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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in Disperbyk-2001

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Ι	Director					
(Chemicals N	lotification a	nd Assessmer	ıt		

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FULL PUBLIC REPORT

Polymer in Disperbyk-2001

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANTS Nuplex Industries (Aust) Pty Ltd 49-61 Stephen Road Botany NSW 2019

ABN: 25 000 045 572

PPG Industries Australia Pty Ltd McNaughton Road Clayton Victoria 3168

ABN: 82 055 500 939

NOTIFICATION CATEGORY

Limited: Polymer with NAMW ≥ 1000 (greater than 1 tonne per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data, purity, Hazardous and Non-hazardous Impurities, Additives/Adjuvants, Identity and composition of the chemical.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT) No variation to the schedule of data requirements is claimed.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S) None.

NOTIFICATION IN OTHER COUNTRIES
The notified chemical is sold in Europe as BYK-LP N 6971

2. IDENTITY OF CHEMICAL

OTHER NAME BYK-LP N 6971

Marketing Name Disperbyk-2001

3. COMPOSITION

DEGREE OF PURITY HIGH

HAZARDOUS IMPURITIES/RESIDUAL MONOMERS None

DEGRADATION PRODUCTS

The polymer crosslinks with other paint components to form a very high molecular weight and stable paint film. Under extreme heat conditions, for example, fire, the paint film containing the polymer would burn emitting noxious fumes including oxides of carbon, nitrogen and phosphorous.

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES

There is no loss of monomers, additives or impurities during the life of the coating on the motor vehicle.

4. INTRODUCTION AND USE INFORMATION

Mode of Introduction of Notified Chemical Over Next 5 Years

The notified polymer will not be manufactured in Australia, but will be imported from Germany as a component in Disperbyk-2001.

MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL OVER NEXT 5 YEARS

Year	1	2	3	4	5
Tonnes	5	5	5	5	5

USE

Disperbyk-2001, containing the notified polymer, is a wetting and dispersing additive for solvent-based coatings and pigment concentrates. It will be used at less than 6% in paint formulations, mostly for automotive use.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, transport and storage

PORT OF ENTRY Sydney and Melbourne

IDENTITY OF MANUFACTURER/RECIPIENTS
PPG Industries Australia Pty Ltd
McNaughton Road
Clayton
Victoria 3168

TRANSPORTATION AND PACKAGING

The notified polymer will be imported as a component of a Disperbyk-2001 wetting agent in 200 L approved steel drums. The product will be stored in the warehouse. Coatings (paint) will be manufactured by a variety of companies located throughout Australia. The formulated coating will be stored and transported in 20 L steel pails or 200 L steel drums. Transport will be by road.

5.2. Operation description

The polymer will be used as an ingredient of automotive paints.

For the manufacture of paints, the polymer solution will be blended with other ingredients to make the final paint product. Workers will connect a vacuum hose line to the drums from which the polymer solution is emptied into a blending vessel. Other ingredients are then added to the vessel. Blending generally occurs in a closed automated system with dedicated transfer lines to minimise the potential for occupational exposure.

Occasionally, coatings manufacture may occur in batch mixers where addition of polymer solution is semi-automated. Blending equipment is fitted with exhaust ventilation systems and there is a regular maintenance programme in place to control airflow levels at regular intervals.

The blended product is sampled for laboratory analysis. The finished product will be packaged into

20 L steel pails or 200 L steel drums and distributed through wholesalers to spray painting/smash repair businesses, who are the main end-users. Filtration, drum and pail filling are automated processes and worker intervention is not required unless the filling line requires adjustment.

At the application sites, the paint will be mixed with other components of the coating system and applied in spray booths to motor vehicles. There is potential for the product to be used at up to 2000 sites in Australia.

After the coating is complete, the spray gun and lines will be emptied and any residual paint will be placed into "paint waste" drums for recycling. The spray gun is then cleaned at an earthed recycled solvent wash station. The spray equipment is then cleaned and ready for the next job.

The industrial coatings may also be applied by roller or dipping into trays.

5.3. Occupational Exposure

Number and Category of Workers

Category of Worker	Number	Exposure Duration	Exposure Frequency per Yr
Transport and warehousing	500	1 hours/day	240 days/year
Paint Manufacturing			
High speed dispersing	40	4 hours/day	30 days/year
Make-up	40	2 hours/day	30 days/year
Quality Control	10	8 hours/day	30 days/year
Filling into containers	40	8 hours/day	30 days/year
Paint Application			
Thinning and application of paint	6000	4 hour/day	220 days/year
and cleaning of spray equipment		-	

Exposure Details

Transport and storage

Exposure to the notified polymer is not expected during the importation, warehousing or transportation of the notified polymer solution or the paint product except in cases where the packaging is accidentally breached.

Paint Manufacture (Blending)

Workers will connect a vacuum hose line to the drums from which the polymer solution is pumped to the blender. Skin contact with splashes, drips and spills may occur as vacuum lines are connected or disconnected. The notifier states that all operations involving transfer are carried out under exhaust ventilation.

Blending of the polymer solution to finished coatings generally occurs in a closed automated system with dedicated transfer lines, thereby minimising the potential for occupational exposure. Occasionally coatings manufacture may occur in batch mixers where addition of the polymer solution is semi-automated, with likely potential for skin contact when adding to and emptying mixing vessels. The notifier states that the blending equipment is fitted with exhaust ventilation systems and there is a regular maintenance programme in place to control airflow levels at regular intervals. Filtration, drum and pail filling are automated and metered processes and worker intervention is not required unless the filling line requires adjustment. The automated and enclosed nature of the process and the presence of exhaust ventilation would reduce worker exposure during normal use and likely exposure will only be due to spillage that may occur during batch adjustment.

The blended product will be sampled for laboratory analysis and incidental skin contact may occur during sampling and analytical procedures.

Paint Application

Prior to application, the paint will be stirred and pumped into trays. Coatings will be applied by spray,

roller or dipping into trays in the presence of a filtered exhaust system. Mixing and spraying is conducted in spray booths where the overspray is collected within the spray booth by its filtering system or on masking materials eg kraft and newspaper. Exposure to significant amounts of the notified polymer will be limited due to the engineering controls and personal protective equipment worn by workers. The spray-painters will be equipped with respiratory protection, eye protection, hand protection conforming to AS and NZ standards. The product is sprayed in booths with an exhaust/filter system, and workers wear air respirator or mask fitted with organic vapour cartridge, faceshield, gloves and protective suit.

Workers may also be exposed to the polymer via the dermal and ocular routes while cleaning and rinsing spray equipment using recirculated solvent.

5.4. Release

RELEASE OF CHEMICAL AT SITE

There will be no release due to the manufacture of the notified polymer, as it will not be manufactured in Australia. However, during its use in the formulation of solvent based automotive paints it could be released due to spills, cleaning of paint formulation equipment and disposal of import containers. The notifier estimates approximately 60 kg per year of the notified polymer will be wasted during manufacture.

RELEASE OF CHEMICAL FROM USE

The paint will only be used by professional tradesman. The paint will be applied by both manual spray and automatic electrostatic atomised spray techniques, whereby overspray, ranging from 20 to 70%, will be generated. Using an overspray average 40%, approximately 3 tonnes of waste polymer may be generated due to overspray. Up to 50 kg annually will be disposed of via the recycling or disposal of the end user container.

Once applied and dried, the polymer will form a matrix with other paint components to form a hard durable film, which will deteriorate very slowly over the life of the vehicle. Ultimately the notified polymer will suffer the same fate as the automobile or other substrate at the end of its useful life. This could entail disposal to landfill or metal recycling, whereby the paint containing the polymer will be destroyed via incineration producing water and oxides of carbon and nitrogen, and phosphate salts.

5.5. Disposal

Since the paint is solvent based, much of the 60 kg of waste generated during paint formulation will go to licensed solvent recovery companies, where the notified polymer will end up in the sludge which is disposed of to landfill.

Some of the wastes generated during paint application (eg spilt paint, excess paint, equipment cleaning effluent and container residues) are also likely to be disposed of via a licensed solvent recovery company and then to landfill in the sludge. Other paint wastes (including the overspray) will be disposed of to landfill in a diffuse manner owing to the expected nationwide use of the products. In this case the polymer will have reacted with the other paint components to form an inert matrix before reaching landfill, rendering the notified polymer immobile.

5.6. Public exposure

Public exposure to the notified polymer is only likely after the paint applied to car bodies and parts, or other substrates, has fully cured. Although there may be dermal contact, there is negligible potential for exposure of the public to the notified polymer since it is strongly bound in cured films.

6. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa Yellow liquid (Disperbyk-2001)

Boiling Point 120°C at 101.3 kPa (for Disperbyk-2001)

Remarks Report not provided

Density $1130 \text{ kg/m}^3 \text{ at } 60^{\circ}\text{C}$

METHOD OECD TG 109 Density of Liquids and Solids.

Remarks Test facility not provided

Vapour Pressure Not determined

Remarks The polymer in Disperbyk-2001 is a high molecular weight ionic polymer and as

such in non volatile with a vapour pressure of much less than 0.1 kPa at 20°C

Water Soluble in water

Remarks Method not provided. The polymer is a polysalt with cationic amine groups,

polyether and anionic groups, which would give it significant water solubility.

Hydrolysis as a Function of pH Not determined

Remarks The polymer contains groups that could be expected to undergo hydrolysis under

extreme pH conditions. However, this is unlikely to occur under ambient

conditions in the environmental pH range of 4 to 9.

Partition Coefficient (n-octanol/water) Not determined

Remarks This was not determined due to the polymer's water solubility. It is not expected

to have a $log P_{ow}$ greater than 3.

Adsorption/Desorption Not determined

Remarks The notified polymer is expected to be mobile in soil and sediments based on its

water solubility. However, this may be offset by the large number of cationic

groups present, known to adsorb strongly to soils.

Dissociation Constant Not determined

Remarks Expected to remain dissociated throughout the environmental pH range.

Particle Size Not determined

Remarks Not applicable as polymer is not isolated from solution.

Flash Point 35°C (for Disperbyk-2001)

Remarks Method or test facility not provided

Flammability Limits Not determined.

Remarks The polymer does not form flammable vapours. The product Disperbyk-2001 is a

flammable liquid.

Autoignition Temperature 230°C (for Disperbyk-2001)

Remarks Details not provided

Explosive Properties Not determined

Remarks No explosive properties are predicted for the polymer.

Reactivity The notified polymer is stable under conditions of use.

Remarks Storage of open containers at elevated temperatures and strong oxidising agents

7. TOXICOLOGICAL INVESTIGATIONS

Endpoint and Result	Assessment Conclusion
Rat, acute oral LD50 >2000 mg/kg bw	Low toxicity
Rabbit, skin irritation	Non-irritating
Rabbit, eye irritation	Slightly irritating

7.1. Acute toxicity – oral

TEST SUBSTANCE BYK-LP N 6971

METHOD OECD TG 423 Acute Oral Toxicity – Acute Toxic Class Method.

EC Directive 92/69/EEC B.1 tris Acute Oral Toxicity - Acute Toxic

Class Method.

Species/Strain Rat/Wistar Vehicle Corn oil

Remarks - Method Oral gavage; a rubber catheter was used to facilitate dosing.

RESULTS

Group	Number and Sex	Dose	Mortality				
	of Animals	mg/kg bw	·				
1	3 females	2000	None				
2	3 males	2000	None				
LD ₅₀ Signs of Toxicity	>2000 mg/kg bw Lethargy, hunched and 6.	posture and piloerection	were noted between day 1				
Effects in Organs	None						
Remarks - Results	No abnormalities we the animals	ere found at macroscopic p	post mortem examination of				
CONCLUSION	The notified chemic	The notified chemical is of low toxicity via the oral route.					
TEST FACILITY	NOTOX B.V.; The	NOTOX B.V.; The Netherlands (2001).					

7.2. Irritation – skin

TEST SUBSTANCE BYK-LP N 6971

METHOD OECD TG 404 Acute Dermal Irritation/Corrosion.

Species/Strain Rabbit/New Zealand White

Number of Animals 3
Vehicle None
Observation Period 72 hours

Type of Dressing Semi-occlusive (gauze).

Remarks - Method Prior to application the polymer was warmed till it became a viscous fluid.

RESULTS

Lesion	Mean Score* Animal No.			Maximum Value	Maximum Duration of Any Effect	Maximum Value at End of Observation Period
	1	2	3			
Erythema/Eschar	0	0	0	0	-	0
Oedema	0	0	0	0	-	0

*Calculated on the basis of the scores at 24, 48, and 72 hours for EACH animal.

Remarks - Results No deviations from normal findings were observed

CONCLUSION The notified chemical is non-irritating to skin.

TEST FACILITY PHARMATOX; Germany (1999a)

7.3. Irritation – eye

TEST SUBSTANCE BYK-LP N 6971

METHOD OECD TG 405 Acute Eye Irritation/Corrosion.

Species/Strain Rabbit/New Zealand White

Number of Animals 3

Observation Period 72 hours

Remarks - Method Prior to application the polymer was warmed till it became a viscous fluid.

RESULTS

Lesion Mean Score* Animal No.		Maximum Value	Maximum Duration of Any Effect	Maximum Value at End of Observation Period		
	1	2	3		V.V.	
Conjunctiva: redness	0.67	0.33	0.33	2	24 h	0
Conjunctiva: chemosis	0.33	0.33	0.33	1	24 h	0
Conjunctiva: discharge	0.33	0.33	0.33	1	24 h	0
Corneal opacity	0	0	0	0	<1	0
Iridial inflammation	0	0	0	0	<1	0

^{*}Calculated on the basis of the scores at 24, 48, and 72 hours for EACH animal.

Remarks - Results Conjunctival irritation with slight redness and increased secretion and

some chemosis were noted for the first 24 hours.

CONCLUSION The notified chemical is slightly irritating to the eye.

TEST FACILITY PHARMATOX; Germany (1999b)

8. ENVIRONMENT

8.1. Environmental fate

No environmental fate data were submitted.

8.2. Ecotoxicological investigations

No ecotoxicity data were submitted.

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

The notified polymer is an additive in solvent-based coatings with the majority of it becoming incorporated into the paint matrix on the surfaces of automobile parts and not available for release. Some release of the notified polymer into the environment may occur during

manufacture and during application of the paint.

The notifier estimates approximately 60 kg per year of the notified polymer will be wasted during manufacture due to spills, during the cleaning of formulation equipment and the disposal of import drums. The paint will be applied by both manual spray and automatic electrostatic atomised spray techniques, whereby overspray, ranging from 20 to 70%, will be generated. Using an overspray average 40%, approximately 3 tonnes of waste polymer may be collected on filters each year from overspray. Up to 50 kg annually will be disposed of via the recycling or disposal of the end user container. Some of the paint will be disposed of via solvent recovery companies where it will end up in the sludge, which is disposed of to landfill. Other paint wastes will be disposed of in landfill in a diffuse manner owing to the expected nationwide use of the products. In this case the polymer will have reacted with the other paint components to form an inert matrix before reaching landfill, rendering the notified polymer immobile.

No biodegradation data are available for the notified polymer; however, it is expected to slowly degrade through biotic processes in landfill to water and oxides of carbon and nitrogen and phosphorous salts.

The notified polymer is not expected to cross biological membranes due to its high molecular weight and is therefore not expected to bioaccumulate.

9.1.2. Environment – effects assessment

No ecotoxicological data were submitted, therefore a PNEC can not be determined. The notified polymer does contain a number of cationic amine groups. Cationic polymers that are water-soluble are know to be toxic to aquatic organisms and therefore, the notified polymer is expected to exhibit some aquatic toxicity (Nabholz, 1993).

9.1.3. Environment – risk characterisation

The majority of the notified polymer will be crosslinked with other paint components to form a very high molecular weight and stable paint film. Once incorporated into the paint formulation, the notified polymer is expected to be immobile and pose little risk to the environment.

The notified polymer is water-soluble and therefore would be expected to be mobile in both the terrestrial and aquatic compartments. The notified polymer would be expected to dilute and disperse and eventually associate with the soil matrix and sediments due to its polycationic nature. However, due to its proposed use pattern it is unlikely be released in significant quantities to the environment in a pure state. Exposure to the aquatic compartment should be low and dispersed and therefore the overall environmental hazard should be low.

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

During transport and storage, workers are unlikely to be exposed to the notified polymer unless packaging is breached. In the event of an accident, spills will be removed in accord with the MSDS and government regulations.

The main potential for occupational exposure is during blending operation leading to the preparation of end use products at the customer manufacturing facilities. Minimal exposure is expected at this stage, as blending/packaging operations will be closed systems except for QC testing.

Workers may be exposed to the notified polymer from drips and spills during the processes of preparation, cleaning, and maintenance and during product changeover. Dermal exposure would be the predominant route of occupational exposure to workers during these activities. Workers handling connections or equipment will be properly protected with PPE as recommended in the MSDS. Filtration, drum and pail filling are automated and metered processes and worker intervention is not required unless the filling line requires adjustment. The automated and enclosed nature of the process and the presence of exhaust ventilation would reduce worker exposure during normal use and likely exposure will only be due to spillage that may occur

during batch adjustment.

Exposure can also occur during industrial application of the finished products. Coatings will be applied by spray, roller or dipping into trays in the presence of a filtered exhaust system. Mixing and spraying is conducted in spray booths. However, exposure to significant amounts of the notified polymer will be limited due to the engineering controls and personal protective equipment worn by workers. The spray-painters will be equipped with respiratory protection, eye protection, hand protection conforming to AS and NZ standards. Furthermore, the notified polymer will be present at a very low concentration in finished product at this stage.

Workers may also be exposed to the notified polymer via the dermal and ocular routes while cleaning and rinsing spray equipment using recirculated solvent.

9.2.2. Public health – exposure assessment

The notified polymer will not be available for sale to the public. It will be blended with resins and other components of the paint formulations and used in paints for car body parts. As a component bound in the resin substrate, routine exposure of the general public is expected to be minimal.

During the transport and handling of the notified chemical, the public will only be exposed if there is an accident resulting in spillage. Therefore, the overall public exposure to the notified polymer will be low.

9.2.3. Human health - effects assessment

The notified chemical was shown to be of low acute toxicity via the oral route in rats. It was not a skin irritant and was slightly irritating to the eye.

Repeat dose toxicity studies for the notified polymer were not provided.

Based on the available data, the notified chemical is not classified as a hazardous substance in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2002).

9.2.4. Occupational health and safety – risk characterisation

Worker exposure during transport, storage and distribution of the notified polymer and its products is unlikely, except in the event of an accidental spill. Exposure after a spill should be controlled by the recommended practices for cleaning up of spills stated in the MSDS.

At the paint formulation sites, occupational exposure to the notified polymer is expected during the blending operations leading to the preparation of end use products at the customer manufacturing facilities. However, for these workers, the risk of exposure is expected to be low, as blending/packaging operations will be closed systems except for QC testing.

Workers handling hose connections or equipment will be properly protected with PPE as recommended in the MSDS. In addition, areas where containers are opened and connected to the blending vessels would be under the control of exhaust ventilation to deal with the hazards associated with other ingredients such as pigments and solvents. Eye contact is only likely in the case of accidental splashes and is controlled by the use of safety glasses or goggles.

Application of paints containing the notified polymer is carried out in spray booths, which significantly reduces the risk of exposure to the notified polymer.

Overall, the occupational risk is low for handlers of the notified polymer, as it is expected to have low hazard at the concentration used. The occupational risk due to the notified polymer would be further reduced due to measures taken to control exposure to other components of the formulation, such as the use of enclosed systems for blending/packaging, and the wearing of protective clothing during product changeover and equipment maintenance.

9.2.5. Public health – risk characterisation

The notified polymer is to be used as a component of paint on motor vehicles and other substrates. The fully cured finished topcoat will come in contact with the general public. However, at that stage the polymer will be fully cured and adhered to the vehicles outer surface forming a continuous totally insoluble molecule of infinite size and is consequently rendered non-hazardous and immobile. The notified polymer will not pose a significant risk to public health when used in the proposed manner.

10. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS

10.1. Hazard classification

Based on the available data the notified polymer is not classified as hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances*.

10.2. Environmental risk assessment

The notified polymer is not considered to pose a risk to the environment based on its reported use pattern.

10.3. Human health risk assessment

10.3.1. Occupational health and safety

There is Low Concern to occupational health and safety under the conditions of the occupational settings described.

10.3.2. Public health

There is Negligible Concern to public health when used as described in the notification.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of the product containing the notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 2003). It is published here as a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

11.2. Label

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

12. RECOMMENDATIONS

CONTROL MEASURES
Occupational Health and Safety

• Employers should implement the following engineering controls to minimise

occupational exposure to the notified polymer:

- Enclosed spray paint application system for industrial use.
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer as introduced and as diluted for use in the products:
 - Protective gloves,
 - safety glasses or goggles,
 - half-facepiece respirator and
 - industrial clothing

Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- A copy of the MSDS should be easily accessible to employees.
- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Environment

- The following control measures should be implemented by end users to minimise environmental exposure during use of the notified polymer:
 - Do not pour leftover paint or cleaning solvent down the drain.

Disposal

- Wastes generated during industrial application should be disposed of through a licensed waste contractor.
- Keep unwanted paint in sealed containers for disposal via special chemical waste collections. Empty paint containers should be left open in a well-ventilated area to dry out. When dry, recycle steel containers via steel can recycling programs.

Emergency procedures

• Spills/release of the notified polymer should be soaked up with absorbent material and disposed of in accordance with State regulations. Do not allow spills to enter drains.

12.1. Secondary notification

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

- (1) Under Section 64(2) of the Act:
 - if any of the circumstances listed in the subsection arise.

If the use pattern changes leading to a significant increase in the potential for aquatic exposure, then ecotoxicity data for fish, daphnia and algae should to be submitted for assessment.

The Director will then decide whether secondary notification is required.

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