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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in Neocryl A1120

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For enquiries please contact the Administration Coordinator at:

Street Address: 92 -94 Parramatta Rd CAMPERDOWN NSW 2050, AUSTRALIA
Postal Address: GPO Box 58, SYDNEY NSW 2001, AUSTRALIA
Telephone: (61) (02) 9577 9514 FAX (61) (02) 9577 9465

Director
Chemicals Notification and Assessment

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FULL PUBLIC REPORT**Polymer in Neocryl A1120****1. APPLICANT**

Orica Australia Pty Ltd of 1 Nicholson Street MELBOURNE, VIC 3000 (ABN 99 004 117 828) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC) Polymer in Neocryl A1120.

2. IDENTITY OF THE CHEMICAL

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

Marketing names: Neocryl A1120

3. POLYMER COMPOSITION AND PURITY

Details of the polymer composition have been exempted from publication in the Full Public Report.

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

Physical and chemical properties of the notified polymer are listed below except the appearance which is for the polymer dispersion.

Property	Result	Comments
Appearance		Neocryl A1120 is a white milky liquid.
Melting point	Not determined.	The polymer is in an aqueous dispersion.
Density	1 020 kg/m ³	The calculated value is 1 040 kg/m ³ .

Water solubility	Practically insoluble (dispersion)	
Particle size	Not determined.	The polymer is not isolated from its dispersion in water.
Flammability	Not determined.	The polymer is in an aqueous dispersion.
Autoignition temperature	Not determined.	The polymer is in an aqueous dispersion.
Explosive properties	The polymer is stable.	
Stability/reactivity	The carboxylic acid group may under go further reaction.	
Hydrolysis as a function of pH	Not determined	See comments below
Partition coefficient	Not determined	See comments below
Adsorption/desorption	Not determined	See comments below
Dissociation constant	Not determined	See comments below

5.1 Comments on physical and chemical properties

Despite the presence of some carboxylate salt, the notified polymer is practically insoluble in water. The submission indicates that it will behave as a dispersion in water if a surfactant is added. When surfactant is added to the polymer, it is adsorbed at the polymer-water interface to disperse the polymer solids in water. In addition, the presence of ammonia imparts an anionic charge to the surface of the particle by partially neutralising the carboxylic acid groups. Even in the presence of surfactants, however, dispersion polymers (typically containing 40-50% polymer solid) are virtually (99.95%) insoluble in water (Guiney et al, 1997).

Hydrolysis of the notified polymer was not determined. The ester and amide groups could hydrolyse, but this is unlikely under environmental conditions (pH 4-9) due to the water insolubility.

The partition coefficient of the notified polymer was not determined. It is likely to preferentially partition into the non-polar phase, again due to the water insolubility.

The adsorption/desorption behaviour of the notified polymer was not determined. Dispersion polymers will bind tightly to organics within soils and sediments.

The dissociation constant of the notified polymer was not determined. The notified polymer contains a readily dissociable proton and would be expected to partially dissociate under environmental (pH 4-9) conditions, particularly in an acidic environment.

6. USE, VOLUME AND FORMULATION

Use:

The notified polymer will be imported as an ingredient in Neocryl A1120 that will be used in the manufacture of aqueous printing inks used for printing on plastic items such as plastic food packaging.

Manufacture/Import volume:

The notifier estimates that approximately 20 tonnes of the notified polymer will be imported in the first year increasing to 50 tonnes in years 2-5 of importation.

Formulation details:

Neocryl A1120 is formulated as a 55% (total solids) aqueous dispersion and packed in 120 L open head polyethylene drums or 1000 kg polyethylene IBCs. Of the total solid components of Neocryl A1120, 20% is the notified polymer.

Formulated inks will contain about 20% of total polymer solids, or 4% the notified polymer, and are packed in 60 L open head plastic containers or 1000 kg plastic bins.

7. OCCUPATIONAL EXPOSURE

The ink formulation will be manufactured and used in accordance with the following process:

Polymer and Blending in Batch adjustment Filling of Warehouse for
adjuvants ⇒ mixer ⇒ and testing ⇒ containers ⇒ distribution

Stirring of ink ⇒ Pump into Application of Ink air dried Finished article
⇒ trays ⇒ ink ⇒ onto surface ⇒

Exposure route	Exposure details	Controls indicated by notifier
Formulation		
<i>Storemen (20 workers, 10 days/year)</i>		
None	Load/unload drums from trucks. No exposure anticipated except in the event of an accident.	Not specified.
<i>Ink makeup (20 workers, 2 hrs/day and 20 days/year)</i>		
skin, eye	Remove lids, insert pump lances and pump the product into mixing tanks.	Exhaust ventilation. Overalls, impervious gloves and splash goggles
<i>Quality control (10 workers, 1 hr/day and 20 days/year)</i>		
skin, eye	Q.C. testing, small volumes	Not specified.

handled.

Fillers (20 workers, 2 hrs/day and 20 days/year)

skin, eye	Automatic operation.	Exhaust ventilation.
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End use

Printery workers (50 workers, 1 hr/day and 200 days/year)

skin, eye	Adding ink mechanically to ink trays.	Exhaust ventilation.
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Overalls, impervious gloves and splash goggles

Cleaners (50 workers, 1 hr/day and 200 days/year)

skin, eye	Cleaning of equipment at the end of a print run.	Exhaust ventilation.
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Overalls, impervious gloves and splash goggles

Transport and storage

Dock/Transport workers (4 workers, 10 days/year)

None	Unloading and transporting of shipping containers. Exposure will only occur in the event of an accident.	Not specified.
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United transport workers at warehouse (8 workers, 10 days/year)

None	Unloading and transporting of shipping containers. Exposure will only occur in the event of an accident.	Not specified.
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Dried ink on plastic wrapping is not anticipated to be bioavailable.

8. PUBLIC EXPOSURE

The notified polymer is not available for sale to the public. The potential for public exposure to the notified polymer during transport, reformulation or disposal is likely to be negligible. Although members of the public will make dermal contact with dried form of the notified polymer when handling items such as food packaging materials printed with ink containing the notified polymer, public exposure is expected to be low.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

Site of Formulation

There is potential for environmental release of the notified polymer during the formulation of ink products and batch adjustment/testing phases. Any spills would be contained within the plant through bunding.

It is estimated that waste material, containing approximately 1,500 kg per annum of the notified polymer, will be generated by minor spills (50 kg), cleaning out manufacturing equipment during ink formulation (1,000 kg), and residual in drums (450 kg). This aqueous waste will be treated with flocculants and the solids will be disposed of to landfill by licensed contractors.

End Use

There is potential for the environmental release of ink containing the notified polymer when pumping ink to the application trays.

It is estimated that up to 500 kg per annum of notified polymer waste will be generated during washing of printing equipment. This waste will be collected from the source by licensed waste contractors, treated with flocculants and disposed of to landfill. Empty containers may contain up to 100 kg of residual polymer waste. These are sent to drum recyclers for rinsing with water. The rinsate is treated as above.

Storage and Transport

Transport of drums and bulk containers to the customer is by road. There is little potential for environmental release during storage and transport, except in the case of an accidental spill.

Overall Release

Standard engineering controls should greatly lessen the chance of direct environmental release of the notified polymer during ink formulation and use in the printing process. Total waste containing up to 2,100 kg of the notified polymer may be released to landfill per annum from formulation and application. Ultimately, nearly all of the notified polymer is expected to reside in landfill from the disposal of used plastic products.

9.2. Fate

The majority of the notified polymer from spills, cleaning, wash water and recycling of packaging will go to landfill. Dispersion polymers exhibit a strong potential to sorb to soils, sludges, and sediments, and will be virtually immobile when associated with organic matter (Guiney et al, 1997). Dispersion polymers are not readily biodegradable but would be subject to slow degradation from biotic and abiotic processes.

In water, the notified polymer would be expected to dilute and disperse, and eventually partition into sediments and sludges. The polymer is not expected to cross biological membranes due to its high molecular weight, and is not expected to bioaccumulate (Connell, 1990).

10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological data were provided.

The notified polymer is not classified as a hazardous substance according to the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHGSC, 1999b). It contains low level of residual monomers. No hazardous impurities, additives and adjuvants are present at above the cutoffs for classification of the notified polymer as a hazardous substance.

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were provided.

12. ENVIRONMENTAL RISK ASSESSMENT

Release of waste products containing the notified polymer to the aquatic environment is likely in cases of random dumping. The majority of the notified polymer will follow the fate of the products in which it is incorporated and eventually be disposed of in landfill. In landfill, the polymer is unlikely to be mobile in the soil environment and would be expected to very slowly degrade to gases such as carbon dioxide and oxides of nitrogen through abiotic and biotic processes. Significant biodegradation is not expected, as dispersion polymers are virtually immobile when bound to organics. Therefore, leaching of the dispersion polymer is not anticipated in landfill.

The notified polymer is virtually insoluble in water and presents limited bioavailability to aquatic organisms. Aquatic toxicity studies have indicated that dispersion polymers are of low concern as they tend to strongly sorb to available organics, thereby reducing exposure to aquatic species (Guiney et al, 1997). This, coupled with the likely low and dispersed nature of release to the aquatic sector, suggests that the risk of significant aquatic damage is low.

Overall, the environmental risk associated with the introduction of the notified polymer is low.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

No toxicological data have been supplied for the notified polymer, and therefore the substance cannot be assessed against the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b). Since the notified polymer has a high NAMW and a low percentage of low molecular species, absorption across biological membranes would be restricted. Neocryl A1120 contains approximately 11% notified polymer with the balance being water and other polymer solids. According to the MSDS supplied, ingestion of Neocryl A-1120 may cause nausea, vomiting. It can also result in irritation of eyes, skin and respiratory tract (aerosols).

13.2. Occupational health and safety

During importation, transportation, distribution and storage of the notified polymer, there is unlikely to be any worker exposure, except in the event of a spill. Exposure after a spill would be minimised by workers following the recommended practices for spillage clean-up given in the MSDS supplied by the notifier.

During formulation, there is potential for dermal and ocular exposure by direct contact when manually transferring the polymer dispersion into the mixer and cleaning mixing vessels. The notifier recommends the use of exhaust ventilation and workers will wear goggles, impervious gloves and overalls during these activities to control the risk of adverse health effects resulting from any dermal and eye contact with the notified polymer. Blending and transfer to packages or containers occur within closed systems and exposure to the notified polymer is expected to be negligible during these operations. Due to low occupational exposure and anticipated low toxicity, the health risk for formulation workers is expected to be low.

During coating applications, the ink is stirred and pumped manually into ink trays. From then on, the process is automated to pump the ink continuously from the ink tray to a chamber in the print press and finally to a roller and printing plate. The operations during which skin and eye exposure may occur are during manual transfer of ink to the ink trays and clean up equipment at the end of a printing run. During these operations, workers are expected to wear goggles, gloves and industrial clothing and the area fitted with exhaust ventilation. These control measures are sufficient to minimise the risk of adverse health effects from exposure to the notified polymer. Once dried, the notified polymer is not bioavailable.

Conclusion

Although the notified polymer per se is unlikely to cause adverse health effects, Neocryl A1120 may cause irritation and risk reduction measures are necessary to reduce exposure to workers during formulation.

13.3. Public health

The notified polymer is not available for sale to the public. Although members of the public will make dermal contact with the dried form of the notified polymer when handling items such as food packaging materials printed with ink containing the notified polymer, the risk to public health from the notified polymer is likely to be low because the notified polymer is unlikely to be bioavailable.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS for Neocryl A1120 was 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 Neocryl A1120 was 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

Control Measures

Occupational Health and Safety

- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer:
 - 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.
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer:
 - Protective eyewear, chemical resistant industrial clothing and footwear and impermeable gloves should be used during occupational use of the products containing the notified polymer.

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.

15.1 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 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.

16. REFERENCES

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