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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

DP2009A

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Director
NICNAS

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SELF ASSESSMENT REPORT

DP 2009A

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
DuPont (Australia) Ltd
49-53 Newton Road Wetherill Park NSW 2164
ABN: 59 000 716 469

NOTIFICATION CATEGORY
LRCC: Synthetic Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication:
Chemical identity information
Use
Import volume
Molecular weight data

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)
No previous Australian notifications for this chemical.

NOTIFICATION IN OTHER COUNTRIES
TSCA USA.

2. IDENTITY OF CHEMICAL

OTHER NAME(S)
DP2009A resin

MARKETING NAME(S)
DP2009A

3. COMPOSITION

PLC CRITERIA JUSTIFICATION

Criterion	*Criterion met (yes/no/not applicable)*
Meets Molecular Weight Requirements	Yes
Meets Functional Group Equivalent Weight (FGEW) Requirements	Yes
Low Charge Density	Yes
Approved Elements Only	Yes
No Substantial Degradability	Yes
Not Water Absorbing	Yes
Low Concentrations of Residual Monomers	Yes
Not a Hazardous Substance or Dangerous Good	Yes

4. INTRODUCTION AND USE INFORMATION

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

The chemical will be imported at less than 10% of finished packaged ink ready to use.

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

Year	*1*	*2*	*3*	*4*	*5*
Tonnes	<10	<10	<20	<20	<20

USE

Ink component for quality industrial printing of flexible and textile substrates for a wide range of end uses requiring durability.

5. PROCESS AND RELEASE INFORMATION

5.2. Operation Description

Data for printing textile:
The amount of ink deposited on the substrate during the printing process will vary depending upon the image being printed. Typical ink coverage would be from 50% to 100%. At the maximum coverage (100%), approximately 20 grams of ink is applied to each square meter of fabric.

The dye is then heat set into the textile fibres. The post printing heat treatment (>130^{o}C and < 220^{o}C) of the printed fabric drives off the water of the emulsion allowing a solid resin to bind to the fabric. This is a thermodynamically irreversible process. The heat "set" treatment of printed fabric is a common process in the textile printing industry.

Washing of the printed fabric should not be a significant source of chemical release to water with most having been made unavailable to the wearer of the garment by the heat set treatment.

Process information
The notified polymer will only be imported into Australia as part of ink formulations contained in bulk containers. There will be no domestic manufacture or processing, reformulation, repackaging of DP2009A in Australia.

Release to the Environment for Each use of the Chemical:
The notified polymer will be used solely as part of an ink formulation contained in one litre container that will in turn be used by dedicated technically trained printers who have undertaken technical and further education courses in design and printing and who have been trained in the handling and disposal of inks. The notification contemplates no other uses of the notified polymer and environmental releases.

Following the personal protective equipment guidelines of the MSDS, workers should be protected from exposure to the chemical. The application process uses machinery fed by bulk disposable containers removing all routine opportunity for exposure.

Only a very small amount 3 – 6% of the total volume of residual new ink containing the notified polymer will remain in the used container. This residual dye is absorbed onto foam contained within the container and can only be removed if the integrity of the cartridge is compromised.

In the end use printing process, it would be expected that the polymer will stay firmly bound into the substrate and would be either land filled or recycled. Should the polymer be released by degradation of land filled refuse paper and leaching, the high molecular weight polymer will show a high affinity for rocks, clay sediments and the organic phase of sediments.

The remainder of the ink will be irreversibly deposited to substrates. The printed material may be
1) burnt
2) recycled
3) land filled

Only options two and three will result in potential release of the ink polymer into the environment. In both cases the extent of the release is determined by the degradation of the structure of the substrate. In

case 2, the ink will be either oxidized by bleaching or deposited from wastewater in the paper mill wastewater treatment process. In both cases residues will be collected as sludge for incineration or landfill.

6. EXPOSURE INFORMATION

6.1. Summary of Occupational Exposure

The notified polymer will be imported as finished packaged ink jet ink cartridges ready for distribution and resale in Australia to a specific industry segment. Potential areas for exposure are distribution and end use by trades people with a purpose designed industrial printer.

The imported ink is in sealed containers whose construction and design make exposure during replacement highly unlikely in the course of industrial printing applications. Service technicians and workers will handle cartridges during replacement and possibly maintenance, however, exposure, if any, would be extremely low due to the limited quantities involved and container design.

The workers using the ink will have undertaken a 3-year TAFE course or equivalent and should be aware of the requirements of occupational health and safety practice. Proper use of personal protective equipment as recommended by the MSDS will minimize risk of exposure to workers.

6.2. Summary of Public Exposure

The notified polymer will not be available to the public. Members of the public will come into contact with the notified polymer once it is dried and heat set in textiles and substrates. Therefore exposure to the polymer will not be available to the public in finished printed products.

6.3. Summary of Environmental Exposure

6.3.1. Environmental Release

Release to the environment during shipping, transport and warehousing will only occur through accidental spills or leaks of the cassette packaged product and that will be limited to single units that may break open on misadventure.

When spills occur, they will be contained and collected with absorbent material such as paper waste or vermiculite, dried and sent to landfill or incineration.

Empty containers from import will also be either land filled or incinerated.

The notified polymer will be used solely as part of a formulation contained in ink that will in turn be used by dedicated trades printers. No other uses of the polymer are expected and environmental releases, if any, would be limited to this application.

6.3.2. Environmental Fate

The notified polymer is expected to be hydrolytically stable based on data for an analogue that demonstrated negligible or no hydrolytic degradation. DP2009A is not readily biodegradable. Due to its hydrophobic nature, the notified polymer is expected to associate with aquatic sediments and organic phases of soil in landfill, and slowly degrade to simple carbon compounds.

7. ESTABLISHMENT OF LOW PHYSICAL AND CHEMICAL HAZARD

Appearance at 20°C and 101.3 kPa	Clear to Light yellow solution polymer
Boiling Point	Water based ink solution >100°C: DP2009A N/A
Density	Estimated ρ = 1.04 g/cm^3 (solid polymer) Ink ρ = 1.00 – 1.10 Kg/m^3.
Water Solubility	Solution polymer DP2009A is >1% in water. (gravimetric analysis)
Reactivity	Stable under normal environmental conditions.
Flash Point	As polymer and ink, Combustible

Auto ignition temperature	As an ink >390°C
Flammability	Not flammable

8. ESTABLISHMENT OF LOW HUMAN HAZARD

8.1. Toxicology

A Local Lymph Node Assay on the ink product was negative.

Triethylamine (TEA) is harmful and causes severe burns, however, it is present at levels below its concentration cut off (1%).

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology

No ecotoxicological data were submitted for the polymer. The associated TEA should volatilise and remain in the air compartment where it will photochemically degrade (half life 4 hours) and not persist for a long period of time

10. RISK ASSESSMENT

10.1. Environment

No aquatic exposure is anticipated during manufacture and end use of the notified polymer. It is envisaged that 2% waste ink would be generated from the manufacturing processes using the ink in Australia. These wastes would be collected by fibres merchants for recycling, land filled or burnt. It is expected that practically all DP2009A will be disposed of in approved landfills as inert solid waste. In landfill, the solid wastes will not be mobile and will be insoluble and not pose a significant risk to the environment.

The polymer is not considered to pose a risk to the environment based on its disperse use pattern and significant level of controls preventing escape to the environment.

10.2. Occupational health and safety

The OHS risk presented by the notified polymer is expected to be low, based on low hazard and low exposure as well as the engineering controls and personal protective equipment used by workers.

10.3. Public health

Polymers similar to DP2009A have been used for highly durable applications for cars , seating, fibres in apparel and medical applications over the last 25 years without any noted effect.

The notified polymer could attract wide use in industry and contact with the printed images could become commonplace. The product will be directed to specialist applications warranting high-resolution colour printing. The resin adheres to the textile filament with ionic bonding and physical anchoring to the fabric structure and is then heat set into the thread matrix. The natural progression with time would be that this use of high-resolution colour becomes more commonplace. The risk associated with DP2009A is low due to its molecular size inhibiting the crossing of cellular boundaries and behaviour of similar classes of polymers.

Exposure to the notified polymer due to industrial accident is not expected since the material will be manufactured and processed only outside of Australia and contained in sealed containers when imported into Australia.

The notified polymer will not be sold to the public, only being used by professional printers. Once the polymer is applied and dried it will be inert and hence not bio-available. Risk to the public is considered low.

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

11.1. Environmental risk assessment

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

11.2. Human health risk assessment

11.2.1. Occupational health and safety

There is No Concern to occupational health and safety under the conditions of the occupational settings described.

11.2.2. Public health

There is Negligible Concern to public health when used in textile printing ink.

12. MATERIAL SAFETY DATA SHEET

12.1. Material Safety Data Sheet

The notifier has provided MSDS in accordance with the schedule item B 12 of the *ICNA Act*. The accuracy of the information on the MSDS remains the responsibility of the applicant.

13. RECOMMENDATIONS

CONTROL MEASURES

Occupational Health and Safety

- No specific engineering controls or work practices 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.

- Personal protective equipment required during use and servicing is
  - Eye protection (safety glasses or goggles) as required
  - Impermeable rubber or polyethylene gloves when undertaking maintenance of printing equipment or replenishment of ink.
  - Industrial clothing and footwear (optional)

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 the notifier to minimise environmental exposure during formulation of the notified polymer:
  - Adhering any residual DP2009A resin and dye stuffs to substrates and adsorbents prior to disposal.

- The following control measures should be implemented by end users to minimise environmental exposure during use of the notified polymer:
  - Exhaust ventilation of the heat set facility

Disposal

- The notified polymer should be disposed of to landfill or incinerated.
- Empty containers should be sent to local recycling or waste disposal facilities.

Emergency procedures

- Spills/release of the notified polymer should be handled by absorbing with sand , vermiculite or paper and put into suitable container for disposal. Contaminated containers can be re-used after cleaning.