File No: PLC/171

July 2000

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Polymer in Polyester Resin HPR-8418

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Director
Chemicals Notification and Assessment

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1. APPLICANT

PPG Industries Australia Pty Limited of McNaughton Road, CLAYTON, VIC 3169 has submitted a Polymer of Low Concern notification statement in support of their application for an assessment certificate for Polymer in Polyester Resin HPR-8418.

2. IDENTITY OF THE CHEMICAL

The chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data and details of the polymer composition have been exempted from publication in the Full Public Report.

Trade names: Polyester Resin HPR-8418

3. POLYMER COMPOSITION AND PURITY

Details of the polymer composition have been exempted from publication in the Full Public Report.

Purity (%): 99%

Additives/adjuvants:

Chemical name	Synonym	CAS no.	% weight
xylene		1330-20-7	< 30

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

The polymer is manufactured as an approximately 70 % (w/v) solution in xylene. It is never isolated. The properties reported below are variously those of the polymer solution and of the notified polymer, as stated.

Property	Result	Comments
Appearance	Viscous, clear slightly yellow liquid with a solvent odour.	
Boiling point	138°C	polymer solution (based on xylene)
Density	1180 kg/m^3 (notified polymer) 1060 kg/m^3 (solution)	
Water solubility	not provided	based on solubility data for polymers of similar structure and molecular weight, the water solubility is expected to be less than 10 mg/L
Particle size	not applicable	the polymer only exists as a solution in xylene
Flammability	0.8 – 7.0 % vol	polymer solution (based on xylene)
Autoignition temperature	499°C	polymer solution (based on xylene)
Flash point	27°C	polymer solution (based on xylene)
Explosive properties	not explosive	
Stability/reactivity	stable under normal environmental conditions	
Hydrolysis as function of pH	not determined	despite containing ester linkages, the polymer is not expected to undergo hydrolysis in the environmental pH range of between 4 and 9 due to the expected low water solubility
Partition coefficient	not determined	determination of partition coefficient was not undertaken as the

		notified polymer is expected to be insufficiently soluble in water; the polymer is expected to partition into n-octanol rather than water
Adsorption/desorption	not determined	determination of adsorption/ desorption was not undertaken as the notified polymer is expected to be insufficiently soluble in water; the polymer may be expected to become associated with the organic component of soil and sediments
Dissociation constant	not determined	the notified chemical is unlikely to dissociate due to its expected poor water solubility and lack of functional groups which can dissociate

5.1 Comments on physical and chemical properties

The product containing the notified polymer is classified under the Australian Dangerous Goods Code as a Class 3 flammable liquid.

6. USE, VOLUME AND FORMULATION

Use:
The notified polymer will be used as a component of an automotive coating for Original Equipment Manufacture (OEM). The coating will be applied by robot or hand spraying and heat cured prior to the final assembly of the vehicles. The finished paint will be produced in Australia using imported Polyester Resin HPR-8418.

Manufacture/Import volume:
The notifier estimates that the import volume will be 1 tonne notified polymer per annum in the first five years of importation.

Formulation details:
The notified polymer will be imported as a resin dispersion, HPR-8418, containing 70 % notified polymer (w/w) in xylene. The resin dispersion will be reformulated at one site in Australia to produce the finished paint, containing up to 1 % (w/w) notified polymer. The resin dispersion will be imported in 200 L steel drums. The finished paint will be stored and transported in 200 L steel drums.

7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
Formulation		
Laboratory manufacture and testing (3 workers)		
dermal	70 % solution, 8 h/day, 80 days/year; polymer solution expected to be handled in small quantities	exhaust ventilation impervious gloves, coveralls and goggles
Paint make-up (18 workers)		
dermal	70 % solution, 4 h/day, 200 days/year; workers may be exposed to drips and spill of polymer solution	exhaust ventilation impervious gloves, coveralls and goggles
QC testing (3 workers)		
dermal	1 % solution, 4 h/day, 200 days/year; paint expected to be handled in small quantities	exhaust ventilation impervious gloves, coveralls and goggles
Drum filling (3 workers)		
dermal	1 % solution, 4 h/day, 200 days/year; workers may be exposed to drips and spill of paint	exhaust ventilation impervious gloves, coveralls and goggles
End use		
Addition of paint to circulation tank (1 worker)		
dermal	1 % solution, 2 h/day, 200 days/year; workers may be exposed to drips and spill of paint	impervious gloves, antistatic coveralls and footwear, and goggles
Hand spray application (4 workers)		
dermal, ocular, inhalation	1 % solution, 8 h/day, 200 days/year workers will be exposed to a fine mist of paint particles	down-draft spray booth nylon overalls, calico hoods, nylon gloves; respiratory protection as required

Cleaning of spray equipment (1 worker)		
dermal	1 % solution, 2 h/day, 200 days/year	impervious gloves, antistatic coveralls and footwear, and goggles
Transport and storage		
Drum handling (2 workers)		
none	70 % solution, 4 h/day, 6 days/year; no exposure expected except in case of accident	none
Transport of drums (1 worker)		
none	70 % solution, 4 h/day, 6 days/year; no exposure expected except in case of accident	none

8. PUBLIC EXPOSURE

The notified polymer is not available for sale to the general public. The potential for public exposure to the notified polymer during transport and use or from disposal is assessed as negligible. Members of the public may make dermal contact with automobiles coated with products containing the notified polymer. However, exposure will be negligible because the notified polymer will be bound within a cured paint film.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

During reformulation of polymer solution into paint there is potential for release as spillage (approximately 5 %). This may occur during filtration, blending, transfer activities, and in the course of cleaning transfer and mixing equipment. Based on the maximum import level of 1000 kg this equates to approximately 50 kg of the notified polymer released per annum. Good work practices are expected to minimise the probability of spillage occurring.

According to the notifier, approximately 10 % of the paint will be applied by the manual method and 90% by the automatic method. Transfer efficiencies will be approximately 35 % and 80% respectively. The notifier estimates that during spray application, an average of 25 % of the notified polymer will be released as overspray which is captured in spray booth air and water filtration systems. The paint material removed in this way is treated in an in-house water scrubbing system whereby paint material is separated out in a treatment pond using flotation techniques (e.g. clarifiers, flocculants and surfactants). Assuming an import volume of 1000 kg and based on a worst case scenario of 25 % overspray, this represents a release of approximately 250 kg per annum. The notifier indicates that waste may be generated as a result of paint and solvent residues removed from spray equipment. Based on an import volume of 1000 kg, this represents a release of approximately 20 kg per annum.

For both application and reformulation, all spills and wastes will be contained on site and removed by a licensed waste contractor.

Residues will also remain in empty import and paint containers after use. It is estimated that up to 5 % (50 kg) per annum of the notified polymer will remain as residue in the containers which will be collected by a licensed waste contractor and disposed of to landfill.

Further release of the polymer may occur in the form of either inert flakes of cross linked paint or on objects painted with the new polymer when panels are consigned to metal reclamation or landfill.

9.2. Fate

Once applied to the metal panels of vehicles, the notified polymer will be incorporated in a hard, durable, inert film and would not present a significant hazard. Fragments, chips and flakes of the paint will be of little concern as they are expected to be inert. The metal panels coated with the polymer are likely to be either recycled for steel reclamation or be placed into

landfill at the end of their useful life. When recycled the polymer would be destroyed in furnaces and converted to water vapour and oxides of carbon.

The solid waste generated during manufacturing, formulation and application of the coating will be disposed of by incineration. The containers and their residues will also be disposed of in this manner. Leaching of the polymer from landfill sites is unlikely, given the expected solid nature of the waste substance and cross linking in paint matrix. Polymer disposed of in this way could be expected to degrade slowly via biotic and abiotic processes.

The polymer is not expected to cross biological membranes, due to the anticipated low solubility and high molecular weight, and as such should not bioaccumulate (Connell, 1990).

10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological data were submitted.

The health hazards of the constituents and hazardous impurities, additives and adjuvants are tabulated below.

Chemical	Health hazards	Regulatory controls
Constituents		
the identities of residual monomers have been exempted from publication in the Full Public Report	all are present at below the cutoffs for classification of the notified polymer as hazardous	none
Hazardous impurities		
	one substance present at below the cutoff for classification of the notified polymer as hazardous	none
Additives/adjuvants		
xylene	harmful by inhalation and in contact with skin irritating to skin (NOHSC, 1999a)	exposure standard 80 ppm TWA, 150 ppm STEL (NOHSC, 1995)

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were provided.

12. ENVIRONMENTAL HAZARD (RISK) ASSSESSMENT

The majority of the waste polymer is expected to ultimately be incinerated or released to landfill. If released to landfill, the polymer is unlikely to be mobile in the soil environment and would be expected to slowly degrade to gases such as carbon dioxide through abiotic and biotic processes. The environmental hazard of the notified polymer in landfill is expected be low. If incinerated, the polymer would be rapidly destroyed and converted to water vapour and oxides of carbon.

In the event of accidental release of the polymer into waterways, the polymer is expected to disperse into the water then gradually settle out onto sediments where it would slowly degrade. The long term environmental hazard of the notified polymer in the aquatic environment is expected to be low.

The high molecular weight and expected low water solubility of the notified polymer should prevent bioaccumulation. Given the above, the overall environmental hazard is expected to be low.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

No toxicological information has been provided for the notified polymer and therefore the substance cannot be assessed against the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b). However, the polymer solution HPR-8418 is a hazardous substance because of the high concentration of xylene. It is also classed as a Class 3 dangerous good (flammable liquid) because of the solvent content. The Material Safety Data Sheet (MSDS) for the polymer solution HPR-8418 lists a number of potential health effects, namely headaches, dizziness, nausea, vomiting, skin, eye and respiratory irritation, irritant contact dermatitis, central nervous system depression and chronic central nervous system disorders. These relate mainly to the solvent xylene, rather than the notified polymer.

13.2. Occupational health and safety

There is little potential for significant occupational exposure to the notified polymer in the transport and storage of the finished paint containing this polymer. There will be exposure during the local production of the paint, and in the use and disposal of the paint.

During the reformulation processes, the main exposure route for the notified polymer will be dermal. The paint and polymer solutions will be viscous, and ready formation of aerosols is not expected. The polymer is not expected to be hazardous by dermal exposure as the high molecular weight will preclude absorption through the skin. Protective measures used to prevent exposure to the hazardous solvents should provide sufficient protection against the notified polymer.

The finished paint, which is applied as provided, apart from dilution, by operators working in a single area of the production line, contains a variety of solvents , pigments and other polymers. It is not classified as hazardous according to the Approved Criteria, although exposure standards apply for a number of the solvents. The spraying procedure produces a

dense aerosol of paint particles which result in potential dermal, ocular and inhalation exposure.

Exposure will be limited by the use of stringent engineering controls, such as a correctly constructed and maintained spray booth, and of a high level of personal protective equipment, such as impermeable overalls and gloves, calico hoods and respirator. The use of the paint containing the notified polymer should be in accordance with the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999c). The level of protection from exposure afforded by the standard protective measures will provide adequate protection from the notified polymer, which is likely to be less intrinsically toxic than most of the solvents, pigments and other paint resins.

Once the applied final paint mix has hardened, the polymer will not be separately available for exposure or absorption.

There is a NOHSC exposure standards for xylene, identified as an ingredient in the polymer solution HPR-8418. The employer is responsible for ensuring that this exposure standard, and exposure standards pertaining to other finished paint solvents, are not exceeded in the workplace.

The paint components containing the notified polymer are flammable due to their solvent content. Precautions must be taken to avoid sources of ignition, e.g. use of earthing leads. Operators should wear antistatic overalls and footwear.

Similar considerations apply in the disposal of the polymer. The wastes containing the notified polymer may be hazardous substances on the basis of the solvent and other resin content, and the precautions used on the basis of these additional materials should be adequate for protection from the notified polymer. In addition, much of the polymer will be crosslinked, hardened and immobilised by the time of disposal.

The notified polymer presents a low hazard to human health, and the control measures required due to the more hazardous components of the products containing the notified polymer will ensure sufficient protection against the notified polymer itself.

13.3. Public health

The notified polymer is not available for sale to the general public and will only be used in automotive paint products. Members of the public may make dermal contact with automobiles coated with paints containing the notified polymer. However, the risk to public health from the notified polymer will be negligible because the notified polymer is bound within a cured paint film from which it is unlikely to be bioavailable.

Based on the use pattern of the notified polymer and its physico-chemical properties, it is considered not to pose a significant hazard to public health.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS of the notified polymer solution provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). It is published here as part of the assessment report. The accuracy of the information on the MSDS remains the responsibility of the applicant.

14.2. Label

The label for the notified polymer solution provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994b). The accuracy of the information on the label remains the responsibility of the applicant.

15. RECOMMENDATIONS

To minimise occupational exposure to Polymer in Polyester Resin HPR-8418, the following guidelines and precautions should be observed:

- Use of the paint containing the notified polymer by spray application should be in accordance with the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999c);
- Safety goggles, chemical resistant industrial clothing and footwear and impermeable gloves should be used during occupational use of the products containing the notified polymer; where engineering controls and work practices do not reduce vapour and particulate exposure to safe levels, an air fed respirator should also be used;
- 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.

If products containing the notified chemical are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b), workplace practices and control procedures consistent with State and territory hazardous substances regulations must be in operation.

Guidance in selection of goggles may be obtained from Australian Standard (AS) 1336 (Standards Australia, 1994) and Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992); for industrial clothing, guidance may be found in AS 3765.2 (Standards Australia, 1990); for impermeable gloves or mittens, in AS 2161.2 (Standards Australia/ Standards New Zealand, 1998); for occupational footwear, in AS/NZS 2210 (Standards Australia/ Standards New Zealand, 1994a); for respirators, in AS/NZS 1715 (Standards Australia/ Standards New Zealand, 1994b) and AS/NZS 1716 (Standards Australia/ Standards New Zealand, 1994c).

16. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act, the Director of Chemical Notification and Assessment must be informed if the polymer characteristics cease to satisfy the criteria under which it has been accepted as a Synthetic Polymer of Low Concern, and secondary notification may be required under subsection 64(1). The Director must be informed if any of the circumstances stipulated under subsection 64(2) of the Act arise, and secondary notification of the notified polymer may be required. No other specific conditions are prescribed.

17. REFERENCES

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Standards Australia (1990) Australian Standard 3765.2-1990, Clothing for Protection against Hazardous Chemicals Part 2 Limited protection against specific chemicals. Standards Association of Australia.

Standards Australia (1994) Australian Standard 1336-1994, Eye protection in the Industrial Environment. Standards Association of Australia.

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