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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Synkyd 50

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Synkyd 50

1. APPLICANT

Swift and Company Limited of 64 Trenerry Crescent Abbotsford VIC 3067 (ACN: 000 005 578) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern **Synkyd 50**.

2. IDENTITY OF THE CHEMICAL

The chemical name, other names, molecular and structural formulae, molecular weight, spectral data, exact manufacture/import volume, purity, details of the polymer composition, maximum content of residual monomers and site of manufacture or reformulation have been exempted from publication in the Full Public Report.

CAS number: None allocated

Marketing name: Synkyd 50

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

Property	Result	Comments
Appearance	Light coloured solid in flake form.	
Melting point	Not determined.	
Density	1.15 kg/m^3	
Water solubility	Not determined.	Expected to be immiscible with water based on the solubility of the major polymer constituent.
Particle size	Between 1-3 cm on any one size.	
Flammability	Not determined.	Not expected to be flammable. Toxic gases (oxides of carbon and hydrogen) may be generated by combustion.
Autoignition temperature	Not determined.	Not expected to autoignite.
Flash point	>82.2^{o}C.	Method not given.
Explosive properties	Not determined.	
Stability/reactivity	Not expected to degrade or undergo hazardous polymerisation under ambient conditions.	May react with strong oxidising agents.
Hydrolysis as function of pH	Not determined.	
Partition coefficient	Not determined.	
Adsorption/desorption	Not determined.	
Dissociation constant	Not determined.	

5.1 Comments on physical and chemical properties

The polymer is manufactured as a solid in flake form. The water solubility of the polymer has not been determined but the notifier expects the polymer to be of very low solubility in water based on the insolubility in water of the major component. The polymer is expected to be of very low solubility in water because it is non-ionic, of high molecular weight and contains a very high level of hydrophobic aromatic and aliphatic groups.

Despite containing ester linkages, the polymer is not expected to undergo hydrolysis in the environmental pH range of 4-9, due to the expected low water solubility.

The notified polymer contains only reactive functional groups of low concern. It is expected to remain stable under ambient conditions although it may react with strong oxidising agents.

6. USE, VOLUME AND FORMULATION

Use:
The notified polymer is a resin used in the manufacture of ink products that are used in the printing industry. It is used to improve ink transfer, obtain higher gloss, provide better water resistance and obtain better printing performance.

Volume:
A maximum of 100 000 kg of the notified polymer per year will be imported for 5 years.

Formulation:
The notified polymer will be imported in the form of Synkyd 50 in 25 kg bags, warehoused, then sold directly to ink reformulators. During reformulation the 25 kg bags of notified polymer are transferred into a holding hopper and weigh station. A measured quantity is then transferred into 1400 kg mixing vessels, and other reagents are added and mixed. There are normally three mixing vessels operating simultaneously. The resultant ink product is then passed through an enclosed bead mill, remixed in mixing vessels and transferred via a manifold system to 15 kg pails, 200 L drums or 1200 kg tote tanks within bunded process areas. The final ink products will contain approximately 25% notified polymer. The reformulation process is automated and occurs in the presence of a local extraction system. The final ink products will be sold directly to printing organisations for newspaper and magazine printing.

During end-use, the final ink product is transferred from the tote tanks or road tanker using a pump and transfer hoses, into a holding tank that may automatically feed a smaller reservoir. The final ink product is applied to printing paper using rotary offset presses in a process termed lithographic offset printing. During this process ink rollers are impregnated with ink, which is transferred to a plate cylinder and rubber blanket and then to the material to be printed. The ink transfer and lithographic offset printing processes are fully automated. Ventilation and extraction systems are present along the length of the printing equipment.

7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
Formulation		
Plant Operators (5-10 workers)		
Dermal and inhalation	8 h/day, 8-75 days/year; workers may be exposed to airborne dust particles when transferring Synkyd 50 into the holding hopper and to drips and spills of the 25% polymer solution when connecting transfer lines.	Coveralls, eye protection, vinyl or rubber gloves and safety boots. The transfer and reformulation processes automated. A local extraction system is located in the mixing area.
QC testing (2 workers)		
Dermal	8 h/day, 8-75 days/year; workers may be exposed to drips and spills of the 25% polymer solution as they collect samples and analyse the contents.	Coveralls, eye protection, gloves and safety boots. A local extraction system is located in the mixing area.
End use		
Application of ink to newsprint (80 workers)		
Dermal and inhalation	8 h/day, 340-360 days/year; workers may be exposed to aerosols of the 25% polymer solution generated during the printing process and to drips and spills of the 25% polymer solution when connecting transfer lines and the cleaning of printing equipment.	Coveralls, eye protection, gloves and safety boots. An automated process is used to dispense the ink product. Ventilation and extraction systems are present along the length of the printing equipment.
Transport and storage		
Unload 25 kg bags at waterside (2-4 workers)		
None	8 h/day, 10-15 days/year; No exposure expected except in case of accident.	
Transport of 25 kg bags (2-4 workers)		
None	8 h/day, 10-15 days/year; No exposure expected except in case of accident.	
Storage of 25 kg bags (2-4 workers)		
None	8 h/day, 10-15 days/year; No exposure expected except in case of accident.	

Adverse Effect Reporting

The notifier advised that no health effects have been reported from the occupational use of the notified polymer.

8. PUBLIC EXPOSURE

The notified polymer will not be sold to the general public. Once applied to the paper and dried, the ink is unlikely to be removed easily, due to the high durability, chemical resistance and strong adhesive properties of inks containing the notified polymer. Consequently the potential for public exposure to the notified polymer is expected to be low when used in the proposed manner.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

The notified polymer will not be manufactured in Australia. It will be imported for reformulation into ink products. Estimates of release were provided in the application.

Storage and transport: Spills or leaks from truck deliveries to and from the Swift & Co. warehouse and reformulation site(s) are unlikely except in the case of an accident. Up to 500 kg/year of the notified chemical will be lost due to spills, leaks or accidents and includes spills or leaks as a result of transfer between bags, hoppers and mixing vessels at the reformulation site(s). The spills or leaks will be either collected within a bunded area, or contained and collected into drums and disposed off-site by a licensed waste contractor. The site of disposal was not specified but the solid nature of the waste would suggest that trade waste land-fill will be the final disposal site.

Reformulation: Up to 995 kg/year of waste will be generated as a result of polymer remaining in bags after transfer into mixing vessels. The bags containing waste residual polymer will be disposed of to land-fill by licensed waste contractors.

During manufacture of the ink product, 1% of the ink product (containing 25% of the notified polymer) may be lost due to spills and leaks. This is equivalent to a maximum loss of 246 kg/year of the notified polymer. Any spilled finished ink product will be collected into drums and disposed off-site by a licensed waste contractor. The notifier did not specify the site of disposal, but it is assumed to be trade waste land-fill.

Application: Up to 245 kg/year of the notified polymer will remain in final ink product containers after being dispensed during the printing process. The containers holding residual ink product are generally disposed of to land-fill.

Up to 245 kg/year of waste polymer may be generated as a result of spills or leaks of the ink product during application to various paper products. The spills or leaks are generally

contained and collected into drums and disposed of by a licensed waste contractor. The notifier did not specify the site of disposal, but it is assumed to be trade waste land-fill.

The total environmental release from the above three situations is 2231 kg notified polymer per annum.

9.2. Fate

The printed paper products at the end of their useful life will either be recycled or disposed of to land-fill. During recycling, waste paper is pulped and de-inked. After pulping, the contaminants and ink are separated from the fibres by pumping the stock through various heat washing, screening, cleaning, flotation and dispersion stages. Polymer removed from the paper will most likely be incorporated with the sludge that remains after recycling, due to its predicted low solubility in water. Sludge is likely to be discarded to land-fill or incinerated. Combustion products are likely to be oxides of carbon and water vapour.

Polymer waste generated during manufacture, formulation and application will be sent to land-fill. Once in land-fill, leaching of the polymer is unlikely to occur due to its predicted low solubility in water. Polymer disposed of in this way could be expected to degrade slowly via biotic and abiotic processes.

Any polymer accidentally entering waterways would be expected to settle out and bind to sediments, where it would slowly degrade. The polymer is not expected to cross biological membranes, due to its high molecular weight and predicted low water solubility, and should not bioaccumulate (Connell, 1990).

10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological data were submitted.

The health hazards of the constituents and hazardous impurities, additives and adjuvants are tabulated below.

Chemical	Health hazards (NOHSC, 1999a)	Regulatory controls
Constituents		
The identity of the polymer constituents have been exempted from publication in the Full Public Report	None	None
Hazardous impurities		
None	Not applicable	Not applicable
Additives/adjuvants		
None	Not applicable	Not applicable

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were submitted.

12. ENVIRONMENTAL HAZARD (RISK) ASSSESSMENT

Notified polymer waste from reformulation, printing or disposal/recycling, is ultimately expected to be released to land-fill or incinerated. Polymer released to land-fill is unlikely to be mobile in the soil environment and would be expected to slowly degrade to carbon dioxide gas through abiotic and biotic processes. The environmental hazard of the notified polymer in land-fill is expected to be low. Incinerated polymer would be rapidly destroyed and converted to water vapour and oxides of carbon.

Minimal release to water is expected during normal use of the polymer. In the event of accidental release of the polymer into waterways, it is expected to settle to the bottom and bind to sediments where it would slowly degrade. The long term environmental hazard of the notified polymer in the aquatic environment is expected to be low.

The polymer's large molecular weight and predicted low water solubility should prevent bioaccumulation. Given the above, the overall environmental hazard is expected to be low.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

No toxicological data have been provided for the notified polymer and therefore the substance cannot be classified in accordance with the NOHSC Approved Criteria for Classifying Hazardous Substances (National Occupational Health and Safety Commission, 1999b). However, the systemic toxicity of the notified polymer is likely to be low, given its high molecular weight and consequent low bioavailability.

The other ingredients present in the final ink products are not hazardous.

13.2. Occupational health and safety

Occupational exposure to the notified polymer 25 kg bags would only be envisaged following accidental puncture of the bags. The health risk is assessed as low, given the high molecular weight and anticipated low toxicity.

Airborne particles of dust or aerosols may be generated during transfer or reformulation. However, given that the transfer, reformulation and packaging of Synkyd 50 are conducted in the presence of a local extraction system, the potential for inhalation exposure is low. Exposure to drips and spills of the 25% polymer solution will be controlled by personal protective equipment. Given these engineering and personal controls and the expected low toxicity of the notified polymer, the health risk to workers during reformulation is assessed as low.

Quality control technicians may receive dermal contact from drips and spills of the 25% polymer solution. Exposure will be controlled by personal protective equipment. Given these

controls and the expected low toxicity of the notified polymer, the health risk to quality control technicians is assessed as low.

Application operators may be exposed to aerosols of the 25% notified polymer solution generated during the printing process and to drips and spills when connecting transfer lines. Given that the transfer and the lithographic offset printing process are fully automated and conducted in the presence of ventilation and extraction systems, the potential for inhalation exposure is low. Dermal exposure will be controlled by personal protective equipment such as coveralls, gloves, eye protection and safety boots. Under these circumstances, given the expected low toxicity of the notified polymer and the equipment used to control exposure, the health risk to application operators is considered to be low. As the product has been designed for high durability it is likely that once dried onto the newsprint, the polymer will be essentially unavailable for absorption. The health risk to application workers from the notified polymer on newsprint would be negligible.

Based on the information provided, Synkyd 50 is unlikely to pose a health risk to workers.

13.3. Public health

The final ink products will not be sold to the general public but will be used as newsprint for newspapers and magazines available to the public. Once applied to the paper and dried, the ink is likely to be durable and not easily removed. This will render the notified polymer biologically unavailable, consequently the potential for public exposure to the notified polymer is expected to be low.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS for Synkyd 50 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 Synkyd 50 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

To minimise occupational exposure to Synkyd 50, the following guidelines and precautions should be observed:

- Protective eyewear, chemical resistant industrial clothing and footwear and impermeable gloves should be used during occupational use of the products containing the notified polymer; where engineering controls and work practices do

not reduce vapour and particulate exposure to safe levels, an air fed respirator should also be used;

- 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;

- A copy of the MSDS should be easily accessible to employees.

If products containing the notified chemical are hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b), workplace practices and control procedures consistent with State and territory hazardous substances regulations must be in operation.

Guidance in selection of protective eyewear may be obtained from Australian Standard (AS) 1336 (Standards Australia, 1994) and Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992); for industrial clothing, guidance may be found in AS 3765.2 (Standards Australia, 1990); for impermeable gloves or mittens, in AS 2161.2 (Standards Australia/ Standards New Zealand, 1998); for occupational footwear, in AS/NZS 2210 (Standards Australia/ Standards New Zealand, 1994a); for respirators, in AS/NZS 1715 (Standards Australia/ Standards New Zealand, 1994b) and AS/NZS 1716 (Standards Australia/ Standards New Zealand, 1994c).

16. REQUIREMENTS FOR SECONDARY NOTIFICATION

Secondary notification may be required if:

(i) any of the circumstances stipulated under subsection 64(2) of the Act arise. If any importer or manufacturer of (the notified polymer) becomes aware of any of these circumstances, they must notify the Director within 28 days; or

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

17. REFERENCES

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National Occupational Health and Safety Commission (1999b) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)]. Australian Government Publishing Service, Canberra.

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Wyatt P. J. (1993) Light scattering and the absolute characterisation of macromolecules. Analytica Chimica Acta, 272: 1-40.