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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in DSX-3000

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FULL PUBLIC REPORT**Polymer in DSX-3000****1. APPLICANT**

Cognis Australia of 83 Maffra St BROADMEADOWS VIC 3047 (ACN 006 374 456) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC) Polymer in DSX-3000.

2. IDENTITY OF THE CHEMICAL

The chemical name, CAS number, molecular and structural formulae, spectral data, details of the polymer composition and exact concentration in products containing the polymer have been exempted from publication in the Full Public Report.

Marketing names: The notified polymer will be imported in an aqueous solution, DSX-3000.

Reactive functional groups: hydroxyl (low concern)

Molecular weight (MW):

| Number-average MW | Weight-average MW | % MW < 1000 | % MW < 500 | Method |
|-------------------|-------------------|-------------|------------|--------|
| 8200 | 20400 | 0.7% | 0.4% | GPC |

Structural identification method: Infrared spectroscopy.

3. POLYMER COMPOSITION AND PURITY

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

Purity (%): > 50%

Hazardous impurities (other than residual monomers and reactants): 0.1%.

Non-hazardous impurities at 1% by weight or more: < 50%.

Additives/adjuvants: None.

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

| Property | Result | Comments |
|---------------------------------|--------------------------------------|----------------------------|
| Appearance | Amber liquid. | Imported aqueous solution. |
| Melting point | < 0°C | |
| Density | 1100 kg/m ³ | Imported aqueous solution. |
| Water solubility | 1 – 10% | Moderate. |
| Stability/reactivity | Not expected to undergo degradation. | Notified polymer. |
| Flammability limits | Not flammable. | |
| Autoignition temperature | Not expected to autoignite | |
| Explosive properties | Not explosive. | |
| Flash point | > 150°C | Imported aqueous solution. |

5.1 Comments on physical and chemical properties

The polymer is not expected to undergo hydrolysis in the environmental pH range of between 4 and 9 as it lacks groups generally recognised as hydrolysable.

6. USE, VOLUME AND FORMULATION

Use:

The notified polymer is used as a thickener in low PVC gloss coatings.

Manufacture/Import volume:

The notified polymer will be imported at a level of 300 kg in the first year increasing by 300 kg/year for each year until the fifth year. It will be imported in 20 – 200 L drums as a polymer solution and in 1 – 20 L drums in a formulated coating.

Formulation details:

The notified polymer will be imported in an aqueous solution (< 50%) and formulated into coatings (< 10%).

7. OCCUPATIONAL EXPOSURE

| Exposure route | Exposure details | Controls indicated by notifier |
|--|---|---|
| <i>Transport and Storage</i> | | |
| Shipping and storage of 20 L or 200 L drums containing imported polymer solution and 1 – 20 L drums containing formulated coating (6 – 8 workers, 4 – 6 hr/day, 200 days/year) | | |
| dermal | Possible skin contamination if accidental spillage occurs and clean-up is required. | Standard sturdy containers and use of correct equipment and machinery for internal and external transport. |
| <i>Coating Manufacture</i> | | |
| Laboratory/Quality Assurance (QA), making up test batches and quality control of final product (6 workers, 4 – 6 hr/day, 200 days/year); 50 – 250 batches/year, yr 1 – 5, respectively. | | |
| dermal | Possible skin contamination when preparing small scale formulations or testing small samples prior to can filling. | Safety glasses, disposable gloves and a laboratory coat for personal protection. If deemed necessary, the dispersion of the notified polymer into the coating can be performed in a fumehood. |
| Batch production of 1000 L batches: weighing the notified polymer to a high speed disperser together with other ingredients, dispersion, batch testing, adjusting and filling into cans (15 workers, 4 – 6 hrs/day, 200 days/year) | | |
| dermal | Possible skin contamination during manual weighing and addition of polymer solution to high speed disperser. Subsequent operations enclosed. Possible skin contamination if cleaning or maintenance of machinery is required. | Operators wear overalls, safety glasses and disposable gloves. General and local exhaust ventilation employed. Process largely automated. |
| <i>End Use</i> | | |
| Demonstrating to customers by sales staff including tinting (250 sales staff, 0.5 – 1 hr/day, 200 days/year) and paint application by trade painters (4 – 6 hr/day, 200 days/year) | | |
| dermal and limited ocular | Limited skin contamination to sales staff. Extensive skin contamination of trade painters with formulated paint during brush, roller or spray application. Some ocular contamination from | Overalls worn by trade painters; protective coat by sales staff. |

splashes.

Disposal

Disposal of minor spills, washings from cleaning of manufacturing equipment and rinsing of drums may occur during coating manufacture. Trade painters will wash residue off paint brushes, paint sprayers and rollers into the domestic sewer.

| | | |
|--------|------------------------------|--|
| dermal | Possible skin contamination. | Plant operators wear personal protective equipment described previously. Trade painters wear overalls. |
|--------|------------------------------|--|

8. PUBLIC EXPOSURE

It is expected that during transport, storage, coating manufacture and industrial use, exposure of the public will be minimal except in the event of an accidental spill.

Public exposure to surface coatings containing the notified polymer is expected to be widespread but intermittent, ie limited to periods of home decoration. The likely route of exposure will be dermal with some accidental oral and ocular exposure.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

Good housekeeping, storage and transport of the polymer solution and final product should prevent any spillage. It is expected that in the event of spillage, the notified polymer would be contained by the plant by bunding, collected with absorbent material and removed off site to industrial land fill by licensed waste contractors. Stormwater isolation should minimise direct release of the polymer to the sewage system.

As the notifier did not provide an estimate for the amount of polymer remaining in import drums, it is assumed that 2% will remain in drums, equivalent to 6 kg in the first year increasing progressively to 30 kg in the fifth year. The residue will be washed out with water and disposed of to an on-site waste water treatment plant.

The notifier estimates that the amount of waste polymer generated from washing manufacturing equipment with water will be approximately 3 kg in the first year, increasing progressively to 15 kg in the fifth year. Aqueous waste will be disposed of to an on-site waste water treatment plant.

Waste polymer incorporated into sludge at the waste water treatment plant will be disposed of to registered land fill. Waste water from the plant will eventually be released to the sewage system.

Most of the notified polymer will be applied to intended surfaces. After each application, painting equipment will be cleaned with water, releasing the polymer to the domestic sewer.

As the notifier did not provide an estimate for the overall amount waste polymer that will be generated from the cleaning of equipment, it is assumed that 2% wastage will occur. This is equivalent to 6 kg of waste polymer in the first year increasing progressively to 30 kg in the fifth year. The aqueous waste will most likely be released directly to the sewer, though in a highly diluted form.

The notifier estimates that 2% of paint products will remain in paint cans to be cured in air prior to disposal to land-fill. The amount of polymer waste generated will range from 6 kg in the first year, increasing progressively to 30 kg in the fifth year.

Therefore, total loss to the sewer from manufacture and normal usage of the notified polymer is expected to be 5% per year, equivalent to 15 kg in the first year, increasing progressively to 75 kg in the fifth year. The amount of polymer waste disposed of to land-fill is expected to be 2% per year, equivalent to 6 kg in the first year, increasing progressively to 30 kg in the fifth year.

9.2. Fate

After treatment at the factory waste water treatment plant, a proportion of the notified polymer would be released to the sewer due to the polymer's solubility in water. Some of the polymer entering the sewer as a result of manufacture and end use may assimilate into the sludge at the sewage treatment plant, and some will pass through into receiving waters. Once in the aquatic compartment, the polymer would be expected to disperse. Because of its possible surface active properties, it will eventually partition to the soil compartment and slowly degrade through biotic and abiotic processes.

Despite its water solubility, waste polymer sent to industrial land fill as a component of sludge would be expected to remain physically associated with it. In industrial land fill, polymer adhered to absorbent material as a result of accidental spills, would be expected to be contained within the land-fill site, partitioning to the soil compartment and possibly degrading slowly through biotic and abiotic processes. However, some leaching into the aquatic compartment is a possibility.

The notified polymer will become immobile within a solid, inert matrix once the paint containing it is dry. It will share the fate of the substrate to which it is applied and is not expected to present a significant hazard. Any fragments or flakes of the paint will be of little concern as they are expected to be inert and partition to the soil compartment.

The notified polymer is not expected to cross biological membranes, due to its high molecular weight, and as such should not bioaccumulate (Connell, 1990). The notified polymer is not expected to be bioavailable after the paint is dry, as it will be incorporated within the paint matrix.

10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological data were submitted. The notified polymer has a large excess of one of the constituent monomers. This monomer is not listed as hazardous in any of the standard sources.

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were submitted.

12. ENVIRONMENTAL RISK ASSESSMENT

The majority of the notified polymer will become incorporated in an inert, solid matrix after application. It will follow the fate of the substrate to which it is applied and is not expected to be an environmental hazard.

Waste polymer disposed of to industrial land fill as a component of sludge or as a result of accidental spills at the factory, is expected to be contained within the land fill site. Polymer incorporated within dry paint in empty paint cans is expected to be immobile and inert. Therefore polymer disposed of to land fill is not expected to present an environmental hazard. A comparatively small amount of polymer will be released to the sewer as a result of manufacture and use. Based on use throughout Australia the Predicted Environmental Concentration (PEC) in receiving waters would be:

| | |
|---------------------------|---|
| Amount released to sewer: | 75 kg |
| Population of Australia: | 18 million |
| Volume of water/person: | 150 L |
| Volume of sewage: | $18 \times 10^6 \times 150 \text{ L} = 2.7 \times 10^9 \text{ L}$ |
| Concentration in sewage: | 0.03 µg/L |

On release to receiving waters after treatment at the sewage treatment plant, it is assumed that the effluent is diluted by a factor of 10 for metropolitan areas and by 2 for inland areas. This gives a final PEC in receiving waters of 0.003 µg/L (metropolitan) or 0.015 µg/L (inland) which are well below expected aquatic toxicity levels for non-ionic polymers with molecular weight greater than 1 000 (Boethling and Nabholz, 1997).

The main environmental hazard arises from spillage in transport accidents where quantities of the polymer may be released to drains and waterways. Once in the aquatic compartment, the polymer would be expected to disperse rapidly and eventually partition to the soil compartment where it would slowly degrade through biotic and abiotic processes.

The low environmental exposure of the polymer as a result of the proposed use indicates the overall environmental hazard should be low.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

The notified polymer fulfils the criteria for a synthetic polymer of low concern and is not considered a health hazard.

13.2. Occupational health and safety

Exposure of workers to the notified polymer during transport and storage of the imported polymer solution or coatings containing it is unlikely except in the event of accidental spillage. Consequently, the risk of adverse health effects to workers is low.

The imported polymer solution is weighed out and added to an enclosed dispersion system fitted with local exhaust ventilation to capture any mists or vapours. Small samples are removed for QA prior to automatic can filling. When formulated into coatings the polymer is at a very low concentration. Exposure to polymer during machine maintenance and cleaning and spills during can filling would be low on this basis. Some exposure to spills may be expected during transfer of the imported polymer solution to the dispersion system and this should be controlled by workers wearing disposable gloves, safety glasses and overalls.

The final coatings are applied in the normal manner by brush, roller or spray by trade painters. Dermal exposure to the coatings can be extensive during application and equipment cleaning however, the very low concentration of polymer in the coatings means a low risk of adverse health effects from the notified polymer.

It is concluded that there is a low risk of adverse health effects to workers involved in transport, storage, quality control testing, use or disposal of the notified polymer due to the low hazard and low exposure concentrations once the notified polymer is mixed. The use of personal protective equipment will further minimise exposure.

13.3. Public health

The public can potentially come into contact with the notified polymer in the event of accidental spillage during transport of the imported polymer solution and paints, during application by home handypersons and when dried or coated on hard surfaces. There is no risk to public health arising from these scenarios. The notified polymer in dried surface coatings is unavailable for absorption and exposure is expected to be low.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS of the notified polymer 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 the notified polymer 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

No special precautions are required for the notified polymer, however, in the interests of good OHS, the following practices and guidelines 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;
- Spillage of the notified polymer should be cleaned up promptly with absorbents and 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, 1999), 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) or other internationally acceptable standards.

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

Boethling R. S. and J. V. Nabholz (1997) Environmental Assessment of Polymers under the U.S. Toxic Substances Control Act, Chapter 10 (pp 187-234) of Ecological Assessment of Polymers, J. D. Hamilton and R. Sutcliffe (Eds), Van Nostrand Reinhold.

Connell D. W. (1990) General characteristics of organic compounds which exhibit bioaccumulation. In Connell D. W., (Ed) Bioaccumulation of Xenobiotic Compounds. CRC Press, Boca Raton, USA.

National Occupational Health and Safety Commission (1994a) National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commission (1994b) National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]. Australian Government Publishing Service, Canberra.

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

Standards Australia (1990) Australian Standard 3765.2-1990, Clothing for Protection against Hazardous Chemicals Part 2 Limited protection against specific chemicals. Standards Association of Australia.

Standards Australia (1994) Australian Standard 1336-1994, Eye protection in the Industrial Environment. Standards Association of Australia.

Standards Australia/Standards New Zealand (1992) Australian/New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994a) Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994b) Australian/New Zealand Standard 1715-1994, Use and Maintenance of Respiratory Protective Devices. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1994c) Australian/New Zealand Standard 1716-1994, Respiratory Protective Devices. Standards Association of Australia/Standards Association of New Zealand.

Standards Australia/Standards New Zealand (1998) Australian/New Zealand Standard 2161.2-1998, Occupational protective gloves, Part 2: General requirements. Standards Association of Australia/Standards Association of New Zealand.