water evaporates from the polymer solution it will become viscous and sticky and undergo further polymerisation to "form insoluble clear solid glasslike flakes".

No dissociation constant has been supplied due to the inability to isolate the polymer from the solution.

These explanations are acceptable for this formulation and class of polymer.

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

The chemical contains no hazardous residual monomers or impurities which are present at levels necessary to classify it as a hazardous substance (1). Therefore information on the chemical purity has been exempted from publication in the Full Public Report and the Summary Report.

#### **5. INDUSTRIAL USE**

The notified polymer is a film forming component in paints used as part of a basecoat to be applied to repaired car bodies by spray gun in enclosed spray booths.

The notified polymer will not be manufactured in Australia. It will be imported as a component of the automotive coating, Aquabase, in 1 and 2.5 L containers and transported by road to most large towns and cities where there are vehicle repair and repainting facilities.

The notified polymer will be imported at a rate of 1-10 tonnes per annum.

## **6. OCCUPATIONAL EXPOSURE**

The notified polymer will be imported in an automotive paint in 1 and 2.5 L containers and transported to distributors by road. The paint will then be onsold to licensed applicators where it will be mixed and applied to car body parts by spray.

Categories of workers potentially exposed to the polymer include transport and storage workers, personnel involved in paint mixing and application as well as personnel involved in waste disposal.

Transport and storage workers will only be exposed in the event of accidental spillage.

Spray applicators (up to 1000) are expected to be exposed for ~4 hours/day, 220 days per year. Paint application will be conducted in spray booths equipped with exhaust ventilation and filtering systems. During paint preparation (mixing, stirring and dilution of the paint), loading of the spray equipment, as well as cleaning of the spray and mixing equipment, workers will be required to wear anti-static flame retardant overalls, anti-static footwear, impervious gloves and eye protection conforming to AS 1337 (2). During paint application, workers will be required to work in a spray booth and wear an air fed breathing mask conforming to AS/NZS 1715 (3) and AS/NZS 1716 (4), in addition to the above personal protective equipment.

After application of Aquabase, a clearcoat will be applied to the painted surface and the car parts will be heat cured at ~65°C. During heat curing the notified polymer will cross link with the other polymers in the paint formulation to form a hard durable layer.

Personnel involved in waste disposal should not be exposed to significant quantities of the polymer, as the paint remaining in the empty containers is expected to dry to a “non-leachable” form.

## **7. PUBLIC EXPOSURE**

Imported paint will be sold to licensed applicators where it will be mixed and applied to car body parts by spray, coated with a clearcoat and heat cured. Spraying will take place in enclosed spray booths with exhaust ventilation. Overspray will be trapped by booth filters, and paint that is removed by scrubbers will be separated using flotation techniques, and the sludge will be disposed to landfill. Empty containers, that may contain up to 5% of the contents, will be disposed to landfills.

The public is unlikely to be exposed to the polymer during any of these operations.

## **8. ENVIRONMENTAL EXPOSURE**

### **. Release**

At the application sites the paint products will be sprayed by a combination of electrostatic and air atomised spray. Transfer efficiency is expected to average 30% depending on the application method. The resultant overspray will be trapped by booth filter systems. The paint material that is removed by scrubbers will be separated using flotation techniques. This separated sludge will then be removed to landfill by licensed waste disposal contractors. The maximum amount of the paint sludge containing the notified substance for annual disposal to landfill will be about 70 tonnes.

Empty containers that may contain up to 5% of the contents will be disposed of to landfill.

## **. Fate**

Although the notified substance is a polymer with high water solubility, degradation in or leaching from landfill sites is not expected as the polymer when disposed of would be in a crosslinked (insoluble) form with the other polymers in the paint formulation. Incineration of the notified substance is expected to produce water and oxides of carbon and nitrogen.

Most of the notified substance is not expected to be released to the environment until it has been fully cured into a solid polymer matrix on the surface of the treated car body. The resultant matrix structure covered by the top colour coat should limit the hydrolysis and biodegradation of the polymer. Bioaccumulation of the polymer is unlikely due to the high molecular weight of the polymer.

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

Toxicological data are not required for polymers of number-average molecular weight (NAMW) > 1000 according to the *Industrial Chemicals (Notification and Assessment) Act, 1989* (the Act) and no data were submitted for the notified polymer.

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

No ecotoxicological data were provided, which is acceptable for polymers of NAMW > 1000 according to the *Act*.

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

The polymer is unlikely to present a hazard to the environment when it is applied to the metal car bodies.

The polymer is also unlikely to present a hazard to aquatic organisms due to the end-use application and the polymer's high molecular weight.

The main environmental exposure will arise from landfill disposal of approximately 70 tonne per annum of recovered waste paint containing the resin. The waste would be widely dispersed in landfills across Australia and as it is expected to be stable and immobile in soil, environmental hazard is expected to be low.

The paint containing the polymer resin will be applied to the body parts of motor vehicles that are covered by the topcoat and protected from the environment. On disposal of the motor body, by resmelting the steel for recycling, the polymer would undergo high temperature incineration.

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

No toxicological data were submitted for the new polymer. However, as the notified polymer has a number-average molecular weight (NAMW) > 1000, it is unlikely to pass biological membranes and cause systemic effects. The polymer contains a number of hazardous impurities. These are present at levels well below the cut-off concentrations necessary to classify the polymer as a hazardous substance (1) and are therefore not expected to cause any significant toxicological concerns. The polymer also contains low levels of low molecular weight species (~2.6% < 1000). At these levels, any toxicological hazards associated with the low molecular weight component of the polymer should be minimal.

The notified chemical will arrive in Australia as a small component (<9%) of a water based automotive paint. As the polymer is available in liquid form, skin and eye contact will be the main sources of occupational exposure during paint preparation, equipment loading and equipment cleaning. Inhalational exposure during these activities is unlikely as the polymer vapour pressure is expected to be low at room temperature. Inhalational exposure during paint application, however, will be significant as the spray process will generate aerosols.

The applicant has stated that a number of engineering controls and personal protective devices will be used to limit exposure. The use of a well ventilated spray booth for spray applications will reduce worker exposure to overspray. Exposure to overspray will be further reduced by the wearing of respiratory protection. The use of overalls, gloves and eye protection will reduce worker exposure in the event of splashings and spillages. Therefore, worker exposure to the notified chemical should be low when the paint product is used in the proposed manner.

The public is not expected to be exposed to the polymer when used in the proposed manner.

## **13. RECOMMENDATIONS**

To minimise occupational exposure to the polymer in Solution X980-217 the following guidelines and precautions should be observed:

- . if engineering controls and work practices are insufficient to reduce exposure to a safe level, then the following personal protective devices should be worn:
    - impervious gloves conforming to Australian Standards (AS) AS 2161 (5),
    - protective eye goggles conforming to AS 1337 (2),
    - protective clothing conforming to AS 3765.2 (6), and
    - protective footwear conforming to AS/NZS 2210 (7).
  - . if aerosols are generated, and engineering controls are not sufficient to control exposure, the following protective equipment should also be worn:
    - air purifying respiratory protection conforming to AS/NZS 1715 (5).
- a copy of the Material Safety Data Sheet (MSDS) should be easily accessible to employees.

#### **14. MATERIAL SAFETY DATA SHEET**

The Material Safety Data Sheet for 968-9900S Aquabase White Solid Basic, containing the notified polymer, was provided in Worksafe Australia format (8).

This MSDS was provided by Dulux Australia as part of their notification statement. The accuracy of this information remains the responsibility of Dulux Australia.

#### **15. REQUIREMENTS FOR SECONDARY NOTIFICATION**

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of the polymer in Solution X980-217 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, Approved Criteria for Classifying Hazardous Substances. Australian Government Publishing Service, Canberra, 1994.
2. Australian Standard 1337-1992, Eye Protectors for Industrial Applications. Standards Association of Australia Publ., Sydney, 1992.
3. Australian/New Zealand Standard 1715-1994, Selection, Use and Maintenance of Respiratory Protective Devices. Standards Association of Australia, Standards Association of New Zealand, 1994.
4. Australian/New Zealand Standard 1716-1994, Respiratory Protective Devices. Standards Association of Australia, Standards Association of New Zealand, 1994.
5. Australian Standard 2161-1978, Industrial Safety Gloves and Mittens (excluding electrical and medical gloves). Standards Association of Australia Publ., Sydney, 1978.
6. 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.
7. Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear. Standards Association of Australia, Standards Association of New Zealand, 1994.
8. National Occupational Health and Safety Commission, Guidance Note for the Completion of a Material Safety Data Sheet, 3rd edition. Australian Government Publishing Service Publ., Canberra, 1991.