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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in Alcoprint PTF

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**POLYMER IN Alcoprint PTF****1. APPLICANT**

CIBA Specialty Chemicals of 235 Settlement Rd Thomastown Victoria (ABN 97005 061 469) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC) **Polymer in Alcoprint PTF**.

2. IDENTITY OF THE CHEMICAL

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

Marketing names: Polymer in Alcoprint PTF

Structural identification method: Infrared (IR) spectroscopy

Peaks at: 3 194, 3 049, 2 925, 2 854, 1 831, 1 708, 1 554, 1 454, 1 409, 1 245, 1 173, 1 115, and 817 cm^{-1} .

Molecular weight (MW):

% MW < 1000	% MW < 500	Method
0%	0%	GPC

Reactive functional groups:

Carboxylic acid (low concern)

Functional group equivalent weight (FGEW):

Although the notified polymer contains carboxylate groups which will give the polymer polyanionic properties, due to the high molecular weight (> 10 000) the FGEW criterion is not applicable.

3. POLYMER COMPOSITION AND PURITY

Details of the polymer composition have been exempted from publication in the Full Public Report. The purity is very high.

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer exists in solution with a mineral oil base. The physico-chemical properties below are for the polymer solution.

Property	Result	Comments
Appearance	Off white liquid	
Boiling point	> 100°C	
Density	1.1	
Water solubility	Not provided	See comments below
Particle size	Not applicable	
Flammability	Not provided	
Autoignition temperature	Not provided	
Explosive properties	Not explosive	
Flash Point	740 °C	
Vapour Pressure	< 0.0013 kPa	
Stability/reactivity	Stable under normal conditions of use	
Hydrolysis as function of pH	Not provided	
Partition coefficient	Not provided	
Adsorption/desorption	Not provided	
Dissociation constant	Not provided	See comments below

5.1 Comments on physical and chemical properties

The polymer is a polyacrylate and imported as a dispersion in a mixture of hydrocarbon solvent and mineral oil. The notifier claims that the notified polymer is insoluble in water as a result of its extremely high molecular weight. However, due to the very high anionic charge density from the carboxylate groups, it is likely the polymer will have high affinity for water considering its water absorbing and gelling properties.

The polymer backbone does not contain any hydrolysable functional groups. A pKa for propanoic acid of 4.87 was provided. Carboxylate anions are moderately basic and would be dissociated (and hence anionic) at pH > 5.

The notified polymer contains only reactive functional groups of low concern. It is expected to remain stable under conditions of normal use.

The data provided are acceptable for a polymer of low concern.

6. USE, VOLUME AND FORMULATION

Use:

The notified polymer is a component of a thickening agent used in textile printing inks in automated screen printing applications.

Manufacture/Import volume:

The estimated import volume is 10, 20, 30, 30, 30 tonnes for years 1, 2, 3, 4, and 5, respectively. The polymer will not be manufactured in Australia.

Formulation details:

The notified polymer will be imported as a component of Alcoprint PTF at 55.5% in 110 kg plastic drums. Alcoprint PTF also contains an acrylic copolymer and petroleum distillates (Solvent neutral 150). Alcoprint PTF will be sold directly to industrial customers without any local reformulation or repackaging.

At the industrial customers, Alcoprint PTF is added directly to textile printing inks immediately prior to the application to textile materials. Alcoprint PTF is pumped slowly from the 110 kg plastic drums using a hand pump into a 5L plastic bucket placed on a set of scales for weighing. A measured weight of Alcoprint PTF is then added manually to an intermediate blending tank and mixed mechanically at low speed with pigments and other ingredients to the desired ink viscosity. The final ink products contain the notified polymer at up to 1%. The contents of the blending tank are then mechanically pumped into the ink reservoir of the printing machine.

The ink is applied to textile materials as they are fed into a printing machine using a conveyer belt and rollercoaters. A doctor blade within the printing machine removes excess ink. The excess ink collects in a waste reservoir within the machine and is reused where possible. Once the ink has been applied to the textile material the operator feeds the moist cloth onto

the pin chain of a dryer. The material is then heat cured at 120-140°C and the polymer becomes fixed onto the fabric.

The printing machine will be cleaned by the operator when required, such as between a change in ink pigment colour and prior to any maintenance work. Cleaning is performed by flushing the reservoirs, lines, and rollers with a small amount of solvent. Rags are also used to clean printing equipment.

7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
<i>Transport and storage</i>		
<i>Transport of drums (2-3 workers)</i>		
None	55.5% solution maximum, 2-3 h/day, 12 days/year; no exposure expected except in case of accident.	Coveralls, protective footwear.
<i>Storage of drums (2-3 workers)</i>		
None	55.5% solution maximum, 2-3 h/day, 12 days/year; no exposure expected except in case of accident.	Coveralls, protective footwear.
<i>End use</i>		
<i>Preparation of final textile ink (16 workers)</i>		
Dermal Respiratory Ocular	55.5% solution maximum, 8-16 h/day, 200 days/year; workers may be exposed to drips and spills during manual weighing and pouring into blending tank and when connecting, disconnecting transfer lines and cleaning the pumping equipment and to splashes, aerosols and particles generated during mixing.	Ventilated and banded area for weighing and mixing; overalls, impervious gloves, eye protection, and protective footwear.
<i>Application of final textile ink (16 workers)</i>		
Dermal Respiratory	1% solution maximum, 8-16 h/day, 200 days/year; workers may be exposed when feeding the moist cloth onto the pin chain of a dryer and to aerosols generated during printing.	Fume extraction system for printing; overalls, impervious gloves, and protective footwear.

Cleaning

Cleaning the printing machine (8 workers)

Dermal	1% solution maximum, when required; workers may be exposed to drips and spills of the final ink solution when flushing and wiping the reservoirs, lines, and rollers.	Overalls, impervious gloves, and protective footwear.
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8. PUBLIC EXPOSURE

The imported Alcoprint PTF polymer solution will not be sold to the public. The public will come into contact with textiles which are treated with the printing ink containing a low level of notified polymer and have been heat cured. Once cured, the notified polymer is strongly absorbed onto the textile fibres. Thus, public exposure to the notified polymer is considered to be low.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

Spills of the product containing the notified polymer during transport are unlikely, and would only occur in the case of an accident. The notifier expects that up to 0.4% of the import volume (< 120 kg/year) of the notified polymer will be lost due to spills during end-use. Spills will be collected and disposed of off-site by a liquid waste contractor.

The notifier estimates that up to 0.4% of the import volume (< 120 kg/year) of the notified polymer will remain in the plastic import drums. Import drums containing waste residual polymer will be disposed of to land-fill by licensed waste contractors.

The ink mixture containing the notified polymer at < 1% will be applied to fabric using an automated process. Cleaning of equipment will involve flushing the reservoirs, lines and rollers with a small amount of solvent. The solvent will be collected and disposed of to a liquid waste facility by a licensed waste contractor. Rags that have been used to wipe the equipment will be disposed of to landfill. Waste ink will be reused where possible, otherwise it will be collected for disposal to a liquid waste facility. Polymer releases as waste ink and residues are expected to be up to 1.8% of the import volume (< 540 kg/year).

After curing, the polymer will be strongly adsorbed onto textile fibres and is unlikely to be released from the textile. Printed textiles bearing the notified polymer will eventually be disposed of to landfill or incinerated.

9.2. Fate

The majority of the polymer will be applied to textiles and fixed strongly to the textile fibres through a curing process. Printed textiles at the end of their useful life will usually be disposed of to landfill. Residual polymer in import drums will also be disposed of to landfill. In landfill, the cured polymer fixed to textiles will be inert and could be expected to degrade slowly through abiotic and biotic processes. The polymer from drum residues will most likely bind to the soil compartment and become immobile, and be mineralised to water and oxides of carbon through abiotic and biotic processes.

At a liquid waste facility, spillage, waste solvent and ink products containing the notified polymer will be incinerated. Incineration will produce water and oxides of carbon.

Any polymer accidentally entering waterways could be expected to disperse, bind with ions such as Ca^{2+} in the water, and eventually settle into the sediment, where it would slowly degrade. The polymer is not expected to cross biological membranes due to its high molecular weight and together with the predicted high water solubility should not bioaccumulate (Connell, 1990).

10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological data were provided for the notified polymer. The Material Safety Data Sheet (MSDS) for Alcoprint PTF indicates this product has been classified as an irritant according to OECD Guidelines. The total quantity of irritant substances in Alcoprint PTF is described as being below 20%. The irritant effect is reportedly caused by a synergistic effect between several components. The product is labelled R36/38 (Irritating to eyes and skin). The MSDS for Alcoprint PTF also indicates that although this product is not an immediate respiratory irritant, experience has shown that when inhalation exposure to mists/sprays may give rise to respiratory irritation.

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

Chemical	Health hazards	Regulatory controls
Constituents The identity of the polymer constituents have been exempted from publication in the Full Public Report	Residual monomers are present at less than 2%	None
Hazardous impurities None	None	None
Additives/adjuvants The identity of the additives/adjuvants have been exempted from publication in the Full Public Report	MSDS describes them as irritant by synergy; Mineral oils may be aspiration hazards (NOHSC, 1999a)	On List of Designated Hazardous Substances R65; Harmful: may cause lung damage if swallowed The NOHSC exposure standard for mineral oil mist is 5 mg/m ³ (NOHSC, 1995)

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were provided.

12. ENVIRONMENTAL RISK ASSESSMENT

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

Minimal release to water is expected during normal use of the polymer. In the event of accidental release of the polymer into waterways, it is expected to dissipate through reaction with counterions in the water and subsequent settling to sediments, where it would slowly degrade. The long term environmental hazard of the notified polymer in the aquatic environment is expected to be low.

The polymer's large molecular weight and predicted low water solubility should prevent bioaccumulation. Given the above, the overall environmental hazard is expected to be low.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

No toxicological data have been provided for the notified polymer and therefore the substance cannot be classified in accordance with the NOHSC Approved Criteria for Classifying Hazardous Substances (National Occupational Health and Safety Commission, 1999a). However, the systemic toxicity of the notified polymer is likely to be low, given its high molecular weight and consequent low bioavailability.

Although no toxicological data were submitted, the MSDS for Alcoprint PTF (which contains the notified polymer at 55.5%) indicates this product has been classified as an irritant according to OECD Guidelines.

13.2. Occupational health and safety

Occupational exposure to the notified polymer during import, transport and storage of Alcoprint PTF could occur following accidental puncture of the 110 kg plastic drums. The health risk to transport and storage workers is considered to be low.

During preparation of the enduse textile printing inks, there is potential for dermal, respiratory and ocular exposure to the notified polymer by drips and spills when weighing and transfer, connecting, disconnecting hoses and cleaning the pumping equipment and to splashes, aerosols and particles generated during mixing. As the weighing and mixing of the textile ink ingredients occurs in a ventilated room, respiratory exposure is unlikely. Exposure will also be controlled by the use of personal protective equipment such as overalls, impervious gloves, and eye and footwear protection. Given these engineering and personal protection controls and the expected low toxicity of the notified polymer, the health risk to workers during formulation of enduse textile printing inks is low.

During application of the enduse textile printing inks, there exists the potential for respiratory exposure to the notified polymer during the printing process, and the potential for dermal exposure when feeding the moist cloth onto the pin chain of the dryer. As the printing process occurs under a fume extraction system, respiratory exposure is unlikely. Exposure will also be controlled by the use of personal protective equipment such as overalls, impervious gloves, and footwear protection. Given the engineering and personal protection controls and the expected low toxicity of the notified polymer, the health risk to workers during application of enduse textile printing inks is low.

There exists the potential for dermal exposure to drips and spills of the notified polymer during cleaning of the printing machine. Although the notifier has indicated no specific controls, printing machine cleaners should adhere to the same engineering and personal protection controls as application operators.

13.3. Public health

The imported Alcoprint PTF solution will not be sold to the public. The public will come into contact with textiles which are treated with the printing ink containing a low level of the notified polymer and have been heat cured. Once cured, the notified polymer is strongly absorbed onto the textile fibres. Based on the above information, it is considered that the notified polymer will not pose a significant risk to public health when used in the proposed manner.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

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, 1994a). It is published here as part of the assessment report. The accuracy of the information on the MSDS remains the responsibility of the applicant.

14.2. Label

The label for the 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, 1994b). The accuracy of the information on the label remains the responsibility of the applicant.

15. RECOMMENDATIONS

To minimise occupational exposure to Polymer in Alcoprint PTF, the following guidelines and precautions should be observed:

- 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 chemical should be avoided. Spillages should be cleaned up promptly with absorbents which should then be put into containers for disposal;
- Good personal hygiene should be practised to minimise the potential for ingestion;
- A copy of the MSDS should be easily accessible to employees.

If products containing the notified chemical are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b),

workplace practices and control procedures consistent with State and Territory hazardous substances regulations must be in operation.

Guidance in selection of 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) and other internationally acceptable standards.

16. REQUIREMENTS FOR SECONDARY NOTIFICATION

Secondary notification may be required if:

- (i) any of the circumstances stipulated under subsection 64(2) of the Act arise. If any importer or manufacturer of (the notified chemical) becomes aware of any of these circumstances, they must notify the Director within 28 days; or
- (ii) the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

17. REFERENCES

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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.

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

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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.

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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.