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

FULL PUBLIC REPORT

FILASINT 3923

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**Director
NICNAS**

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FULL PUBLIC REPORT**FILASINT 3923****1. APPLICANT AND NOTIFICATION DETAILS**

APPLICANT(S)

Cognis Australia Pty Ltd (ABN 87 006 374 456) of 83 Maffra Street, Broadmeadows, Victoria, 3047.

NOTIFICATION CATEGORY

Polymer of Low Concern

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical Name, Other Names, CAS Number, Molecular and Structural Formulae, Molecular Weight, Polymer Constituents, Residual Monomers/Impurities, Use details and Import Volume.

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(S)

None

NOTIFICATION IN OTHER COUNTRIES

United States, Canada, South Korea

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

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MOLECULAR WEIGHT (MW)

Number Average Molecular Weight (Mn) >10000

3. COMPOSITION

PLC CRITERIA JUSTIFICATION

<i>Criterion</i>	<i>Criterion met</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

Import

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>	<5	<5	<5	<5	<5

USE

The notified polymer is used as a textile sizing agent.

5. PROCESS AND RELEASE INFORMATION

5.1. Operation Description

The notified polymer is imported in 25 kg bags into Cognis warehouse by sea. From the warehouse it is transported to textile sizing works in Tasmania.

In a typical textile sizing day operation, the solid state notified polymer is added to a mixing tank of 400-litres water and the resulting solution (also known as sizing liquor) is raised to 90°C. The solution is mixed at this temperature for 30 minutes to dissolve the notified polymer. Fifty (50) litres of cold water is then added to lower the temperature to 70-75°C before the sizing liquor is pumped over to the sizing machine. By means of mechanical rollers a warp of polyester yarn is then run through a trough of the sizing liquor solution containing up to 10% of the notified polymer. Excess sizing liquors is squeezed from the yarn by means of mechanical rollers. The sized yarn is dried by passing over hot rollers.

The pick up of size liquor depends on the types of yarn. Flat yarns pick up to 60% of the liquor while texturized yarn pick up to 100%. The excess size liquor left in the sizing trough after a size run or at the end of the day is pumped back to the mixing vessel and used for subsequent size runs.

The dried sized polyester warp yarn is then wound onto a weavers beam before being sent to the on-site looms for weaving. The Size on the polyester warp yarn protects the yarn from breaking during the weaving process where alternate warp threads are continually raised and lowered to allow the weft yarn to pass in between in order to produce the woven fabric. The resultant fabric is stiff due to the presence of the Size.

The desizing factory is located nearby and the sized yarn is transported there by road. The desizing is the removal of the notified polymer from the fabric and is carried out in an enclosed washing range. A mildly alkaline scouring process is used to remove the Size. The fabric travels continuously from one end of the enclosed wash range to the other whilst being sprayed and immersed in the washing liquor. The washing range contains four enclosed compartments. The first contains soda ash to give a pH up to pH 8.0 and 1-2 g/L of a detergent. The other three compartments use water only. The process is carried out at approximately 95°C.

6. EXPOSURE INFORMATION

6.1. Summary of Occupational Exposure

The main sources of occupational exposure are during the opening of bags containing the notified polymer at the sizing plant. There is potential for exposure to polymer dusts by two workers during transfer into mixing vessel. Dermal exposure to the powder may also occur. However, exposure to significant amounts of the notified polymer is limited because of the engineering controls and personal protective equipment, such as gloves, safety glasses and face masks as required, worn by workers.

The sizing solution contains up to 10% of the notified polymer and is pumped from the mixing tank to enclosed tanks. No occupational exposure to workers is expected during this process except in the case of accidental leak from the transfer pipes and valves. The sized yarn is woven into fabrics. It is estimated that up to 40 loom operators would be exposed to fabric treated with the notified polymer. However, the exposure would be limited to changing spools.

Woven fabrics are transported to desizing factory. At the desizing plant up to four personnel will be exposed to the fabric before it undergoes desizing.

During transport and storage of the notified polymer, workers are unlikely to be exposed to the notified polymer except when packaging is accidentally breached. During transport and handling of the treated yarn workers are unlikely to be exposed to the notified polymer because it is bound to polyester fabric and not bioavailable.

6.2. Summary of Public Exposure

The notified polymer is intended only for use in industry and is removed from the fabric before dyeing process.

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 bags. The amount of accidental spillage is expected to be 2-3 split bags (75 kilos) per year. The granules would be easily swept up. If not badly contaminated, the accidental spill would be re-bagged and used. If the spillage were contaminated, the product would be disposed of to an approved landfill by a contracted disposal firm.

Sizing

The notified polymer will be discharged to the sewer under Launceston council guidelines in accordance with their council permit. As a worst-case scenario it is estimated that 90 kg of the notified polymer is released direct to sewer annually.

Since the notified polymer is a granular solid, the amount of polymer expected to remain in the imported containers (bags) is approximately 10 grams per bag. This would equate to 250×20 kg bags (5 tons) \times 10 grams = 2.5 kilos per year. The bags containing the residue would be disposed of to an approved landfill by a contracted disposal firm.

Any plant equipment would be cleaned by hot water and detergent with the residue going to sewer. This is estimated to be approximately 10 kilos per year.

Desizing

After weaving the fabric the notified polymer will be removed in a desizing plant. The site undertaking the desizing has an on-site licensed effluent treatment plant. Washings from the desizing of the fabric containing the notified polymer will be released to the effluent plant before being released direct to sewer.

6.3.2. Environmental Fate

The notified polymer is water soluble, expected to be hydrolytically stable and not expected to be readily biodegradable. However, an inherent biodegradability test noted around 99% of the DOC had been removed after 5 days, which was attributed to adsorption to the sludge rather than degradation. Therefore, it is expected that the notified polymer will absorb to soils and sediments and slowly degrade into simple compounds by a mixture biotic and abiotic processes.

7. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa

Odourless beige coloured granulate

Melting Point

160-170°C

Density

650 kg/m³ at 20°C

Water Solubility

47.5 g/L at 20°C. Measured using a gravimetric method in which the test material (~10 g) was stirred with water (~10 g) at 25°C (unspecified time) and then cooled to 20°C. The water was decanted from the flask and evaporated to dryness. The difference in mass was taken to be the water solubility of the notified polymer. The reported solubility is consistent with the structure provided. The notifier also states during that upon heating to

Dissociation Constant	90°C to solubilise the notified polymer (up to 10%), the notified polymer remains in solution when cooled to room temperature. The results are consistent with a high water solubility for the notified polymer.
Particle Size	Not determined, but the notified polymer contains acid groups, which are expected to remain ionised throughout the environmental pH range of 4 to 9.
Reactivity	3 mm
Degradation Products	Stable under normal environmental conditions, danger of dust explosion if fine dust collects. None under normal conditions of use, small amounts of monomers produced when heated to 300°C.

8. HUMAN HEALTH IMPLICATIONS

8.1. Toxicology

No toxicological data were submitted.

8.2. Human Health Hazard Assessment

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

9. ENVIRONMENTAL HAZARDS

9.1. Ecotoxicology

The following toxicological studies were submitted:

<i>Endpoint</i>	<i>Result and Conclusion</i>
Inherent Biodegradability (OECD TG 302B Zahn-Wellens Test)	99% removal of DOC in 5 days
Fish Toxicity (Fresh water guppy, <i>Poecilia reticulata</i>)	48 h LC50 >2000 mg/L
Inhibition of Bacterial Respiration ^a	EC50 > 100 mg/L

^aResult quoted in MSDS, report not submitted.

All results were indicative of low hazard. The rapid removal of DOC in the inherent biodegradability study, a 78% reduction in dissolved organic carbon (DOC) in the first 24 h, was attributed to adsorption to sludge. After 5 days around 99% of the DOC had been removed, after which the test was terminated.

The fish toxicity study was conducted according to the US EPA guideline OPPTS 850.1075, except that the study duration was 48 h. Only a range finding study was conducted. Four test concentrations were used starting with 500 mg/L increasing by increments of 500 mg/L. No mortality or abnormal behaviour was observed.

9.2. Environmental Hazard Assessment

The notified polymer is practically non-toxic to fish. Based on the single 48 h result for fish and applying an assessment safety factor of 1000 a PNEC of 2 mg/L can be determined, noting that this is a lower limit value.

10. RISK ASSESSMENT

10.1. Environment

The notified polymer is intended for use in textile sizing treatment. The major environmental exposure of the notified polymer is from wash water from fabric sizing and desizing facilities. It is expected that the sizing and desizing facilities where the notified polymer will be used will discharged to different sewage treatment plants. The washings from the sizing will be released directly to the sewer, while the desizing washings will pass through an onsite treatment plant.

Estimates of the predicted environmental concentrations (PECs) resulting from the sizing and desizing of fabric in a worst case scenario, for the entire import volume being used at a single sizing facility and single desizing facility which both feed into secondary sewage treatment plants (with daily flow rates of 4 ML/day and 16 ML/day, respectively). The waste from the desizing facility will pass through an onsite treatment plant before entering the sewer. The receiving water from the sewage treatment plant is a river, in which no further dilution is expected. Calculations are provided in the following table:

Process or Dilution Factor	Quantity
<i>Sizing Discharge</i>	
Quantity in wash water entering sewer from sizing	0.8 kg ^a
Typical daily volume of treatment effluent	4 ML/day
Removal rate from sewage treatment: ^c	78%
Concentration in Effluent:	0.044 mg/L
<i>Receiving Waters</i>	
Dilution factor in receiving waters	1:1 (river)
PEC	0.044 mg/L
<i>Desizing Discharge</i>	
Quantity in wash water (Complete removal from fabric):	19.6 kg ^b
Removal rate from onsite sewage treatment: ^c	78%
Quantity in wash water entering sewer from desizing:	4.312 kg
Typical daily volume of treatment effluent	16 ML/day
Effluent concentration in sewer	0.27 mg/L
Removal rate from sewage treatment plant: ^c	78%
Concentration in effluent from sewage treatment plant	0.059 mg/L
<i>Receiving Waters</i>	
Dilution factor in receiving waters	1:1 (river)
PEC	0.059 mg/L

^aBased on a worst case release of 90 kg notified polymer per year. ^bBased on the maximum import volume for the product of 5,000 kg per annum less quantity lost during sizing (100 kg/annum) and exposure frequency of 250 days/year. ^cBased on removal in inherent biodegradability study.

The risk of the release of all the imported notified polymer can be estimated by determining the aquatic risk quotient ($RQ = PEC/PNEC$).

Process	PEC	PNEC	Risk Quotient (RQ)
Sizing	0.044 mg/L	2 mg/L	0.022
Desizing	0.059 mg/L	2 mg/L	0.030

The above risk quotients indicate an acceptable risk ($RQ \gg 1$) to aquatic organisms from both the sizing and desizing facilities.

It is expected that the notified polymer disposed of to landfill will associate with sediments and organic phases of soil and sediments and will slowly degrade to simple carbon compounds.

10.2. Occupational Health and Safety

The OHS risk presented by the notified polymer is expected to be low. The notified polymer may be present in formulations containing hazardous ingredients. If these formulations 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.

The level of atmospheric nuisance dust should be maintained as low as possible. The NOHSC exposure standard for atmospheric dust is 10 mg/m³.

10.3. Public Health

The notified polymer is removed from the textile as part of the industrial processing of the yarn.

As there will be no exposure of the public to the notified polymer the risk to the public from exposure to the notified polymer 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 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 when used in the proposed manner.

12. MATERIAL SAFETY DATA SHEET

12.1. Material Safety Data Sheet

The notifier has provided MSDS as part of the notification statement. 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, 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

- The notified polymer and residues of the notified polymer should be disposed of in accordance with federal, State and local environmental control regulations.

Disposal

- The notified polymer should be disposed of by either incinerating or disposed of to landfill.

Emergency procedures

- Spills of the notified polymer should be handled by containment, swept or vacuumed up and seal in properly labelled containers for disposal.

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.