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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME
(NICNAS)**

FULL PUBLIC REPORT

Polymer in AI-148-143

This Self Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (Cwlth) (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 Department of Health and Ageing, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Department of the Environment and Heritage. The data supporting this assessment will be subject to audit by NICNAS.

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**Director
NICNAS**

TABLE OF CONTENTS

1.	APPLICANT AND NOTIFICATION DETAILS	3
2.	IDENTITY OF CHEMICAL	3
3.	COMPOSITION.....	3
4.	INTRODUCTION AND USE INFORMATION.....	4
5.	PROCESS AND RELEASE INFORMATION.....	4
5.1.	Operation Description.....	4
6.	EXPOSURE INFORMATION	5
6.1.	Summary of Occupational Exposure	5
6.2.	Summary of Public Exposure	5
6.3.	Summary of Environmental Exposure.....	5
6.3.1.	Environmental Release	5
6.3.2.	Environmental Fate	5
7.	PHYSICAL AND CHEMICAL PROPERTIES.....	6
8.	HUMAN HEALTH IMPLICATIONS.....	6
8.1.	Toxicology	6
8.2.	Human Health Hazard Assessment.....	6
9.	ENVIRONMENTAL HAZARDS.....	6
9.1.	Ecotoxicology	6
9.2.	Environmental Hazard Assessment	6
10.	RISK ASSESSMENT.....	6
10.1.	Environment	6
10.2.	Occupational Health and Safety.....	7
10.3.	Public Health	7
11.	CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS.....	7
11.1.	Environmental Risk Assessment.....	7
11.2.	Human Health Risk Assessment.....	7
11.2.1.	Occupational health and safety.....	7
11.2.2.	Public health.....	7
12.	MATERIAL SAFETY DATA SHEET	7
12.1.	Material Safety Data Sheet	8
13.	RECOMMENDATIONS.....	8
13.1.	Secondary Notification	9

Polymer in AI-148-143**1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

Carter Holt Harvey
Como Office Tower
644 Chapel Street
South Yarra 3141
Victoria

ABN: 77 000 601 892

NOTIFICATION CATEGORY

Self Assessment: Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical name

Other name

Molecular formula

Structural formula

Polymer constituents

Molecular weight

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

The substance has been notified via a PMN (P-03-698) in the USA, and an NSN (13001) in Canada

2. IDENTITY OF CHEMICAL

OTHER NAME(S)

Rosin modified phenolic resin

MARKETING NAME(S)

AI-148-143

The substance will be imported as a component of various ink formulations which are as yet undesignated.

3. COMPOSITION

PLC CRITERIA JUSTIFICATION

<i>Criterion</i>	<i>Criterion met (yes/no/not applicable)</i>
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	Yes
Low Charge Density	Yes
Approved Elements Only	Yes
Stable Under Normal Conditions of Use	Yes
Not Water Absorbing	Yes
Not a Hazard Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

4. INTRODUCTION AND USE INFORMATION

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

The chemical will be imported as a component of formulated ink preparations at up to 30% by weight. The formulated inks are used by printers for printing documents such as magazines, labels and packaging materials.

Typically the inks may be packed in metal tubs ranging from 0.5 to 25 kg.

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>	10-100	10-100	10-100	10-100	10-100

USE

The notified polymer acts as a binder, at a concentration of < 30% in printing inks.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

The notified polymer will be imported into Australia as a component of formulated ink preparations at up to 30% by weight.

Contact with the notified polymer before the end use is not anticipated (eg, due to repackaging of inks at a warehouse).

The formulated inks are used by printers using the gravure, letterpress and lithographic techniques. At the printing sites, the formulated inks are added to printing presses together with aliphatic and aromatic hydrocarbon solvents in order to print documents such as magazines, labels and packaging materials. After printing the notified polymer will be fixed with other ink ingredients to form a matrix from which there is no release.

The inks are delivered to the printing company in sealed metal containers, typically ranging from 0.5 kg to 25 kg capacity. The container size is governed by the colour of the ink and the quantity needs of the printer. The lid or cap of the container is removed and depending on the formulation of the ink the ink may be scooped out using a suitable scoop-tool (if it is a highly viscous paste ink typically used in lithography and letterpress) or poured out (typically for flexography, or gravure printing). The ink is put into the ink-reservoirs on the printing machine. Using the scoop, the highly viscous ink is applied to the rollers of the machine, while the more fluid versions will be poured into the in-built containers on the machine.

Depending on the printing technique employed, the ink is transferred from the ink reservoir to the paper by a system of rollers. The image to be printed is covered with the ink by the machine and then this inked image is rotated against the material to be printed (paper or plastic film if packaging). The metering and application of the ink on the machine is conducted automatically.

When the printing job has been completed, then the residual ink in the ink reservoirs is transferred back to the original container, in much the same way as it was applied to the machine. The parts of the printing press that are covered with ink will be wiped clean using rags and solvents typically. These rags and dirty solvents are normally disposed of by the printing company through licensed waste disposal contractors.

6. EXPOSURE INFORMATION

6.1. Summary of Occupational Exposure

Transport and warehousing workers may come into dermal and ocular contact with the notified polymer through accidental leaks and spillages of the drums and containers.

Dermal and ocular exposure may occur during certain printing processes. However, exposure to significant amounts of the notified polymer is limited given the use of engineering controls and personal protective equipment by workers. Typically, the printing machines are provided with guards and covers to catch any airborne ink such as aerosols being generated by the rotating parts. In some machines where solvents are employed, such as gravure, the printing presses will be designed with solvent extraction to take away any aerosol and solvent vapours. The viscosity of the inks is such that splashes from the ink would not be expected to occur therefore ocular exposure would be very low. Where the risk is greatest, the workers would use eye protection such as safety glasses. The printing machine operators will be provided with suitable gloves in order keep his hands clean and his skin free from as much ink as possible. It is normal for printing machine operators to also wear overalls fully covering their arms and legs, and these would be laundered weekly.

The likelihood of inhalation exposure is very low as the inks are highly viscous and aerosol production is unlikely. Engineering controls and personal protective equipment are also used by workers.

After application and once dried, the ink containing the notified polymer is cured into an inert matrix and hence further exposure is not possible.

6.2. Summary of Public Exposure

The notified polymer is intended only for use by industry within ink formulations. The notified polymer will not be sold to the public except in the form of printed articles. There is the potential for extensive public exposure to articles in which the notified polymer is contained. However, after printing, the ink containing the notified polymer is cured into an inert matrix and hence in practice no exposure is possible.

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 containers with the ink formulations within them.

A minimal amount of the polymer is wasted during the start-up of printing presses, and a significant proportion of this will be applied to the substrate (paper for example) and this becomes printed waste paper and is likely to enter the recycling chain. A minimal amount of the polymer may be washed off during cleaning of printing machinery. Disposal of such wastes will be the responsibility of the printing plant and certified waste contractors who will transfer wastes off-site for solvent re-generation and incineration.

Residues remaining in the imported containers should be either disposed of through recycling facilities together with the containers. Alternatively the containers should be washed and sent to landfill with washings going to solvent recovery off-site.

The remainder of the notified polymer will be bound to printed articles and hence will not be available for direct release to the environment. The eventual fate of printed articles is recycling or landfill.

6.3.2. Environmental Fate

The notified polymer is expected to be hydrolytically stable and to not be readily biodegradable. Due to its hydrophobic nature, it is expected that the notified polymer in landfill will associate with sediments and organic phases of soil and sediments, and slowly degrade to simple carbon compounds.

While environmental exposure is limited during the printing process, the total import volume of the notified polymer will ultimately be disposed of in either landfill or be incinerated. The widespread use pattern indicates that landfills throughout Australia would receive the notified polymer as residues in the original packaging and on paper products. The residual ink would be expected to remain within the packaging unless breached. On paper the notified polymer will interact with other components to form

a stable polymer matrix and, once dry, is expected to be immobile and pose little risk to the environment.

During recycling processes, waste paper is repulped using a variety of alkaline, dispersing and wetting agents, water emulsifiable organic solvents and bleaches. These agents enhance fibre separation, ink detachment from the fibres, pulp brightness and the whiteness of paper. These aqueous wastes are expected to go to sewer. Very little of the notified polymer is expected to partition to the supernatant water which is released to the sewer. Sludge generated during the washing process is dried and incinerated or sent to landfill for disposal.

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

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa	Amber solid
Melting Point/Glass Transition Temp	Melts from 159 to 212 °C
Density	Relative Density = 1.05 at 20.0°C
Water Solubility	$\leq 1.47 \times 10^{-4}$ g/l solution at 20°C
Dissociation Constant	Not measurable
Particle Size	Not applicable, as made up of solid lumps
Reactivity	Stable under normal environmental conditions.
Degradation Products	None produced under acidic or basic conditions.

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

No toxicological data are available.

8.2. Human Health Hazard Assessment

The notified polymer contains combined rosin that is not likely to cause sensitisation. However, up to 11% residual rosin monomers are present. Thus, the product described in the MSDS is classified as R43, and may cause sensitisation by skin contact.

However, analogous polymers have been shown not to be sensitisers. Also the notified polymer meets the PLC criteria and can therefore be considered to be of low hazard.

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology

No toxicological data were submitted.

9.2. Environmental Hazard Assessment

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

10. RISK ASSESSMENT

10.1. Environment

The notified polymer will be a component of formulated ink preparations. Once these inks have been used in order to print documents such as magazines, labels and packaging materials the notified polymer is expected to remain within the article matrices. Hence the majority of the notified polymer will share the fate of the articles into which it is incorporated. It is anticipated that these articles will be disposed of by landfill or incinerated after use. In landfill, it is expected that the notified polymer will remain immobile within the matrices. Incineration of the notified polymer will result in the formation of water vapour and oxides of carbon.

A reasonable prediction is that the notified polymer will distribute to the sludge compartment from the wastewater treatment plant based on low water solubility and low biodegradability. Paper recycling will result in the notified polymer ending up as a sludge which is then disposed of as landfill or incinerated by licensed waste contractors.

Given the widespread and disperse environmental exposure, together with the low expected toxicity of the notified polymer there is no immediate concern.

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.

Residual rosin monomers are present in the product, and thus there is a risk of skin sensitisation from dermal exposure. The MSDS clearly defines this risk, and details the necessary PPE and engineering controls necessary to prevent exposure. Thus, the OHS risk presented by the notified polymer is expected to be low, based on the low hazard presented by the notified polymer, and low exposure to the polymer due to the controls detailed in the MSDS.

Typically, the printing machines are provided with guards and covers to catch any airborne ink such as aerosols being generated by the rotating parts. In some machines where solvents are employed, such as gravure, the printing presses will be designed with solvent extraction to take away any aerosol and solvent vapours. The viscosity of the inks is such that splashes from the ink would not be expected to occur therefore ocular exposure would be very low. Where the risk is greatest, the workers would use eye protection such as safety glasses. The printing machine operators will be provided with suitable gloves in order keep his hands clean and his skin free from as much ink as possible. It is normal for printing machine operators to also wear overalls fully covering their arms and legs, and these would be laundered weekly.

10.3. Public Health

The notified polymer will not be available to the public. Members of the public may make dermal contact with articles containing the notified polymer. However, the risk to public health will be negligible because the notified polymer is bound within a matrix and so will not be bioavailable.

Therefore there is no immediate concern for public exposure to the notified polymer.

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 Low 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 based on the reported use pattern.

12. MATERIAL SAFETY DATA SHEET

12.1. Material Safety Data Sheet

A MSDS is provided in accordance with the schedule item B 12 of the *ICNA Act*.

13. RECOMMENDATIONS**CONTROL MEASURES****Occupational Health and Safety**

- Employers should implement the following safe work practices to minimise occupational exposure during use of the notified chemical:
 - Prevent splashes and spills.
- No specific engineering controls or personal protective equipment are required for the safe use of the notified polymer itself, however, due to the sensitisation potential of the residual rosin these should be selected to prevent dermal and inhalation exposure.

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

- Service personnel should wear long impervious PVC gloves and overalls and ensure adequate ventilation is present during routine maintenance and repairs.
- A copy of the MSDS should be easily accessible to employees.
- Products and mixtures containing the notified polymer may be 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 in the manufacture of printed documents:
 - Do not allow material or contaminated packaging to enter drains, sewers or water courses.

Disposal

- The notified polymer should be disposed of by landfill or incineration.

Emergency procedures

- As 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.

13.1. 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 subsection 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 subsection 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.