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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Acrylic Vinylic Copolymer

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**Director
Chemicals Notification and Assessment**

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PLC/300

FULL PUBLIC REPORT

Acrylic Vinylic Copolymer

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT

3M Australia Pty Ltd
2-74 Dunheved Circuit
St Marys 2760

NOTIFICATION CATEGORY

The notified polymer meets the PLC criteria.

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

The chemical name, CAS number, structural formula, and spectral data have been exempted from publication in the Full Public Report.

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

LVC/460

NOTIFICATION IN OTHER COUNTRIES

USA (TSCA) 1990; Canada (DSL, Schedule VI) 1998; NEPA (China) 1995; New Zealand (Toxic Substances Act) 1996.

2. IDENTITY OF CHEMICAL

OTHER NAME EFKA-4400; Acrylic Vinylic Copolymer

MARKETING NAME Not marketed by itself

CAS NUMBER Not assigned

METHODS OF DETECTION AND DETERMINATION

ANALYTICAL IR Spectrum
METHOD

3. COMPOSITION

DEGREE OF PURITY

>99%

MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (NAMW)	8600
Weight Average Molecular Weight (WAMW)	26,400
Polydispersity Index (WAMW/NAMW)	3.07
% of Low MW Species < 1000	0.6
% of Low MW Species < 500	0.1

RESIDUAL MONOMERS

All residual monomers are below the relevant cut-offs for classification of the notified polymer as a hazardous substance.

4. INTRODUCTION AND USE INFORMATION

MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Tonnes</i>	100	100	100	100	100

USE

The notified polymer is a component of inks used in piezo ink jet inks.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, Transport and Storage

IDENTITY OF RECIPIENTS

The ink containing notified polymer will be received, stored and dispatched from the notifier's warehouse.

TRANSPORTATION AND PACKAGING

The notified polymer will be imported as the ready to use inks in 1 quart (0.95 L) and 1 gallon (3.78 L) bottles, into Sydney prior to use throughout Australia. There will be no packaging or reformulation in Australia.

5.2. Operation Description

At the end user site the ink containing the notified polymer will be placed into the printing machine and then applied to the substrate. Following application onto PVC materials via an inkjet nozzle, the substrate is heated to drive off solvents and dry the printed surface. The entire system is enclosed.

5.3. Release

During use of the inks it is estimated that up to 6 kg per annum of notified polymer waste will be generated. This will be derived from:

Release from use of ink < 4 kg/annum

Residues in import containers < 2 kg/annum

The notifier indicates that printing machines are rarely cleaned; however, if periodically cleaning does take place, it would be conducted with lint free cloth and solvent. Solid wastes from this process will be disposed of to landfill while solvent wastes will either be collected for solvent reclamation, incinerated or disposed of directly in landfill.

It is expected that import containers and any residual polymer solution they contain will be also disposed of to landfill.

5.4. Fate

The majority of the notified polymer will be applied to a variety of substrates during the manufacture of industrial equipment, which at the end of their useful life, will be disposed of to landfill.

The wastes derived from the use of the ink will be disposed of to landfill, as too will import containers. Here, given its low water solubility, the notified polymer will associate with the soil matrix and degrade slowly through abiotic and biotic process. Solvent wastes will either be collected for solvent reclamation, incinerated or disposed of directly in landfill. Incineration of the notified polymer will produce water vapour and oxides of carbon and nitrogen.

The notified polymer is not expected to cross biological membranes due to its high molecular weight and low water solubility and is therefore not expected to bioaccumulate (Connell 1990).

6. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	Light yellowish solid at room temperature
Melting Point/Freezing Point	110-140°C
Density	1130 kg/cm ³ at 20°C
Water Solubility/Extractability	< 1% The test substance (10 g) was added to water (1 L) and stirred at 20°C for 24 h. After 24 h, the sample was filtered and the dry weight of the filter residue was determined gravimetrically. The experiment described above was also repeated at pH 2, 7 (at 37°C) and 9.
Remarks	OECD TG 120 (EKFA Additives, Research Laboratory, 2001)
Particle Size	Not determined
Remarks	Notified polymer is not a powder
Flammability	
Remarks	The notified polymer is not flammable, but the product EFKA-4400 is flammable
Explosive Properties	
Remarks	The notified polymer is not expected to autoignite and is not explosive. However formation of explosive air/vapour mixtures produced by the product EFKA-4400 is possible. The ignition temperature for EFKA-4400 is 370°C (MSDS)
Hydrolysis as a Function of pH	Not determined
Remarks	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.
Partition Coefficient (n-octanol/water)	Not determined
Remarks	The notified polymer is expected to partition into the octanol phase due to its low water solubility
Adsorption/Desorption	Not determined
Remarks	The notified polymer is expected to be relatively immobile in soil due to its low water solubility
Dissociation Constant	Not determined
Remarks	The notified polymer contains alcohol groups, which are expected to have typical acidity.

7. TOXICOLOGICAL INVESTIGATIONS

No toxicological data were submitted.

The Material Safety Data Sheet (MSDS) for EFKA-4400 indicated that it is not irritating to the skin and eyes and is not a skin sensitiser.

8. ENVIRONMENT

No ecotoxicological data were submitted on the notified polymer.

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

The majority of the notified polymer will be applied in inks to a variety of substrates, during the manufacture of various items, which at the end of their useful life, will be disposed of to landfill (see Section 5).

Solid wastes containing the notified polymer from spills and use will be disposed of to landfill, as too will empty import containers. Liquid wastes resulting from the cleaning of application equipment will either be collected for solvent reclamation, incinerated or disposed of directly in landfill.

9.1.2. Environment – effects assessment

Incineration of the notified polymer will produce water vapour and oxides of carbon and nitrogen.

The notified polymer has low water solubility and, as a result, will be immobile in both terrestrial and aquatic compartments. As a consequence, the notified polymer is expected to associate with the soil matrix and sediments and slowly degrade through abiotic and biotic processes to water vapour and oxides of carbon. The notified polymer is not expected to cross biological membranes due to its high molecular weight and low water solubility and is therefore not expected to bioaccumulate.

9.1.3. Environment – risk characterisation

Given that the notified polymer is considered to be of low hazard, the use is controlled (ie product contained in 1 litre bottle and fits into a specified location before opening the cap and emptying), there is little risk of exposure to the environment, and the wastes are collected and disposed of to landfill, the risk to the environment is low.

Once dry, the notified polymer will be incorporated in a high molecular weight polymer matrix and as such poses little risk to the environment.

9.2. Human health

9.2.1 Occupational health and safety – exposure assessment

There will be up to three delivery and six warehouse personnel. Two converter employees will receive the ink at the converter site and two printer operators will change the empty ink bottle in the printer with the new packaged ink bottle. No mixing is required and the bottle only requires opening at changeover.

Dermal and inhalation exposure may occur when opening and changing the ink bottles. Worker activities are described in the following steps:

1-placing the ink bottles in specified locations or pouring the ink from the original container into a reservoir.

- 2- removing the cap and aluminium seal to expose the ink valve/filter
- 3-connecting the ink line to the valve
- 3-removing the first bottle and replacing with another

In the piezo ink jet printing process, the entire plumbing is enclosed and there is little risk of exposure as accidental spills and splashes are not likely. Workers are not likely to be exposed to the notified polymer when making contact with the equipment. The ink “overspray” containing less than 1% of printed ink onto material is removed via an exhaust fan connected to an outside vent. This eliminates any ink content of the air in the printing room.

After application and once dried, the notified polymer is cured into an inert matrix and is hence unavailable to exposure.

During transport and storage, workers are unlikely to be exposed to the notified polymer except when packaging is accidentally breached.

9.2.1. Public health – exposure assessment

Ink products containing the notified polymer are not available for sale to the general public and will only be used by printing professionals. The potential for public exposure to the notified chemical during transport, manufacture, use and disposal is assessed as negligible. Members of the public may make dermal contact with items coated with products containing the notified polymer. However, exposure will be low because the notified polymer is present at low concentrations and is likely to be bound to the printed item.

9.2.2. Human health - effects assessment

The notified polymer meets the PLC criteria and is therefore considered to be of low hazard.

The product contains 2-butoxyethanol which is on the list of designated hazardous substances with the following risk phrases (NOHSC, 1999a):

- R20/21/22 Harmful by inhalation, in contact with skin and if swallowed
- R37 Irritating to respiratory system

Employers should ensure that the exposure standard for 2-butoxyethanol of 25 ppm (TWA) (NOHSC, 1995) is not exceeded.

9.2.3. Occupational health and safety (OHS) – risk characterisation

The OHS risk presented by the notified polymer is expected to be low due to the following reasons:

- 1) The polymer is considered to be of low hazard
- 2) The procedure for installation of the ink bottles is designed such that worker exposure to the ink is minimised
- 3) The notified polymer is present in the ink formulations at low concentrations

The notified polymer may be present in formulations containing hazardous ingredients. Appropriate safety measures will be used to reduce the risk of adverse effects from exposure to ingredients contained in the formulation other than the notified polymer.

9.2.5. Public health – risk characterisation

Ink products containing the notified polymer are not available for sale to the general public and will only be used by professional printers. The potential for public exposure to the notified polymer during transport, manufacture, use and disposal is assessed as negligible. Members of the public may make dermal contact with items coated with products containing the notified chemical. However, exposure will be negligible because the notified polymer is present at low concentrations and is likely to be bound to printed items. Therefore the risk to public health is considered to be very low.

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* (NOHSC, 1999b).

10.2. Environmental risk assessment

The 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 in printing formulations.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of the products containing the notified polymer provided by the notifier were in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). These MSDS are 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 notified polymer and products containing the notified polymer provided by the notifier were 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.

12. RECOMMENDATIONS

CONTROL MEASURES

Occupational Health and Safety

- No specific engineering controls, work practices or personal protective equipment are required for the safe use of the notified polymer itself, however, these should be selected on the basis of all ingredients in the formulation.

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

Emergency procedures

In the event of a spill, the notified polymer should be contained and absorbed on inert material (soil or earth) and the resulting waste disposed of to landfill.

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(1) of the Act; if

- the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

or

(2) Under Section 64(2) of the Act:

- if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

No additional secondary notification conditions are stipulated.

13. BIBLIOGRAPHY

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