

File No: NA/801

January 2001

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**Disperbyk-180**

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act* 1989 (the Act) and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the National Occupational Health and Safety Commission which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Department of the Environment and the assessment of public health is conducted by the Department of Health and Aged Care.

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**FULL PUBLIC REPORT****Disperbyk-180****1. APPLICANT**

Nuplex Resins (Aust) Pty Ltd (ACN 000 045 572) of 49 –61 Stephen Rd BOTANY NSW 2019 has submitted a limited notification statement in support of their application for an assessment certificate for Disperbyk-180.

**2. IDENTITY OF THE CHEMICAL**

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

**Other Names:** BYK-LP N 6364

**Marketing Name:** Disperbyk-180

**Molecular Weight:**

**Number-Average  
Molecular Weight (NAMW):** > 1 000

**Weight-Average  
Molecular Weight:** > 1 000

**Maximum Percentage of Low  
Molecular Weight Species**

**Molecular Weight < 500:** 0%  
**Molecular Weight < 1 000:** 30 – 40%

**Method of Detection and  
Determination:** Infrared (IR) spectroscopy.

**Spectral Data:** An IR spectrum was provided.

**3. PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance at 20°C & 101.3 kPa:** Yellow liquid.

<b>Boiling Point:</b>	> 200°C
<b>Specific Gravity:</b>	1.08 (see notes below)
<b>Vapour Pressure:</b>	< 1 mbar (estimated-see notes below)
<b>Water Solubility:</b>	Soluble (see notes below).
<b>Partition Co-efficient (n-octanol/water):</b>	$\log P_{ow} = 3.3$ (estimated-see notes below)
<b>Hydrolysis as a Function of pH:</b>	Not determined (see notes below)
<b>Adsorption/Desorption:</b>	$\log K_{oc} = 0.89$ (estimated-see notes below)
<b>Dissociation Constant:</b>	Not determined (see notes below).
<b>Flash Point:</b>	> 100°C
<b>Flammability Limits:</b>	Does not form flammable vapours.
<b>Autoignition Temperature:</b>	Not determined.
<b>Explosive Properties:</b>	Not expected to be explosive.
<b>Reactivity/Stability:</b>	Stable under normal conditions of use.

### 3.1 Comments on Physico-Chemical Properties

No test reports for any of the Physico-Chemical properties were provided by the notifier. Estimated values were given for the boiling point, specific gravity, vapour pressure and water solubility but none of these values were substantiated in any direct way by test results or reports and the notifier claims that no information could be sourced on analogue polymers.

The notifier claims that the notified polymer should not be volatile as indicated by the structure and relatively high boiling point.

The polymer is expected by the notifier to have 'complete' solubility based on the structural properties of polyphosphoric acid esters. Also present is a soluble polyethylene glycol chain and a cationic counter-ion from the phosphate salt.

The notifier indicates that the polymer contains ester groups that could be expected to undergo hydrolysis but no measurements were performed.

The notifier has provided calculated estimations (Lyman et al, 1982) for partition coefficient and adsorption/desorption values based on equations for oligomeric phosphate esters. However, these methodologies are of limited use in cases such as this where the notified

polymer is more complex than the basic structures used to derive the estimated values and the estimates may differ greatly from the actual values. In the case of the partition coefficient, the equation used " $\log K_{ow} = (12.90 - \log 0.089 \times 10^6)/2.38$ " would seem inappropriate and to significantly overestimate the octanol solubility.

The high water solubility suggests the chemical would be associated with the aqueous phase. The estimated  $\log K_{oc}$ , using a more appropriate equation " $\log K_{oc} = -0.55 \log S + 3.64$ " (used for organophosphorus pesticides) indicates that the polymer would not be expected to associate with soil and sediment but to remain mobile in the aquatic compartment.

No dissociation constant has been provided. The polymer is a phosphate salt and would be expected to dissociate in water.

#### 4. PURITY OF THE CHEMICAL

<b>Degree of Purity:</b>	The notifier states that the purity is unknown. From the levels of residual monomers and additives, a range from 89.3 to 100% can be deduced.
<b>Hazardous Impurities:</b>	No hazardous impurities whose identity is required to be disclosed.
<b>Non-hazardous Impurities (&gt; 1% by weight):</b>	One residual monomer at a maximum concentration of 5%.
<b>Maximum Content of Residual Monomers:</b>	5.5%

#### 5. USE, VOLUME AND FORMULATION

The notified polymer is used in automotive enamel paints to stabilise fillers against settling, for deaeration and for levelling to achieve a smooth finish. It is used to a lesser extent in a two-part epoxy coating for concrete floors.

The notified polymer is formulated in enamel paints at a final concentration of 1.5% and is present in the floor coating Sikafloor-261 Part A at a concentration of 0.1%. Import volumes for the automotive paints will be up to 1 tonne in the first year increasing to 3 – 5 tonnes by the fifth year. For the floor coating, less than 100 kg per year will be imported for use in the manufacture of the finished product.

#### 6. OCCUPATIONAL EXPOSURE

##### **Automotive enamel paints**

The paints are manufactured initially by one of the large paint formulators in a purpose built facility and later by another large paint formulator also in a purpose built facility.

### *Import, transport and storage*

The notified polymer is imported in 25 L closed-head (bung-top) steel pails. Three workers transport the containers by road to the customer's site. Exposure can occur in the event of accidental rupture of the pails.

### *Manufacture of paints*

During paint manufacture, 21 workers potentially may be exposed each for 4 hours per day for 200 days per year. Initially, a weigh up operator opens the 25 L pail and pours the notified polymer into a 20 L container. The weighing is conducted under local exhaust ventilation and the operator wears gloves, overalls and safety goggles. These precautions, together with the non-volatile nature of the polymer make inhalation exposure unlikely. The 20 L container is sealed and transported to the manufacturing floor where the contents are transferred under extraction to an enclosed mixing vessel containing solvent and pigment. There is potential for spillage during decanting and occupational exposure to the notified polymer may occur, predominantly via the skin. To control exposure to the skin workers wear impervious gloves, coveralls and goggles. At this stage the concentration of the polymer in the millbase is a maximum of 10%. The millbase is drummed off into 200 L drums until paint manufacture occurs.

Blending, filtration and storage of final paints in 200 L drums are conducted under local exhaust ventilation. The dilution of the polymer with other paint ingredients, the non-volatile nature of the polymer and the engineering controls used to limit exposure makes inhalation exposure unlikely. However, as during manufacture of the millbase, there is the potential for spillage during decanting and mixing procedures and occupational exposure to the notified polymer may occur, predominantly via the skin. To control this exposure, workers will wear impervious gloves, anti-static coveralls, anti-static footwear and eye protection conforming to the relevant Australian Standards.

### *Laboratory testing*

For the manufacture and testing of paint during laboratory development, 3 workers may be exposed each for 8 hours per day for 20 days per year. Quality control testing during actual paint production involves 3 workers for 4 hours/day, 200 days per year. Worker exposure to the notified polymer and other paint ingredients in the laboratory environment is controlled through the use of ventilated fume cupboards and personal protective equipment consisting of coveralls/laboratory coats, impervious gloves and eyewear.

### *End use (paint application)*

The final paint coating will be sold and shipped in 200L drums by road transport to 2 customer sites where the coating will be applied by manual and automatic electrostatic atomised spray application techniques. At these sites the notifier has identified a total of 18 workers involved in adding the final paint coating to an open circulation tank who are potentially exposed for 2 hours per day for 200 days per year. For hand spray painting, 60 workers each spending 8 hours per day for 200 days per year are expected to be involved in applying the coating and 18 workers for 2 hours per day for 200 days per year will be involved in cleaning spray equipment. Given transfer efficiencies of approximately 35% and 80% for manual and automatic electrostatic spray application respectively, it is at this point of manual application and cleaning of spray equipment that occupational exposure to the notified polymer (at up to 1.5% w/w) and polymer solvents may be considered most likely. An estimated 90% notified polymer used in automotive paints will be applied by automatic

methods and 10% by manual spray gun.

The spray painters who potentially will be exposed to the notified polymer will be fully TAFE trained and coating of automobile components will be conducted in laminar flow downdraft spray booths which are designed to rapidly remove aerosol particles and solvent vapour from the atmosphere. Several possible booth designs may be used. In a dry floor booth, overspray will be collected in filters contained in the floor of the booth and any unremoved particulates will reach the exhaust stack with the solvent vapours. In a wet floor booth, overspray will collect in a pool of water below the grill floors or in a wet scrubber in the exhaust and will be removed in a filter. The residual solids will be disposed of to secure landfill. The spray booths are subject to Australian/New Zealand Standards (AS/NZS/4114.1: 1995 Spray Painting Booths – Design, Construction and Testing (Standards Australia/Standards New Zealand, 1995a) and AS/NZS/4114.2: 1995 Spray Painting Booths – Selection, Installation and Maintenance (Standards Australia/Standards New Zealand, 1995b).

Spray painters will wear personal protective equipment consisting of impervious nylon overalls, calico hoods, cartridge type respirators and nylon gloves conforming to the relevant Australian Standards.

After application of the paint coating, the automotive components are heated to cure the coating to form a stable film. After this stage, the notified polymer is essentially immobilised within a resin matrix and not available for exposure to workers.

### **Concrete Floor coating**

The notified polymer will be imported in 20 L open head pails. It is to be incorporated into part A of the concrete floor coating at a level of 0.1% w/w.

Manufacturing will be conducted by a single company at a single site. The 20 L pails will be transported by road by 5 – 10 workers working 3 – 12 hours/day, 12 days per year. Exposure may occur in the event of accidental rupture of the pails.

Four to 8 workers will be involved in manufacturing part A of the coating, 10 – 20 workers in warehousing (75 days per year, 2 hours per day) and 20 workers in distribution.

Manufacture is conducted using 2 kg of the notified chemical in a batch of 2 000 kg containing reactive epoxy resin, fillers, diluents and additives. For each batch, the 2 kg of notified polymer is weighed out into a 4 L tinplate can then poured into the mixing vessel by workers wearing a respirator, safety goggles, PVC gloves and overalls. Although the additions and cleaning of containers are conducted under local exhaust ventilation, inhalation exposure would be expected to be low in any case for reasons outlined previously. Dermal exposure is possible during decanting but should be controlled by the use of personal protective equipment.

Once the notified polymer is incorporated into the coating, exposure should be negligible given its very low concentration (0.1%).

## **7. PUBLIC EXPOSURE**

Public exposure to the notified polymer is only likely after enamel paint has been applied to the exterior of car bodies or floor coating has been applied to concrete floors. Although, in each case, there may be dermal contact, there is negligible potential for exposure of the public to the notified polymer since it is strongly bound in films.

## **8. ENVIRONMENTAL EXPOSURE**

### **8.1 Release**

#### *Automotive Coating*

There is potential for loss of the notified polymer during reformulation due to spills, drum residues and equipment cleaning. The notifier expects these losses to be low as the rinsates from the import drums and equipment cleaning will be reused in the following batches and any spills will be contained by the plant bunding and collected for disposal. The total estimated waste for the reformulation process is estimated to be 50 kg/annum. This waste will be treated on-site by the “Dusol” process, where the solids are separated out, then collected by licensed waste contractors for incineration.

Each method of spray paint application used at the customer sites (automated and manual) has a degree of loss of material. The notifier estimates that the average transfer efficiency will be 75% for the combined methods ie, approximately 25% of the paint/polymer (up to 1.25 tonnes/annum at maximum import quantity) will be lost as overspray. The notifier estimates that the further losses will be 50 kg/annum from equipment cleaning, up to 50 kg/annum left as residues in the ‘empty’ paint drums and though the losses for spills are not given it can be estimated that up to 50 kg/annum due to spills would be expected. This waste will also be collected by licensed waste contractors for incineration.

#### *Floor Coating*

During the reformulation process of the floor coating product release of the polymer may occur from spills and equipment cleaning. The notifier estimates the release volume from this use of the polymer will be 1% of the total volume used (up to 0.5 kg/annum).

No information was given by the notifier on how the coating will be applied to the concrete floors but any of the common application methods (roller, mop or brush) can be assumed to have approximately the same release volume (< 1%) and route of disposal, ie. washing down the drain with large volumes of water. This release would most likely be very disperse.

### **8.2 Fate**

The waste polymer produced during the manufacture and application process should be disposed of by incineration where it will be destroyed producing water, carbon dioxide and nitrogen oxides. It is likely that any particles of cured material released would be immobile due to the very high molecular weight and inert characteristics.



The very small amount of polymer released to waterways from the floor coating process and any polymer emulsion accidentally released to water would remain mobile until it slowly associates with the organic components of the sediments present on the beds of the waterways and is slowly broken down by natural processes. Any polymer waste disposed of to landfill may be mobile while in its uncured state and may leach until the polymer slowly binds to the organic component of the soils and sediments.

Once applied to the metal panels of motor vehicles the notified polymer will be incorporated in a hard, durable, inert film and will not present a significant hazard. Any fragments, chips and flakes of the lacquer 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 placed into landfill at the end of their useful life. During steel reclamation the polymer would be incinerated in the blast furnaces and converted to water vapour and oxides of carbon and nitrogen.

The inert coating product containing the notified polymer applied to the concrete floors would be expected to remain associated with the concrete floor until the end of its useful life when the concrete would likely be broken up and disposed of to landfill with other demolition waste. The polymer would be unlikely to leach from landfill as it would be in its cured state and remain inert.

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

## 9. EVALUATION OF TOXICOLOGICAL DATA

### 9.1 Acute Toxicity

#### Summary of the acute toxicity of Disperbyk-180

<i>Test</i>	<i>Species</i>	<i>Outcome</i>	<i>Reference</i>
acute oral toxicity	rat	LD <sub>50</sub> = 3 850 mg/kg	Dickhaus and Heisler (1993a)
skin irritation	rabbit	Not irritant	Dickhaus and Heisler (1993b)
eye irritation	rabbit	Not irritant	Dickhaus and Heisler (1993c)

#### 9.1.1 Oral Toxicity (Dickhaus and Heisler, 1993a)

*Species/strain:* Rat/Wistar.

*Number/sex of animals:* 5/sex for the 2, 3 and 4 g/kg dose groups; 3/sex for the 5 g/kg dose group.

*Observation period:* 14 days.

<i>Method of administration:</i>	Oral (gavage). Vehicle: 0.25% tylose.
<i>Test method:</i>	OECD TG 401
<i>Mortality:</i>	No animals in the 2 g/kg dose group; 1 male in the 3 g/kg dose group; 2 males/1 female in the 4 g/kg dose group and all animals in the 5 g/kg dose group.
<i>Clinical observations:</i>	Some apathy was observed in the first 4 hours in the 2 g/kg dose group. The 3 g/kg dose group exhibited some tremors for the first 10 hours and convulsions, apathia, ataxia and a slow recovery over 4 days was noted. The male decedent died after 6 days following cachexia and apathia. One other animal exhibited cachexia. In the 4 g/kg dose group tremor, some tonic-clonic convulsions and very bad condition were exhibited within the first 4 hours. Three animals died within 6 days and two others exhibited indications of cachexia. All animals in the 5 g/kg dose group died within hours of administration of the test substance.
<i>Morphological findings:</i>	No pathological changes could be clearly attributed to the notified polymer.
<i>LD<sub>50</sub>:</i>	3 850 mg/kg
<i>Result:</i>	The notified polymer was of very low acute oral toxicity in rats.

#### **9.1.2 Skin Irritation (Dickhaus and Heisler, 1993b)**

<i>Species/strain:</i>	Rabbit/NZW.
<i>Number/sex of animals:</i>	3/sex unspecified.
<i>Observation period:</i>	7 days.
<i>Method of administration:</i>	0.5 mL of test substance under (possibly) semi-occlusive dressing for 4 hours.
<i>Test method:</i>	OECD TG 404
<i>Comment:</i>	No erythema or oedema was observed in any animal at any time point (1 hour; 1, 2, 3 or 7 days post-treatment).
<i>Result:</i>	The notified chemical was not irritating to the skin of rabbits.

#### **9.1.3 Eye Irritation (Dickhaus and Heisler, 1993c)**

*Species/strain:* Rabbit/NZW.

*Number/sex of animals:* 3/sex unspecified.

*Observation period:* 7 days.

*Method of administration:* 0.1 mL in the conjunctival sac of the left eye of each animal.

*Test method:* OECD TG 405

*Draize scores of unirrigated eyes:*

	<i>Time after instillation</i>														
<i>Animal</i>	<i>1 hour</i>			<i>2 hours</i>			<i>4 hours</i>			<i>8 hours</i>			<i>24 hours</i>		
<i>Cornea</i>	No score above zero.														
<i>Iris</i>	No score above zero.														
<i>Conjunctiva</i>	<i>r</i>	<i>c</i>	<i>d</i>	<i>r</i>	<i>c</i>	<i>d</i>	<i>r</i>	<i>c</i>	<i>d</i>	<i>r</i>	<i>c</i>	<i>d</i>	<i>r</i>	<i>c</i>	<i>d</i>
1	1	1	2	2	2	2	2	2	1	2	1	1	1	0	1
2	1	1	2	2	1	1	2	1	1	2	1	1	1	0	0
3	1	1	2	2	2	2	2	2	1	2	1	1	1	0	1

<sup>1</sup> see Attachment 1 for Draize scales  
r = redness    c = chemosis    d = discharge

*Comment:* No scores above zero from day 2 to day 7 were observed for cornea, iris or conjunctiva in any animal.

*Result:* The notified polymer was a slight irritant to the eyes of rabbits.

## 9.2 Overall Assessment of Toxicological Data

The notified polymer was of very low acute oral toxicity in rats (LD<sub>50</sub> = 3 850 mg/kg), was not a skin irritant in rabbits and was a slight eye irritant in rabbits.

The notified polymer is not determined to be a hazardous substance according to NOHSC *Approved Criteria for Classification of Hazardous Substances* (National Occupational Health and Safety Commission, 1999a) in relation to the toxicological data provided.

## 10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided.

## 11. ASSESSMENT OF ENVIRONMENTAL HAZARD

The majority of waste containing the polymer (up to 1.5 tonnes/annum) will be generated

during the manufacture and use of the coatings. This waste will be disposed of by incineration, producing water, carbon dioxide and nitrogen oxides. If landfill is used as an alternative, some of the polymer may leach due to its solubility. However, the majority of the polymer will be in the form of overspray from the automotive application and will be present within the cured inert coating matrix, and unavailable for leaching.

Once applied to the metal panels of motor vehicles the notified polymer will be incorporated in a hard, durable, inert film and will not present a significant hazard. Any fragments, chips and flakes of the lacquer 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 placed into landfill at the end of their useful life. During steel reclamation the polymer would be incinerated in the blast furnaces and converted to water vapour and oxides of carbon and nitrogen.

The inert coating product containing the notified polymer applied to the concrete floors would be expected to remain associated with the concrete floor until the end of its useful life when the concrete would likely be broken up and disposed of to landfill with other demolition waste. The polymer would be unlikely to leach from landfill as it would be in its cured state and remain inert.

Given the above, environmental exposure and the overall environmental hazard is expected to be low.

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

### **Hazard assessment**

The notified polymer is of very low acute oral toxicity in rats, is not a skin irritant in rabbits and is a slight eye irritant in rabbits. It is not determined to be a hazardous substance according to NOHSC *Approved Criteria for Classification of Hazardous Substances* (National Occupational Health and Safety Commission, 1999a). The notified polymer has a molecular weight greater than 1 000, and a high percentage of molecular weight species between 500 and 1 000. Passage across biological membranes for the latter is possible but would be slow. There is a high level of residual monomers. However, only one is identified as a hazardous substance (a severe skin irritant) but is of insufficient concentration to render the polymer a hazardous substance under NOHSC *Approved Criteria for Classification of Hazardous Substances* (National Occupational Health and Safety Commission, 1999a). Overall, the notified polymer is not considered hazardous to health.

### **Occupational health and safety**

The notified polymer is imported in 25 L closed-head (bung-top) steel pails by road to the customer's site. Exposure is possible in the event of accidental rupture of the pails.

The notified polymer is used in the manufacture of automotive enamel paints and a concrete floor coating.

During paint manufacture the notified polymer is first weighed out into a 20 L drum under

local exhaust ventilation, mixed with solvent and pigment to a concentration of up to 10% in a closed vessel, drummed off in 200 L drums and stored. The resultant product is introduced into a closed vessel for mixing into paint under local exhaust ventilation and the paint is drummed off into 200 L drums for distribution. Inhalation exposure is unlikely during these operations due to the non-volatile nature of the polymer and the use of local exhaust ventilation. There is potential for spillage when adding the polymer or polymer/pigment solution to mixing vessels. To control exposure to the skin, workers wear impervious gloves, goggles and coveralls. These precautions coupled with the likely low hazard of the notified polymer means that there is a low risk of adverse health effects to paint manufacturing workers. As drumming off is automatic and conducted under local exhaust ventilation, there is little risk of health effects to workers at this stage.

Laboratory testing during paint development or production should involve small samples and is conducted in ventilated fume cupboards. This together with the wearing of laboratory coats, gloves and eyewear is expected to minimise the risk of health effects to workers.

During spray painting procedures, worker exposure will be limited through a combination of engineering controls such as laminar spray booths and personal protective equipment consisting of impervious nylon overalls, calico hoods, cartridge type respirators and nylon gloves. Under these circumstances, given the likely low hazard of the notified polymer and the equipment used to control exposure, the health risk is considered low.

It should be noted that the final applied paint products, for which a typical MSDS was supplied by the notifier, contain potentially hazardous solvents and that appropriate measures are expected to be taken to control of exposure to these components. These solvents have NOHSC exposure standards (National Occupational Health and Safety Commission, 1995). Thus, it is important that the final paint is applied and overspray controlled in a manner described in for example the *NOHSC Spray Painting Guidance Material* (National Occupational Health and Safety Commission, 1999b) and that employers ensure that airborne exposure is maintained below the exposure standards for these solvents in the workplace. These standards are as follows: n-butyl acetate, 150 ppm TWA, 200 ppm STEL; xylene, 80 ppm TWA, 150 ppm STEL; n-butanol, 50 ppm TWA; propylene glycol monomethyl ether, 100 ppm TWA, 150 ppm STEL. The NOHSC *List of Designated Hazardous Substances* (National Occupational Health and Safety Commission, 1999c) lists xylene and n-butanol as flammable. In addition xylene would render the paints harmful by inhalation and in contact with the skin. Although n-butyl acetate is not listed in the NOHSC *List of Designated Hazardous Substances* ((National Occupational Health and Safety Commission, 1999c), the ACGIH TLV recommendation was based on human observation of eye, nose and throat irritation.

Following curing of the paint, the polymer will be cross-linked with other paint components to form a high molecular weight stable film. In this form, the polymer is essentially unavailable for absorption and thus the health risk to workers from the notified polymer after paint curing would be negligible.

Manufacturing of the floor coating will be conducted by a single company. The notified polymer is imported in 20 L open-head steel pails by road to the customer's sites. Exposure is possible in the event of accidental rupture of the pails.

Each batch of coating involves the addition of a small amount (2 kg) of the notified polymer

to an enclosed mixing vessel under local exhaust ventilation. As the weighing out and addition is conducted by workers wearing respirator, safety goggles, PVC gloves and overalls, inhalation and dermal exposure should be negligible and the health risk low. Once the polymer is mixed in the coating at a concentration of 0.1% subsequent exposure of workers during drumming off and applying the coating to concrete floors should be negligible and the health risk low. However, components of the manufactured coating, Sikafloor 261 Component A, are listed on the NOHSC *List of Designated Hazardous Substances* (National Occupational Health and Safety Commission, 1999c) and render the coating hazardous. Diglycidyl ether of bisphenol A renders the coating irritating to skin and eyes and sensitising to skin. Glycidyl ether of C<sub>12</sub>-C<sub>14</sub> alcohols also renders the coating sensitising to skin. Following mixing of the coating, drum filling is conducted under local exhaust ventilation and the workers wear a respirator, safety goggles, PVC gloves and overalls to control the risk of irritation or sensitisation. Under these circumstances the risk should be controlled. Few details about the method of application were provided except that the coating would be used on factory floors or outdoor areas and that, typically, a half-face respirator, impervious gloves, goggles and overalls would be worn to control the risk of irritation or sensitisation.

## **Public Health**

The public can potentially come into contact with the notified polymer in the event of accidental spillage during transport and when it is a component of a hard film on automobiles or concrete floors. The risk to public health arising from these scenarios is expected to be very low.

## **13. RECOMMENDATIONS**

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

- The paints containing the notified polymer should be applied in accordance with the National Guidance Material for Spray Painting (National Occupational Health and Safety Commission, 1999b);
- Employers should ensure that NOHSC exposure standards for all of the components of the final paint mix are not exceeded in the workplace;
- Safety goggles should be selected and fitted in accordance with Australian Standard (AS) 1336 (Standards Australia, 1994) to comply with Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992); industrial clothing should conform to the specifications detailed in AS 3765.2 (Standards Australia, 1990); impermeable gloves should conform to AS/NZS 2161.2 (Standards Australia/Standards New Zealand, 1998); all occupational footwear should conform to AS/NZS 2210 (Standards Australia/Standards New Zealand, 1994);
- Spillage should be avoided. Spillage should be cleaned up promptly with absorbents which should 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 polymer are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (National Occupational Health and Safety Commission, 1999a), workplace practices and control procedures consistent with State and territory hazardous substances regulations must be in operation.

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

The MSDS for the notified polymer and products containing it were provided in a format consistent with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (National Occupational Health and Safety Commission, 1994).

These MSDS were provided by the applicant as part of the notification statement. They are reproduced here as a matter of public record. The accuracy of this information remains the responsibility of the applicant.

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

Under the Act, 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 chemical may be required. No other specific conditions are prescribed.

#### **16. REFERENCES**

Connell D W (1989) General characteristics of organic compounds which exhibit bioaccumulation. In Connell DW, (Ed) *Bioaccumulation of Xenobiotic Compounds*. CRC Press, Boca Raton, USA.

Dickhaus, S and Heisler, E (1993a) Acute Toxicological Study of Compound BYK-LP N 6364 after One Oral Application. Project No. 4-117-93. Pharmatox GmbH, Germany.

Dickhaus, S and Heisler, E (1993b) Irritant Effects of BYK-LP N 6364 on Rabbit Skin Acc. to Draize. Project No. 3-118-93. Pharmatox GmbH, Germany.

Dickhaus, S and Heisler, E (1993c) Irritant Effects on Compound BYK-LP N 6364 on Rabbit Eye. Project No. 3-119-93. Pharmatox GmbH, Germany.

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.

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.

National Occupational Health and Safety Commission (1999a) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1999b) List of Designated Hazardous Substances [NOHSC:10005(1999)]. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1999c) National Guidance Material for Spray Painting. Australian Government Publishing Service, Canberra.

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.

Standards Australia/Standards New Zealand (1992) Australian/New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994) Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1998) Australian/New Zealand Standard 2161.2-1998, Occupational protective gloves, Part 2: General requirements. Standards Association of Australia/Standards Association of New Zealand.



## 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

Draize, J. H., Woodward, G., Calvery, H. O. (1944) Methods for the Study of Irritation and Toxicity of Substances Applied Topically to the Skin and Mucous Membranes, *J. Pharmacol. Exp. Ther.* 82 : 377-390.

Draize J. H. (1959) Appraisal of the Safety of Chemicals in Foods, Drugs and Cosmetics. Association of Food and Drug Officials of the US, 49 : 2-56.