

File No: NA/821

23 April 2020

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**Solsperse HPA-10**

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**FULL PUBLIC REPORT****Solsperse HPA-10****1. APPLICANT**

Orica Australia Pty Ltd of 1 Nicholson Street MELBOURNE VIC 3000 (ACN 004 145 888) has submitted a Limited Notification statement in support of their application for an assessment certificate for **Solsperse HPA-10**.

**2. IDENTITY OF THE CHEMICAL**

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

**Marketing Name:** Solsperse HPA-10;  
Solsperse 36600 (30 – 60% Solsperse HPA-10 in solvent).

**Spectral Data:** Solsperse HPA-10 has been characterised using InfraRed and Nuclear Magnetic Resonance techniques (Analytical Services Group 1999).

**3. PHYSICAL AND CHEMICAL PROPERTIES**

The following properties are for the notified polymer unless otherwise indicated.

**Appearance at 20°C & 101.3 kPa:** Solsperse HPA-10 - white waxy solid;  
Solsperse 36600 - pale yellow liquid.

**Particle Size:** Unlikely to dust under normal conditions.

**Melting Range:** 8 to 40°C

**Relative Density at 20°C:** 1.05

**Vapour Pressure:** Not volatile - see comments below

**Water Solubility at 25°C:** 13 000 mg/L

<b>Partition Co-efficient (n-octanol/water) at 25°C:</b>	$\log P_{ow} = 1.3$ (estimated)
<b>Hydrolysis as a Function of pH:</b>	No data available – see comments below
<b>Adsorption/Desorption:</b>	No data available – see comments below
<b>Dissociation Constant:</b>	No data available – see comments below
<b>Flash Point:</b>	No data available – see comments below
<b>Flammability Limits:</b>	No data available – see comments below
<b>Autoignition Temperature:</b>	No data available – see comments below
<b>Explosive Properties:</b>	No data available; expected to be stable under normal use conditions.
<b>Reactivity/Stability:</b>	The polymer is stable but should be segregated from oxidising agents.

### Comments on Physico-Chemical Properties

Melting point was determined using differential scanning calorimetry (Analytical Services Group 1999), and as expected for a material containing a number of structurally different but closely related components, the material melts over a range of temperatures (8-40°C).

On the basis of data for similar polymers, the notified polymer is not considered volatile.

The polymer contains organic ester groups that could undergo hydrolysis under extreme pH. Hydrolysis of the polymer between environmental pH 4 to 9 is considered unlikely.

The water solubility was determined at 1.3% w/v using an evaporative method (Analytical Services Group 1999). The polymer is classified as being readily soluble (Mensink B J W G et al 1995). However, the general structure of the polymer indicates that it is more likely to be dispersible rather than truly soluble in water. The acidic groups give the polymer an anionic charge which will have high affinity for water, while the predominantly hydrocarbon based portion will be hydrophobic. Consequently, the polymer may form micelle like dispersions in water. These general polymer characteristics are also responsible for the dispersant action of the polymer, where it is assumed that the polyester moieties would become attached to the pigment particles while the hydrophilic “head groups” with high water affinity stabilise the dispersed particles in the water medium.

The  $\log P_{ow}$  of the notified polymer was estimated from the ratio of the solubility in water saturated n-octanol and n-octanol saturated water at 25°C after stirring the polymer into each phase for 48 hours. The solubility of the polymer in water saturated n-octanol was determined as 126.6 g/L, while that in n-octanol saturated water was found to be 6.44 g/L (Analytical Services Group 1999). The ratio of these solubilities is 19.67, giving the value for  $\log P_{ow}$  of 1.3. It should be noted that the solubility of the polymer in n-octanol saturated water is

around half that determined in the dedicated water solubility test described above, and no comment on this disparity was offered.

An adsorption/desorption value is not available but it is expected that the polymer would associate with soils and sediment. The Log  $P_{ow}$  of 1.3 indicates that the polymer will have some affinity for the organic component of soils and sediments, although this may be mitigated by the appreciable water solubility (13 g/L). However, the anionic nature of the polymer may also assist association with soil through ionic interactions with positively charged mineral surfaces. Without further data it is not possible to quantify the potential strength of association with soil and sediments, and while the general physico-chemical properties indicate some association is likely, the polymer may also be quite mobile in these media.

A dissociation constant has not been provided. By analogy with phosphoric acid, the pKa for first ionisation of the esterified acidic groups is expected to be between 2 and 3 for both the mono-ester and the di-ester. The amine counterions would be expected to have pKa between 9 and 10.

For the polymer solution the flashpoint, autoignition temperature and flammability limits will be similar to those for the solvents present.

#### 4. PURITY OF THE CHEMICAL

**Degree of Purity:** 95.3% w/w

**Hazardous Impurities:** None

**Non-hazardous Impurities  
(> 1% by weight):**

*Chemical name:* acid derivative

*Weight percentage:* 1.2

*Chemical name:* amine salt of acid derivative

*Weight percentage:* 3.9

**Maximum Content of Residual Monomers:** Exact details are claimed as confidential information. The total residual monomer content is below 1%.

**Additives/Adjuvants:** Exact details are claimed as confidential information.

*Chemical name:* Hydrocarbon solvent

*Weight percentage:* 30-60%

*Chemical name:* Zirconium oxide

*Weight percentage:* <5%

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

Solsperse HPA-10 will be used as a pigment dispersant, at up to 3%, in the formulation of coatings to be used in automotive and industrial applications (household appliances, drum coatings, pipelines, oil terminals, exterior coatings for beverage cans, aluminium and zincalume cladding) and in packaging gravure inks.

Solsperse HPA-10 will not be manufactured in Australia. It will be imported at 30 to 60% in hydrocarbon solvent as Solsperse 36600 in 20 L, 25 L and 200 L steel pails and drums.

Solsperse 36600 will be distributed to 10 to 20 coatings manufacturers throughout Australia.

### *Coatings Manufacture*

The coatings will be batch processed. Solsperse 36600 will be added to a blending mixer with pigment(s), resin and solvent and blended at high speed to produce a mill base. The mill base is pumped to a large mixing vessel where the remaining resin and additives are mixed in by direct pumping. The batch will be tested for quality control purposes and adjusted. Once the desired coating properties are achieved, the finished product is filtered, then packaged into steel pails and drums of 20 L and 200 L capacity, respectively.

### *Coatings Application*

The main uses for the coatings containing the notified polymer will be automotive and industrial. The coatings are likely to be used Australia-wide at up to 100 sites. The coatings will be applied by either spraying, roller coating or dipping. Each entails a heat curing period after the coating has been applied. The coatings will be applied in booths or factories with filtered exhaust ventilation systems, which should prevent fugitive loss of any polymer.

The inks will be used in flexographic printing units at approximately 20 sites in Australia.

Within Australia, the containers will be transported by either road or rail.

## 6. OCCUPATIONAL EXPOSURE

Workers who may receive exposure to the notified polymer include transport and storage workers, workers involved in coatings manufacture, coatings application and printers.

<i>Nature of Work Done</i>	<i>Number of Workers Exposed</i>	<i>Maximum Duration of Exposure: Hours per day/Days per year</i>
<b>Transport and Storage</b>	10	*/200
<b>Coatings Manufacture:</b>		
Mixing & dispersion;	40	4/30
Makeup;	40	2/30
QC testing;	10	8/30
Filtering and Packaging.	40	8/30
<b>Coatings Application:</b>		
addition to coater trays;	10	8/200
spray painting;	20	8/200
cleaning of equipment.	30	2/200
<b>Ink Application:</b>		
Addition to ink trough;	200	8/200
Cleaning of equipment.	200	8/200

\* data on hours per day was not provided.

### *Transport and Storage*

After importation, the notified polymer solution Solspers 36600, will be transported to the notifier's site and stored in original containers in a bonded licensed dangerous goods storage site. Repackaging is not envisaged. The products will be distributed to manufacturing sites by road. Both Solspers 36600 and reformulated products will be packed in steel pails or drums.

Transport and storage workers would only be exposed to the notified polymer in the case of an accident spill.

### *Coatings Manufacture*

Solsperse 36600 presents as a viscous, tacky liquid and following manual addition to a high speed shear mixer is blended with other ingredients. Spillages may occur during high speed dispersing, batch adjustment and testing. Occupational exposure to coatings formulations containing the notified polymer (at up to 3%) may occur through direct skin contact. All workers involved in the coatings manufacture process are required to wear personal protective equipment, namely impervious gloves, overalls and eye protection as a minimum. Exhaust ventilation is fitted in the formulation sites to capture volatiles at source. Inhalation exposure is unlikely given the viscous nature of the polymer.

The filtration and filling procedures are enclosed, automated systems. Skin contact is possible where operator attention is required if overfilling and spillage were to occur.

Waste polymer and formulations containing up to 3% polymer at formulation sites are collected and disposed of by licensed waste disposal contractors. Clean-up and maintenance workers may be exposed to residual paint products in the equipment.

### *Coatings Application*

There are three types of paint application for the products containing the notified polymer namely spray and roller coating and dipping.

Spray painting has a high potential for occupational exposure and about 50% of the polymer will be used in this manner. Typically the spray painter will measure out the components required in a particular formulation, including the pre-prepared paint containing the notified polymer, into an open container and pour this mixture into a spray gun. Spray painting operations and plant will be subject to the relevant spray painting legislation promulgated by the States and Territories. Spray painters wear personal protective equipment at all times; gloves and overalls while mixing the paint, and, in addition, a full face shield and respirator while spraying.

Roller coating application is usually performed in a booth like that used in spray painting. Aerosols are unlikely to be generated during roller coating. Painters will wear personal protective equipment including overalls, gloves and safety spectacles (or goggles) while mixing and applying the paint, and a cartridge respirator if volatile solvents are used.

Coating application by dipping into a large container or trough can be performed manually or by use of mechanical equipment. Painters do not manually insert individual objects into the paint. Usually, objects are fitted to a holder or frame lowered manually or automatically into the paint. Some splashing may occur during this process. Dipping applicators will wear overalls, gloves and eye protection.

Residual paint will be washed from the equipment manually, using recycled paint solvent, and the washings will be disposed of by solvent recyclers.

Once residual final paint mixture has dried, the notified polymer will be irreversibly bound within the cured matrix. It will not be separately available for either worker exposure, or dermal absorption.



### *Ink Application*

Ink application is an automatic process using the flexographic method. Skin exposure and splashes to the eye are possible during manual activities where workers transfer ink from drums to the ink troughs. The task is carried out with a pump, with workers connecting and disconnecting transfer lines, or by workers manually measuring the required amount.

Residual paint is usually washed from the equipment manually on a daily basis, using recycled paint solvent. The washings will be collected by solvent recyclers. Workers could be exposed to the notified polymer via skin contamination. Residues in the equipment will be small.

At the ink application sites, ventilation will be provided to control solvent concentrations below the relevant national occupational exposure standards. Both ink applicators and equipment cleaners will wear overalls, eye protection and gloves.

## **7. PUBLIC EXPOSURE**

Release to the environment may occur during transport and disposal of the notified polymer or products containing it. Any spills during transport are expected to be absorbed to a suitable material (e.g. sand) for disposal into landfill. Releases during manufacture of paints are expected to be contained within the manufacturing site prior to disposal into landfill. Waste Solsperse HPA-10, paint and ink products and containers holding residual product are likely to be disposed of into landfill. Drums containing residue may be cleaned by incineration prior to recycling.

Exposure of the general public as a result of manufacture, transport and disposal of the products containing Solsperse HPA-10 is assessed as being negligible. Paint and ink products containing Solsperse HPA-10 are to be used in a variety of industrial applications. Solsperse HPA-10 and products containing it will not be available to the public. The general public may make dermal contact with cured paint and ink products on automobiles and packaging products.

## **8. ENVIRONMENTAL EXPOSURE**

### **Release**

There is potential for loss of the polymer during coatings manufacture due to spills, drum residuals and equipment cleaning. Solvent is recovered from these combined waste streams and the solid sludge/residue will be disposed of to landfill. The notifier expects that annually 450 kg of solid residue will be generated after solvent recovery at coatings manufacturing plants. Solvent will be recovered via a distillation process. The notifier has indicated that approximately 250 kg per annum will be lost from equipment cleaning, 50 kg per annum from spills and up to 150 kg per annum as residues in empty containers.

Each method of coating application has a degree of loss of material. The notifier estimates that 42% (12.6 tonnes per annum) of the polymer will be used in the spray application. During spray painting the loss due to overspray has been given as 40% (5 tonnes/annum). A

further 42% of the polymer will be used for roller coating of cans and cladding. For roller application the loss has been given as 4%, a maximum of 250 kg per annum from equipment cleaning, 50 kg per annum due to spills and 200 kg per annum left as residues in empty paint cans.

Ink application will be a minor use for the polymer at up to 5 tonnes/annum. Expected losses of 6% (300 kg per annum), up to 150 kg per annum from equipment cleaning, 100 kg from spills and 50 kg left as residues in empty paint cans.

Therefore, 5.8 tonnes of waste will be generated annually from all the user sites combined. This waste will also be collected by licensed waste contractors and is likely to be disposed of to landfill.

### **Fate**

The final fate of the polymer will be the same as the coated article, that is, either recycled or sent to landfill. During the recycling process the coating (incorporating the polymer) will either be removed and become part of a solid/sludge waste that will go to landfill, incineration, or be destroyed during smelting of the metal. Incineration of the paint film would produce water vapour and noxious fumes of oxides of carbon and nitrogen, while the phosphorus component would become associated with ash or furnace slag.

The solid waste generated in the manufacturing, formulation and application of the coating will be disposed of to landfill. This includes the sludge formed after solvent recovery. Due to the high molecular weight and low water solubility of the polymer it would be expected to remain in the landfill site. If any of the polymer is accidentally released to the waterways or leaches from landfill, it would be expected to remain suspended in the water column until such time as it becomes associated with soils and sediments in river and creek beds or the ocean floor. Some may be removed during the sewage treatment process, although this cannot be estimated.

The notified polymer was found to be not readily biodegradable, exhibiting 45% degradation over the 28 day test period in a manometric respirometry test conducted in accordance with OECD TG 301 F (OECD 1995-1996) as determined from comparison of regular BOD measurements with the Chemical Oxygen Demand (COD) (Brixham Environmental Laboratory 1999). A summary report (Brixham Environmental Laboratory 1999) indicated that the polymer at a nominal concentration of 100 mg/L, and incubated with activated sludge bacteria, showed 28% degradation after 5 days, 39% degradation after 15 days rising to 45% after 28 days. Control experiments with the reference material acetate, indicated that the bacterial culture used was viable, and that the test results are valid. Since 60% degradation was not achieved after 28 days the polymer cannot be classified as readily biodegradable. However, since significant degradation was observed it may be ultimately degradable.

Although not readily biodegradable, the notified polymer released to landfill or aqueous sediments is expected to slowly degrade to water, carbonate and nitrate or ammonia. The acid functional component would be liberated and either remain in solution or associate with sediments as precipitated calcium phosphate.

The polymer is not expected to cross biological membranes due to its high molecular weight, and should not bioaccumulate (Connell DW 1989).

## 9. EVALUATION OF TOXICOLOGICAL DATA

The following toxicological investigations were conducted in facilities that complied with OECD Principles of Good Laboratory Practice, and based on methods that complied with OECD test guidelines and or EC Directive 92/69/EEC (OECD 1995-1996), European Commission 1992) unless otherwise indicated.

The notified polymer is identified in the study reports as Substance HPA10 (95.5% pure, waxy solid).

### 9.1 Acute Toxicity

#### Summary of the acute toxicity of Solsperse HPA-10.

<i>Test</i>	<i>Species</i>	<i>Outcome</i>
Acute oral toxicity	Rat	Discriminating dose > 2 000 mg/kg
Skin irritation	Rabbit	Slight irritant
Eye irritation	Rabbit	Very slight irritant
Skin sensitisation	Mouse	Not a moderate or strong sensitiser

#### 9.1.1 Oral Toxicity (Central Toxicology Laboratory 1999)

<i>Species/strain:</i>	Rat/Alpk:APfSD (Wistar derived)
<i>Number/sex of animals:</i>	5/sex
<i>Observation period:</i>	15 days
<i>Method of administration:</i>	2 000 mg/kg (dose volume 10 mL/kg) administered in deionised water by gavage.
<i>Test method:</i>	OECD TG 401 (fixed dose).
<i>Mortality:</i>	Nil
<i>Clinical observations:</i>	No signs of systemic toxicity.
<i>Morphological findings:</i>	No treatment related findings.
<i>Discriminating dose:</i>	> 2 000 mg/kg
<i>Result:</i>	The notified polymer was of very low acute oral toxicity to the rat.

### 9.1.2 Skin Irritation (Central Toxicology Laboratory 1999)

*Species:* Rabbit/New Zealand White

*Number/sex of animals:* 3 females

*Observation period:* 4 days

*Method of administration:* A single 4-hour occluded application of 500 mg of test substance to the intact shorn flank.

*Test method:* OECD TG 404; EC Method B4.

*Draize scores:*

<b><i>Time after treatment (hours)</i></b>	<b><i>Animal #</i></b>		
	<b><i>1</i></b>	<b><i>2</i></b>	<b><i>3</i></b>
<b><i>Erythema</i></b>			
1	<sup>a</sup> 0	1	1
24	0	1	1
48	0	1	0
72	0	1	0
<b><i>Oedema</i></b>		<i>All individual scores were zero</i>	

<sup>a</sup> see Attachment 1 for Draize scales

*Individual mean scores (24, 48, 72 hours):* Erythema: 0.0, 1.0, 0.3;  
Oedema: 0.0, 0.0, 0.0.

*Cutaneous reactions:* The very slight erythema (Grade 1) was observed in one animal for one day and in another animal for 3 days after application which had not resolved by the end of the observation period. There were no signs of oedema in any animal and no additional signs of irritation.

*Result:* The notified polymer was slightly irritating to rabbit skin.

### 9.1.3 Eye Irritation (Central Toxicology Laboratory 1999)

<i>Species/strain:</i>	Rabbit/New Zealand White
<i>Number/sex of animals:</i>	1 female
<i>Observation period:</i>	96 hours
<i>Method of administration:</i>	Not stated. However, the waxy solid fell out of the conjunctival sac immediately after dosing.
<i>Test method:</i>	OECD TG 405; EC Method B5
<i>Mean individual scores (24, 48, 72 hours):</i>	Chemosis: 0.0; Conjunctival redness: 0.0.
<i>Ocular response:</i>	Slight conjunctival redness (Grade 1) was observed at the one hour observation period, resolving by 24 hours. No other ocular responses were observed.
<i>Result:</i>	The notified polymer was very slightly irritating to rabbit eye.

### 9.1.4 Sensitisation potential – Mouse Local Lymph Node Assay (LLNA) (Central Toxicology Laboratory 1999)

<i>Species/strain:</i>	Mouse/CBA/Ca/Ola/Hsd
<i>Sex/Number of animals:</i>	Male, 4 per group
<i>Induction of T lymphocyte proliferation:</i>	<p>Day 1: 25 µl of 0%, 3% 10% or 30% w/v of test substance in acetone applied to the dorsal surface of each ear, daily for 3 consecutive days. Positive control animals were treated similarly substituting the test substance with 1%, 3% or 10% w/v of hexylcinnamaldehyde in acetone.</p> <p>Day 6: All animals were injected, via the tail vein, with 20 µCi of 3H-methyl thymidine. The draining auricular lymph nodes from each animal were removed and pooled in the respective dose groups.</p>
<i>Test method:</i>	OECD TG 406

<i>Concentration of Sample (w/v)</i>		<i>CPM/Lymph node (x10<sup>-2</sup>) <sup>3</sup>H-TdR</i>	<i>Test/Control Ratio*</i>
Test Substance:	0%	1.60	N/A
	3%	1.19	0.74
	10%	1.50	0.94
	30%	1.78	1.11
Positive control:	0%	1.19	N/A
	1%	1.98	1.66
	3%	3.87	3.25
	10%	7.96	6.69

A test/control ratio  $\geq 3.0$  indicates a positive LLNA result (prediction, a sensitiser);

A test/control ratio  $\leq 3.0$  indicates a negative LLNA result (prediction, unlikely to be a strong sensitiser).

*Comment:*

Evidence of induction of T-cell proliferation was not observed with the test substance as the incorporation of tritiated thymidine into the lymph node at each test concentration was less than 3-fold at all concentrations. The positive control was shown to have the capacity to cause skin sensitisation when applied at 3% or 10% w/v confirming the validity of the assay.

*Result:*

The notified polymer was not shown to be a moderate or strong sensitiser under the conditions of the test.

## 9.2 Genotoxicity

### 9.2.1 Bacterial Reverse Mutation Assay (Central Toxicology Laboratory 1999)

*Strains:*

*S. typhimurium*: TA 1535, TA 1537, TA 98, TA 100;  
*E. coli*: WP2P, WP2PuvrA.

*Auxillary metabolising system:*

Liver fraction (S9) from rats pretreated with phenobarbital and  $\beta$ -naphthaflavone.

*Concentration range:*

0, 100, 200, 500, 1 000, 2 500, 5 000  $\mu$ g/plate.  
Each concentration was tested in triplicate, with or without metabolic activation, in two independent experiments. Appropriate strain specific positive control reference substances were used.

<i>Test method:</i>	OECD TG 471 – plate incorporation (Experiment 1) and pre incubation (Experiment 2) methods; EC Method B13 & B14.
<i>Comment:</i>	<p>Precipitation was noted at 5 000 µg/plate in both experiments.</p> <p>Toxicity was observed at 2 500 µg/plate and above in Experiment 2 (without S9).</p> <p>There were no significant increases in revertant colony numbers at any concentration, in the presence or absence of metabolic activation. Concurrent positive controls used in the test induced marked increases in the frequency of revertant colonies and the activity of the S9 fraction was found to be satisfactory.</p>
<i>Result:</i>	The notified polymer was non mutagenic under the conditions of the test.

### 9.3 Overall Assessment of Toxicological Data

The notified polymer is of very low acute oral toxicity ( $LD_{50} > 2\,000$  mg/kg) in rats. Testing for irritant properties in rabbits shows it is a slight skin irritant and very slight eye irritant. Screening for skin sensitisation potential using the LLNA indicates that the polymer is unlikely to be a moderate to strong sensitiser. However, the OECD test guideline for skin sensitisation (406) recommends that negative findings in the LLNA be confirmed with adjuvant (guineapig maximisation test) or non-adjuvant type (Buehler test) testing. Confirmatory data was not provided for the polymer.

The notified polymer was non mutagenic in a bacterial test system.

Based on the available data, the notified polymer would not be classified as a hazardous substance under the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC 1999) for the toxicological end points investigated, excluding skin sensitisation. In the latter instance the data is inadequate to enable classification.

## 10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

A summary report only was provided for the following investigations (Brixham Environmental Laboratory 1999) on the notified polymer. The summary report indicates that the material identified as Substance HPA-10 was “poorly soluble” and that the toxicity results should be interpreted with caution. This comment does not appear to be consistent with the measured ready water solubility of 13 g/L (see Section 3), but no comments on this were provided.

### Summary of the acute ecotoxicity of Substance HPA-10.

<i>Test</i>	<i>Species</i>	<i>Results (nominal concentration)</i>
Acute Toxicity to Fish	Rainbow trout	LC <sub>50</sub> (96 h) >10 mg/L
	<i>Salmo gairdneri</i>	NOEC (96 h) >10 mg/L
Acute Toxicity to Fresh Water Invertebrates		EC <sub>50</sub> (48 h) >3.2 mg/L
	<i>Daphnia magna</i>	NOEC (48 h) >0.10 mg/L
Inhibition of Algal Growth	<i>Selenastrum</i>	EbC <sub>50</sub> (72 h) >3.2 mg/L
	<i>capricornutum</i>	ErC <sub>50</sub> (72 h) > 3.2 mg/L
Respiration Inhibition of Activated Sludge Bacteria	Activated sludge	EC <sub>50</sub> (3 h) > 100 mg/L
	bacteria	NOEC (3 h) = 100 mg/L

The data indicate that the notified polymer is moderately toxic to daphnia (EC<sub>50</sub> > 3.2 mg/L).

Any release of the notified polymer to the aquatic compartment will entail release of free amine component. Many amine containing compounds are significantly toxic to aquatic organisms and particularly so to algae. Toxicity tests on an amine component against algae (Verschuere K 1996) have shown it to be at least moderately toxic with the 72 hour EC<sub>50</sub> between 2.5 and 100 mg/L (depending on species). However, under normal circumstances release of this component (see above) is expected to be low and toxic effects anticipated to be correspondingly low.

## 11. ASSESSMENT OF ENVIRONMENTAL HAZARD

Once the paint/coating is applied, the polymer will be incorporated in an inert film and should not present a hazard. Any chips, flakes or fragments formed by mistreatment or general wear and tear will be inert. The paint will slowly deteriorate due to exposure to UV light and other abiotic processes, but this will be insignificant.

The majority of waste containing the polymer will be generated during the manufacture and use of the coatings. This waste will be disposed of to landfill, or by incineration. The polymer is unlikely to leach from landfill due to its solubility and likely affinity to soil. The majority of the polymer will be present within the cured inert coating matrix, and therefore unavailable for leaching. Although not readily biodegradable the polymer is likely to be ultimately degradable, and any released to the soil or water compartment is expected to be slowly mineralised to water, carbonate and phosphate.



The ecotoxicity data indicate that the polymer may be moderately toxic to daphnia (NOEC = 0.10 mg/L). It was tested at 10 and 3.2 mg/L against fish and algae, respectively. Toxicity at higher concentrations cannot be excluded.

The use pattern of the notified polymer should result in little release to the aquatic environment, and any release would be in a disperse manner. The amine component is toxic to algae and other aquatic species, but at the low anticipated release levels, toxic effects are expected to be low.

The environmental hazard resulting from the intended use and disposal of the notified polymer can be rated as low.

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

### *Hazard Characterisation*

The notified polymer is of very low acute oral toxicity to the rat and is slightly irritating to rabbit skin and very slightly irritating to rabbit eye. The notified polymer is unlikely to be a moderate to strong sensitiser to skin as evidenced by the findings in the local lymph node assay. However, confirmatory evidence that the notified chemical was non sensitising would be required as agents that induce a weak sensitisation reaction are unlikely to be detected by this assay. The notified polymer was non mutagenic in a bacterial test system.

Based on the available data, the notified polymer would not be classified as a hazardous substance under the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC 1999) for the toxicological end points investigated, excluding skin sensitisation. In the latter instance the data is inadequate to enable classification.

The notified polymer is imported in hydrocarbon solvent and in this form is known as Solperse 36600. Solperse 36600 presents as an aspiration hazard, because of the hydrocarbon solvent content, and is classified as hazardous under the *Approved Criteria for Classifying Hazardous Substances* (NOHSC 1999). The classification details are: Harmful (Xn), R65 – May Cause Lung Damage if Swallowed. Hydrocarbon solvents have skin defatting properties and may cause occupational dermatoses upon prolonged or repeated skin contact. Solperse 36600 is also classified (FORS 1998) as a Class 3 (Flammable Liquid) dangerous good for road and rail transport and is regulated as a Scheduled Poison-S5 (AHMAC 1999).

### *Occupational Health and Safety*

Exposure to the notified polymer may occur during coating manufacture and coating applications. During these processes where manual handling is required, exposure is most likely to occur from skin (predominantly) and eye contact with the notified polymer at 30 to 60% as it is incorporated into the coatings preparation during formulation, and from exposure to coatings preparations that contain the notified polymer at up to 3%. Exposure, and any potential for skin and eye irritation during formulation will be mitigated by the presence of engineering controls, such as closed systems and the requirement for workers to wear personal protective equipment, such as impervious gloves, overalls and eye protection. The

risk of skin and eye irritation from the notified polymer during coatings application and ink applications is considered negligible given that the polymer will be present at a maximum of 3%, the presence of *in situ* engineering controls and the requirement that personal protective equipment be worn.

#### *Public Health*

Exposure of the general public as a result of manufacture, transport and disposal of Solsperse HPA-10 and products containing it is assessed as negligible. Solsperse HPA-10 is not available for sale to the general public. Members of the public may make dermal contact with items such as automobiles or packaging products coated with products containing the notified polymer. However, the risk to public health from Solsperse HPA-10 will be negligible because Solsperse HPA-10 is bound within a cured coating or ink film, from which it is unlikely to be bioavailable.

### **13. RECOMMENDATIONS**

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

- Workers should receive regular instruction on good occupational hygiene practices in order to minimise personal contact, and contamination of the work environment with Solsperse 36600 and the products that contain it.
- Workers involved in coatings manufacture should be advised of the potential for occupational dermatoses following repeated skin exposure to Solsperse 36600 (containing hydrocarbon solvent) and to report any skin changes to the occupational health and safety officer at their workplace. When an occupational skin disease occurs, the employer should review work practices and opportunities for contact with the substance and instigate preventive measures to ensure other workers do not develop the same condition. Further guidance on preventing the occurrence of occupational skin diseases can be found in the NOHSC guide *Occupational Diseases of the Skin* (NOHSC 1990).
- Personal protective equipment should be used where exposure to Solsperse 36600 and the products that contain it occurs. Workers should be trained in the proper fit, correct use and maintenance of their protective gear. Guidance in the selection, personal fit and maintenance of personal protective equipment can be obtained from:

Protective eyewear:	AS 1336 (SAA 1994) AS/NZS 1337 (SAA/SANZ 1992).
Chemical impermeable clothing:	AS 3765.2 (SAA 1990).
Impermeable gloves:	AS 2161.2 (SAA/SANZ 1998).
Occupational footwear:	AS/NZS 2210 (SAA/SANZ 1994).

- Workplace practices and control procedures consistent with provisions of State, Territory and Commonwealth legislation based on the *National Model Regulations for the Control of Workplace Hazardous Substances* (NOHSC 1994) must be in operation if products containing the notified polymer are determined to be hazardous.
- Practical guidance on achieving a safe working environment for spray painting, and compliance with the provisions of State, Territory and Commonwealth legislation based on the *National Model Regulations for the Control of Workplace Hazardous Substances* (NOHSC 1994) and the *National Standard for Plant* (NOHSC 1994) can be found in *National Guidance Material for Spray Painting* (NOHSC 1999).
- A copy of the MSDS for Solsperse 36600 and the products that contain it should be easily accessible to employees.

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

The MSDS for Solsperse HPA-10 and Solsperse 36600 were provided in a format consistent with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC 1994).

This MSDS was provided by the applicant as part of the notification statement. It is reproduced here as a matter of public record (see end pages). The accuracy of this information remains the responsibility of the applicant.

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

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

## 16. REFERENCES

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## Attachment 1

The Draize Scale (Draize, 1959) for evaluation of skin reactions is as follows:

<i>Erythema Formation</i>	<i>Rating</i>	<i>Oedema Formation</i>	<i>Rating</i>
No erythema	0	No oedema	0
Very slight erythema (barely perceptible)	1	Very slight oedema (barely perceptible)	1
Well-defined erythema	2	Slight oedema (edges of area well-defined by definite raising)	2
Moderate to severe erythema	3	Moderate oedema (raised approx. 1 mm)	3
Severe erythema (beet redness)	4	Severe oedema (raised more than 1 mm and extending beyond area of exposure)	4

The Draize scale (Draize *et al.*, 1944) for evaluation of eye reactions is as follows:

### *CORNEA*

<i>Opacity</i>	<i>Rating</i>	<i>Area of Cornea involved</i>	<i>Rating</i>
No opacity	0 none	25% or less (not zero)	1
Diffuse area, details of iris clearly visible	1 slight	25% to 50%	2
Easily visible translucent areas, details of iris slightly obscure	2 mild	50% to 75%	3
Opalescent areas, no details of iris visible, size of pupil barely discernible	3 moderate	Greater than 75%	4
Opaque, iris invisible	4 severe		

### *CONJUNCTIVAE*

<i>Redness</i>	<i>Rating</i>	<i>Chemosis</i>	<i>Rating</i>	<i>Discharge</i>	<i>Rating</i>
Vessels normal	0 none	No swelling	0 none	No discharge	0 none
Vessels definitely injected above normal	1 slight	Any swelling above normal	1 slight	Any amount different from normal	1 slight
More diffuse, deeper crimson red with individual vessels not easily discernible	2 mod.	Obvious swelling with partial eversion of lids	2 mild	Discharge with moistening of lids and adjacent hairs	2 mod.
Diffuse beefy red	3 severe	Swelling with lids half-closed	3 mod.	Discharge with moistening of lids and hairs and considerable area around eye	3 severe
		Swelling with lids half-closed to completely closed	4 severe		

### *IRIS*

<i>Values</i>	<i>Rating</i>
Normal	0 none
Folds above normal, congestion, swelling, circumcorneal injection, iris reacts to light	1 slight
No reaction to light, haemorrhage, gross destruction	2 severe