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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Polymer Emulsion X980-220

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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.

Under subsection 34(2) of the Act the Director of Chemicals Notification and Assessment is to publish this Report in the Chemical Gazette on 1997.

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Polymer Emulsion X980-220

1. APPLICANT

Dulux Australia of McNaughton Road CLAYTON VICTORIA 3168 has submitted a notification statement in support of the assessment of a synthetic polymer of low concern, Polymer Emulsion X980-220.

2. IDENTITY OF THE POLYMER

Polymer Emulsion X980-220 is considered not to be hazardous based on the nature of the chemical and the data provided. Therefore the chemical name, chemical abstract service number, molecular and structural formulae, spectral data and purity have been exempted from publication in the Full Public Report.

Trade Name:	polymer emulsion X980-220
Means of Identification:	infrared spectrum

3. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is imported as a 33% emulsion in water and is never isolated. The properties below are those of the emulsion except where indicated.

Appearance at 20°C and 101.3 kPa:	milky white liquid
Melting Point:	not applicable, polymer is manufactured as a dispersion and is never isolated
Density:	1 231 kg/m^3 (notified polymer; calculated)
Water Solubility:	< 1 mg/L at 20°C
Flammability Limits:	not applicable as the polymer is never isolated from its dispersion in water; the polymer latex in water is not flammable
Autoignition Temperature:	not applicable as the polymer is never isolated from its dispersion in water; the polymer latex in water is not flammable

Explosive Properties:	the polymer latex in water is stable and so does not demonstrate explosive properties
Reactivity:	the polymer latex in water is stable but should be segregated from strong oxiidisers
Particle Size Distribution:	not applicable, polymer dispersion in water

Comments on physico-chemical properties

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

The notifier provided a literature reference (1) which indicates that emulsion polymers, like the notified polymer, are essentially dispersions of water insoluble polymer in water[1]. The notified polymer is expected to be insoluble in water.

The polymer contains a number of ester sidechains that are susceptible to hydrolysis. However, hydrolysis in the environmental pH range would be precluded by low solubility.

4. INDUSTRIAL USE

The notified chemical will be imported as a polymer emulsion at about 33% in water. The notified chemical will be used by industry as a film forming polymer in automotive repair basecoat. The amount of polymer to be imported will start at one tonne per annum for the first year rising to 1 to 10 tonnes per annum by the third year and after.

5. OCCUPATIONAL EXPOSURE

The notified polymer will be imported into Australia as part of a full coating system in 1 and 2.5 litre plastic containers ready for sale. Transportation throughout Australia will be via road to distributors. There should be no exposure to the notified polymer during transport and storage except in the event of a spill.

The main group of workers that will be exposed to the polymer are those involved in the paint application. It is expected that the maximum duration of exposure is approximately 10 hours per day for 220 days per year for each worker. An indeterminate number of professional workers in 8 000 automotive repair shops will be using the paint containing the polymer. Mixing and paint application will be conducted in a well ventilated, down draft spray booth with a minimum volume of four air changes per minute. There is significant potential for dermal contact with the

[1] Emulsion polymerisation: the monomer, which is slightly soluble, is dispersed as emulsion droplets. The initiator is insoluble in the monomer but soluble in the continuous (aqueous) phase. Polymerisation therefore occurs in the continuous phase, the droplets of monomers serving as a source of monomer. When the growing polymer in solution reaches a critical weight, nucleation occurs and insoluble polymer particles are formed. The final polymer in dispersion form is thus water insoluble and must be stabilised against separation from the aqueous phase, for example, by including a surfactant. [1]

notified polymer when opening and handling paint cans as well as during cleaning and maintenance of equipment.

6. PUBLIC EXPOSURE

There is little potential for public exposure to the notified polymer during import, storage, transport or 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).

7. ENVIRONMENTAL EXPOSURE

. Release

During application, up to 70% of the polymer may be lost through overspray (up to 7 tonnes per year of the polymer at maximum import volumes). However, release of the basecoat will be contained within spray booths. The resultant overspray will be captured and collected through the spray booths' filtering system. Cleaning of the spray gun and mixing equipment will generate waste and this will be collected. Liquid wastes will be cleaned by licenced waste disposal contractors. This waste is then treated and sent to trade-waste landfill.

Residues of basecoat remaining in paint cans are estimated by the notifier at 3% (up to 300 kg per year of the polymer at maximum import volumes). These residues will dry within the can and be disposed of to landfill.

. Fate

The majority of the notified polymer is not expected to be released to the environment until it has been fully cured into a solid polymer matrix. When the polymerised polymer is disposed of, either as a residue or as a coating, no hydrolysis, movement, leaching, biodegradation or bioaccumulation of the polymer is expected. The paint coating containing the polymer will share the fate of the substrate to which it is applied.

Incineration of the polymer is expected to produce water and oxides of carbon. Any chips or flakes of the cured paint that occur (due to stone chips, accidents, wear and tear, etc) will be inert, diffuse and form part of the sediments.

8. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided which is acceptable for polymers of low concern according to the Act.

Due to the polymer's high molecular weight, the polymer is not anticipated to cross biological membranes (2,3).

9. ASSESSMENT OF ENVIRONMENTAL HAZARD

The main environmental exposure of the polymer arises from the landfill disposal of recovered dry waste paint from the application process. It estimated that up to 7.3 tonnes per year of the polymer may be consigned to landfill at maximum projected import volumes (due to 70% overspray in application and 3% residues in basecoat cans). However, such material will be cured, or bound to soil, and remain immobile in the environment. The environmental hazard from such disposal is expected to be low.

The main environmental hazard would arise through spillage in transport accidents that may release quantities of the uncured polymer to drains and waterways. However, the polymer would quickly become immobile on association with soil/sediment. Adequate control procedures are outlined in the MSDS.

The polymer is unlikely to present a hazard to the environment when it is used as the basecoat on panels of cars. The basecoat is topcoated which will further limit environmental exposure of the polymer. Such painted panels will be consigned to landfill or recycled at the end of their useful life. Chips or flakes of the cured basecoat will form part of the sediments. The environmental hazard from such exposure of cured basecoat is expected to be low.

10. ASSESSMENT OF OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY EFFECTS

Polymer Emulsion X980-220 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 therefore is considered of low hazard to human health.

The notified polymer has low levels of hazardous residual monomers that are below levels requiring a hazardous classification, however, the atmospheric exposure standard to the residual monomer methyl methacrylate of time-weighted average (TWA) 100 ppm (4) should be observed.

Inhalational exposure to the notified chemical will be reduced by applying paint in well ventilated, down draft spray booths. Dermal exposure may occur through splashing or spillage of the paint containing the polymer when opening the cans, this can be minimised by the use of protective gloves, clothing and goggles.

The introduction of water based paints such as those containing the notified polymer into industry will result in occupational benefits through elimination of organic solvent based paints currently used. There is a low risk associated with the introduction of the notified polymer as dictated by the requirements of the Polymer of Low Concern category under which it is to be introduced. However, the polymer is contained in a formulation, the basecoat coating system, which has some potential to cause skin and eye irritation, due to the components 2-butoxyethanol and ethyl alcohol. Tthe

levels of 2-butoxyethanol and ethyl alcohol are below the threshold for classification of the formulation as hazardous according to Worksafe Australia's List of Designated Hazardous Substances (5). It would however, be prudent to limit possible eye or dermal exposure to the basecoat coating through the appropriate use of personnel protective equipment.

There is negligible potential for public exposure to the notified polymer arising from importation, storage, transportation and application. After the basecoat coating system has been applied a clearcoat is applied over the top of the basecoat, and then cured. The cured film is very hard, inert and durable, and public exposure to the notified polymer from paint surfaces of motor vehicles is likely to be negligible, since it is not bioavailable.

11. RECOMMENDATIONS

To minimise occupational exposure to the Polymer Emulsion X980-220 the following guidelines and precautions should be observed:

- Industrial clothing should conform to the specifications detailed in Australian Standard (AS) 2919 (6) and AS 3765.1 (7);
- All occupational footwear should conform to Australian/New Zealand Standard (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.

The following safety equipment should be used when handling the imported formulation Emulsion X980-220:

- Safety goggles should be selected and fitted in accordance with AS 1336 (9) to comply with AS/NZS 1337 (10);
- Impermeable gloves or mittens should conform to AS 2161 (11);

In addition during spray application of paints containing the notified polymer it is advisable if engineering controls are inadequate to use an appropriate respiratory device. Such protection should be selected and used in accordance to (AS/NZS) 1715 (12) and should conform to AS/NZS 1716 (13) to minimise inhalational exposure to the notified polymer and other components of the paint.

12. MATERIAL SAFETY DATA SHEET

The attached MSDS for Polymer Emulsion X980-220 was provided in an acceptable format according to the *National Code of Practice for the Preparation of Material Safety Data Sheets* (14).

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.

13. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of the noitified polymer shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

14. REFERENCES

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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 5:637-646.

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

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7. Standards Australia 1990, *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.

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

9. Standards Australia , 1994, *Australian Standard 1336-1994, Recommended Practices for Eye Protection in the Industrial Environment.*, Standards Association of Australia Publ. Sydney, Australia.

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

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12 Standards Australia, Standards New Zealand, 1994, *Australian/New Zealand Standard 1715-1994 Selection, Use and Maintenance of Respiratory Protective Devices.* Standards Association of Australia Publ., Sydney, Australia, Standards Association of New Zealand Publ. Wellington, New Zealand.

13. Standards Australia, 1991, *Australian Standard 1716-1991 Respiratory Protective Devices,* Standards Association of Australia Publ., Sydney, Australia.

14. National Occupational Health and Safety Commission, 1994, *National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)],* AGPS, Canberra.