

File No: NA/924

May 2001

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in Disperbyk-2000

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.

For the purposes of subsection 78(1) of the Act, copies of this full public report may be inspected by the public at the Library, National Occupational Health and Safety Commission, 92-94 Parramatta Road, Camperdown NSW 2050, between the following hours:

Monday - Wednesday	8.30 am - 5.00 pm
Thursday	8.30 am - 8.00 pm
Friday	8.30 am - 5.00 pm

Copies of this full public report may also be requested, free of charge, by contacting the Administration Coordinator on the fax number below.

For enquiries please contact the Administration Coordinator at:

Street Address: 92 -94 Parramatta Rd CAMPERDOWN NSW 2050, AUSTRALIA
Postal Address: GPO Box 58, SYDNEY NSW 2001, AUSTRALIA
Telephone: (61) (02) 9577 9514 FAX (61) (02) 9577 9465

Director

Chemicals Notification and Assessment

TABLE OF CONTENTS

FULL PUBLIC REPORT.....	4
1. APPLICANT	4
2. IDENTITY OF THE CHEMICAL.....	4
3. PHYSICAL AND CHEMICAL PROPERTIES	4
3.1 Comments on Physico-Chemical Properties	5
4. PURITY OF THE CHEMICAL.....	5
5. USE, VOLUME AND FORMULATION	6
6. OCCUPATIONAL EXPOSURE	6
7. PUBLIC EXPOSURE	8
8. ENVIRONMENTAL EXPOSURE.....	8
8.1 Release	8
8.2 Fate.....	8
9. EVALUATION OF TOXICOLOGICAL DATA	8
10. ASSESSMENT OF ENVIRONMENTAL EFFECTS	9
11. ASSESSMENT OF ENVIRONMENTAL HAZARD	9
12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS	9
13. RECOMMENDATIONS	11
14. MATERIAL SAFETY DATA SHEET	11
15. REQUIREMENTS FOR SECONDARY NOTIFICATION	12
16. REFERENCES.....	12

FULL PUBLIC REPORT**Polymer in Disperbyk-2000****1. APPLICANT**

Nuplex Industries (Aust) Pty Ltd (ACN 000 045 572) of 49-61 Stephen Road Botany NSW 2019 has submitted a limited notification statement in support of their application for an assessment certificate for Polymer in Disperbyk-2000.

2. IDENTITY OF THE CHEMICAL

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

3. PHYSICAL AND CHEMICAL PROPERTIES

The polymer is never isolated in pure form. The following data is for polymer solution in a mixture of organic solvents.

Appearance at 20°C & 101.3 kPa:	Clear amber liquid with an ester like odour
Boiling Point:	175°C
Specific Gravity:	1.163
Vapour Pressure:	Not determined (see comments below)
Water Solubility:	Not determined (see comments below)
Partition Co-efficient (n-octanol/water):	Not determined
Hydrolysis as a Function of pH:	Not determined (see comments below)
Adsorption/Desorption:	Not determined (see comments below)
Dissociation Constant:	Not determined (see comments below)
Flash Point:	> 100°C

Flammability Limits:	Not flammable
Autoignition Temperature:	Not applicable
Explosive Properties:	Not explosive
Reactivity/Stability:	The polymer is stable and no decomposition occurs up to 100°C

3.1 Comments on Physico-Chemical Properties

The notified polymer contains approximately 20% quaternary ammonium and polyethoxylate functionality, the remainder is hydrophobic. The notifier has confirmed that the notified polymer is water soluble rather than dispersible in water.

The notified polymer contains ester linkages that could be expected to undergo hydrolysis under extreme pH conditions. However, in the environmental pH range of 4 to 9, significant hydrolysis is unlikely to occur.

The partition coefficient was not determined due to the water solubility of the notified polymer. However, its hydrophilic nature is indicative of partitioning into the aqueous phase.

No adsorption/desorption tests were conducted for the notified polymer, however, it is expected to be mobile in soil due to its water solubility.

The vapour pressure for the notified polymer was not determined, due to its high molecular weight it is likely to be relatively low.

No dissociation constant tests were conducted for the notified polymer due to lack of groups that are likely to dissociate in water.

4. PURITY OF THE CHEMICAL

Degree of Purity: high

Additives/Adjuvants:

<i>Chemical name:</i>	1-methoxy-2-propyl acetate
<i>CAS No.:</i>	108-65-6
<i>Weight percentage:</i>	> 20 %
<i>Toxic Properties</i>	eye irritant (harmful \geq 20 %); flammable (NOHSC, 1999a)
<i>Chemical name:</i>	2-butoxyethanol
<i>CAS No.:</i>	111-76-2
<i>Weight percentage:</i>	> 20 %

Toxic Properties

Harmful by inhalation, skin contact or if swallowed; irritating to respiratory system (harmful ≥ 20 %) (NOHSC, 1999a)

5. USE, VOLUME AND FORMULATION

The notified polymer is to be used as a component in solvent based paints for automotive OEM and refinish applications, particularly in anticorrosive paints and primer surfaces for refinish paints. It functions as a dispersing additive in solvent based paint applications. The notified polymer is manufactured in solution in mixed organic solvents and is never isolated. The notified polymer will be present in the imported product Disperbyk-2000 at a concentration of approximately 40 % and in the final formulated paints at < 1 %.

The notified polymer will be imported in 200 L steel drums. Less than 10 tonnes per annum notified polymer will be imported in each of the first 5 years.

The notified polymer in Disperbyk 2000 is blended predominantly in a completely enclosed and fully automated process, although sometimes the process may be open and semi-automated. Blending of Disperbyk 2000 could potentially occur at any site where coatings are manufactured. The finished product will be packaged into 20 L steel pails or 200 L steel drums.

6. OCCUPATIONAL EXPOSURE

Exposure

The table illustrates the nature of work done where occupational exposure to the notified polymer in Disperbyk 2000 may occur during transport to and at the notifier's site where the product is initially stored before transportation to the formulation site. The table also illustrates nature of work done during blending and end-use.

<i>Nature of Activity (Number of Workers)</i>	<i>% Notified Polymer</i>	<i>Maximum Potential Exposure Duration</i>
<i>Notifiers Site</i>		
Transport & Warehousing (10)	Approximately 40	200 days/year.
<i>Paint Manufacture</i>		
High Speed Dispersing (40)	Approximately 40	4 hour/day; 30 days/year.
Makeup (40)	Approximately 40	2 hour/day; 30 days/year.
Quality Control Testing (10)	Approximately 40	8 hour/day; 30 days/year.

Filling Containers (40)	<1	8 hours/day; 30 day/year.
<i>Paint Application</i>		
Addition to Coater Trays (10)	<1	8 hour/day; 200 days/year.
Spray Painting (20)	<1	8 hour/day; 200 days/year.
Cleaning of Equipment (30)	<1	2 hours/day; 200 days/year.

Storage

The drums containing the notified polymer will be stored at notifier's site and will not be opened but sent to blending plant sites. Occupational exposure is not likely except in the event of a spill.

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 air flow 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.

Control Measures and Worker Education and Training

All workers handling the notified polymer are trained in safe use of chemicals. Workers handling the polymer solution and coatings will wear impervious gloves, coveralls and goggles. Spray painters who are potentially will be exposed to the notified polymer during spraying, cleaning of spray guns and cleaning equipment will wear air feeding breathing

mask. Workers handling open cans of paint will wear anti-static flame retardant overalls and footwear.

7. PUBLIC EXPOSURE

Public exposure to the notified polymer is only likely after fully cured paint has been applied to car bodies and parts. 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.

8. ENVIRONMENTAL EXPOSURE

8.1 Release

During coating production, the notifier estimates that up to 50 kg per annum of waste containing the notified polymer will be generated from cleaning minor spills, manufacturing equipment and rinsing drums. The notifier further estimates that up to 3.5 tonnes per annum of the notified polymer will be disposed of during coating use and up to 100 kg of the notified polymer will be disposed of during drum cleaning.

8.2 Fate

The majority of the notified polymer will be crosslinked with other paint components to form a high molecular weight and stable paint film. The notifier states that deterioration of the paint formulation is negligible over the average life (20 years) of a motor vehicle. Once incorporated into the paint formulation, the notified polymer is expected to be immobile and pose little risk to the environment.

The notified polymer in waste from spills, equipment cleaning and drum recycling will be collected by licensed waste disposal contractors and treated by a distillation process whereby the solvent is reclaimed and the remaining solid containing the notified polymer will be disposed of in landfill. The notified polymer in overspray will also be disposed of in landfill. The notifier indicates that incineration of waste may also occur.

The notified polymer is water soluble and is expected to be mobile in both the terrestrial and aquatic compartments. However, the notified polymer is expected to dilute, disperse and associated with the soil matrix and sediments due to its polycationic nature. The notified polymer is not expected to cross biological membranes due to its high molecular weight and is therefore not expected to bioaccumulate.

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicological data were provided.

The notified polymer is not classified as a hazardous substance according to the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b). It contains low level of residual monomers.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

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

The notified polymer in waste from spills, equipment cleaning and drum recycling will be collected by licensed waste disposal contractors and treated by a distillation process whereby, the solvent is reclaimed and the remaining solid containing the notified polymer will be disposed of in landfill. The notified polymer in overspray will also be disposed of in landfill. The notifier indicates that incineration of waste may also occur.

The notified polymer is water soluble and therefore would be expected to be mobile in both the terrestrial and aquatic compartments. However, the notified polymer would be expected to dilute and disperse and eventually associate with the soil matrix and sediments. Cationic polymers that are water soluble are known to be toxic to aquatic organisms and therefore, the notified polymer is expected to exhibit some aquatic toxicity (Nabholz, 1993). However, environmental exposure in this manner should be low and dispersed and therefore the overall environmental hazard should be low. The notified polymer is not expected to cross biological membranes due to its high molecular weight and is therefore not expected to bioaccumulate.

The notified polymer is not likely to present a hazard to the environment when it is stored, transported and used in the proposed manner.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

Hazard Assessment

No toxicological data was provided and the notified polymer cannot be assessed against the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b). Polymers of high molecular weight do not readily cross the skin or other biological membranes, and the overall toxicity is expected to be low. The Material Safety Data Sheet (MSDS) for the imported product Disperbyk-2000 indicates that it is a possible skin, eye and a respiratory irritant. The MSDS list a number of potential health effects due to inhalation, or repeated skin contact namely headaches, dizziness to loss of consciousness, injury to liver, kidney and bone marrow and on prolonged exposure may result in permanent damage to brain and nervous system. These relate mainly to the solvents present in the product rather than the notified polymer.

The imported product Disperbyk-2000 is classed as a Class 3 dangerous good (flammable liquid) because of the solvent content.

Occupational Health and Safety

There is little potential for significant occupational exposure to the notified polymer during transport and storage of Disperbyk 2000.

The system by which the notified polymer is dispensed from the drums to the blending vessel is via vacuum hose lines and all operations involving the transfer is carried under exhaust ventilation, and exposure due to skin contact from drips and splashes is likely only when hoses are coupled and uncoupled from the production line. The blending of the product, containing the notified polymer at approximately 40 % concentration, into finished coatings will occur in automated closed systems. Exposure to the product containing the most concentrated form of the notified polymer will be limited to incidental skin contact arising from drips, splashes and spillage that may result during semi-automated blending, batch adjustments, sampling and analytical procedure. Other scenarios of exposure (paint application) to the notified polymer are at concentrations of less than 1 %.

The final paint mix including the pre-prepared paint component containing the notified polymer could contain a wide variety of additional ingredients. The spraying procedure also produces a dense aerosol which could adversely affect human health even in the absence of additional hazardous components.

For these reasons, the notified polymer must be assessed for the contribution it makes to the hazards associated with spray application of the paint. The presence of many potential and actual hazardous substances in the formulations requires the use of stringent engineering controls, such as a correctly constructed and maintained spray booth, and of a high level of personal protective equipment, such as impermeable overalls and gloves and a full face shield and respirator. The use of the paint containing the notified polymer should be in accordance with the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999c). The level of protection from exposure afforded by the standard protective measures will provide adequate protection from the notified polymer.

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

There is a NOHSC exposure standard for 2-butoxyethanol, identified as an ingredient in the polymer solution Disperbyk-2000. The employer is responsible for ensuring that this exposure standard, and exposure standards pertaining to other final paint mix additives, are not exceeded in the workplace.

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

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

The polymer size, mode of use, use of personal protective gear and *in situ* engineering controls indicate that significant risks to human health through occupational exposure to the notified polymer are unlikely. No specific control measure are required to reduce the risk of skin, eye and respiratory irritation due to the notified polymer.

Public Health

The notified polymer will not be available for sale to the public. Since the notified polymer will be used in paints for car body parts not handled by the public, the risk of exposure of the public to the notified polymer is considered to be low. The notified polymer will not pose a significant risk to public health when used in the proposed manner.

13. RECOMMENDATIONS

To minimise occupational exposure to Polymer in Disperbyk-2000 the following guidelines and precautions should be observed:

- Use of the paint containing the notified polymer should be in accordance with the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999c);
- Employers should ensure that NOHSC exposure standards for all of the components of the final paint mix are not exceeded in the workplace;
- Protective eyewear, chemical resistant industrial clothing and footwear and impermeable gloves should be used during occupational use of the products containing the notified polymer; where engineering controls and work practices do not reduce vapour and particulate exposure to safe levels, an air fed respirator should also be used;
- Spillage of the notified polymer should be avoided. Spillages should be cleaned up promptly with absorbents which should then be put into containers for disposal;
- Good personal hygiene should be practised to minimise the potential for ingestion;
- A copy of the MSDS should be easily accessible to employees.

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

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

14. MATERIAL SAFETY DATA SHEET

The MSDS for the product containing the notified polymer was 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. 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 polymer may be required. No other specific conditions are prescribed.

16. REFERENCES

Nabholz, J.V., Miller, P. and Zeeman, M., (1993) Environmental Risk Assessment of New Chemicals Under the Toxic Substances Control Act (TSCA) Section Five, Environmental Toxicology and Risk Assessment, American Society for Testing and Materials, ASTM STP 1179, Landis, W.G., Hughes, J.S. and Lewis, M.A., Eds. Philadelphia, pp 40-55.

NOHSC (1994): National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]. National Occupational Health and Safety Commission, Canberra, Australian Government Publishing Service.

NOHSC (1999a) List of Designated Hazardous Substances [NOHSC:10005(1999)]. Australian Government Publishing Service, Canberra.

NOHSC (1999b): Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1999)]. National Occupational Health and Safety Commission, Canberra, AusInfo.

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

Standards Australia/Standards New Zealand (1994b) Australian/New Zealand Standard 1715-1994, Use and Maintenance of Respiratory Protective Devices. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994c) Australian/New Zealand Standard 1716-1994, Respiratory Protective Devices. 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.