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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

Synocure 866D

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

Synocure 866SD

1. APPLICANT

T R (Chemicals Australia) Pty Ltd of 195 Briens Road NORTHMEAD NSW 2152 has submitted a limited notification statement in support of their application for an assessment certificate for Synocure 866SD.

2. IDENTITY OF THE CHEMICAL

Claims were made and accepted for the identity of Synocure 866SD to be exempt from publication in the Full Public Report. The data items were: chemical name; CAS number; molecular and structural formulae; polymer constituents and residual monomer content.

Trade Name:	Synocure 866SD
Number-Average Molecular Weight (NAMW):	> 2 500
Method of Detection and Determination:	The polymer is characterised by gel permeation chromatography and identified by infrared spectroscopy.

3. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer will be imported as a solution in a mixture with ethyl-3-ethoxypropionate (solvent). The properties reported below are those of the solution. The flammability properties are due to the solvent.

Appearance at 20°C and 101.3 kPa:	clear pale straw mobile liquid when in solvent
Boiling Point:	160°C
Specific Gravity:	1.07 at 20°C
Vapour Pressure:	not determined

Water Solubility:	< 0.5 mg/L
Hydrolysis as a Function of pH:	no groups are expected to be hydrolysed under normal environmental conditions
Flammability Limits:	Lower Explosive Limit = 1.05 % in air at 88°C (solvent)
Autoignition Temperature:	not determined
Explosive Properties:	not determined
Reactivity/Stability:	not reactive
Particle Size Distribution:	not applicable

Comments on Physico-Chemical Properties

The data provided for the notified polymer satisfies the criteria of Regulation 4A of the Industrial Chemicals (Notification and Assessment) Regulations for the notification category of synthetic polymers of low concern.

Water solubility was determined by mixing known quantities of the polymer and water for 24 hours, then evaporating a 250 mL aliquot of the water phase and a water blank. The residues were weighed to allow calculation of the solubility of the resin from the amount of polymer residue (corrected for residue from the water blank) found in the 250 mL aliquot.

The notifier claims that the polymer will be chemically and environmentally inert as a constituent of vehicle and industrial coatings. While the notified substance contains pendant ester linkages which are inherently susceptible to hydrolytic cleavage, It is noted that:

1. the polymer contains no charged groups or functionalities capable of readily ionising;
2. it is hydrophobic in nature; and
3. it is bound in a cured resin matrix when the coating is cured.

Contact between the potentially reactive functional groups and water (as well as other reactants in the environment), will restrict hydrolysis or other reactions from occurring.

4. PURITY OF THE CHEMICAL

Degree of Purity: 98%

Additives/Adjuvants:

The notified polymer will be as imported in a solution with the solvent ethyl-3-ethoxypropionate and trace amounts of residual monomers

5. USE, VOLUME AND FORMULATION

The notified polymer will not be manufactured in Australia. It will be imported at a volume of 20 tonnes in the first year and less than 30 tonnes per year subsequent years. The polymer will be imported as a 76% solution with ethyl-3-ethoxypropionate to be used in the manufacture of a two pack solvent base refinish acrylic enamels for automotive repair coatings and heavy industrial metal coatings.

6. OCCUPATIONAL EXPOSURE

The notified polymer will be imported in 205L steel drums packed in 20 meter containers (80 drums in each container). The notifier states that the containers are carried from the wharf by Dangerous Goods approved system of transport to three possible storage sites. Six to 8 personnel may be involved.

At the warehouse, the 205L steel drums will be unpacked and stored in bunded areas prior to dispatch to customers. At the four customer sites, the notified polymer will be blended with other components to make one part (Part A) of a two-pack polymer coating. The typical concentration of the notified polymer in two end use polymer coating (paint) products is 36% and 64%. The notifier states that 20 to 25 personnel will be involved in paint formulation. The notifier has not provided any information on paint formulation processes but has stated that there will be exhaust and ventilation systems in place to overcome the effects of organic solvent vapours. The notifier stated those coming into contact with the polymer solution or paint will be wearing suitable organic vapour masks, PVC gloves, goggles and industrial footwear. The paint formulators are expected to carry out atmospheric monitoring for solvent emission.

The notifier states there will be approximately 1 000 paint applicators that will use the paint containing the notified chemical. The notifier has not provided any information on paint application procedures. The coating may be mixed prior to use with other hardners and thinners. Part B containing an isocyanate, is added prior to application However it is expected that the use in automotive repair coating, if typical procedures for this industry are followed, will be carried out in a laminar flow downdraft spray booth which is designed to rapidly remove aerosol particles and solvent vapour from the atmosphere. Several possible booth designs may be used. In a dry floor booth, the overspray will be collected in filters contained in the floor of the booth; any unremoved particulates will reach the exhaust stack with the solvent vapours. In a wet floor booth, overspray will collect in a pool of water below the grill floor or in a wet scrubber in the exhaust and will be removed with a filter. There is no information on the use in heavy industrial metal coating.

Dermal, ocular and inhalation exposure to the notified chemical may occur during paint formulation and paint application.

7. PUBLIC EXPOSURE

No public exposure is expected to occur from transport, except in the case of accidental

spills.

The notified polymer will only be used by professional spray-painters for automotive repair and heavy industrial coatings, and will not be available for sale to the general public. Overspray is estimated to be 20 to 30% of the polymer ie 4 to 6 tonnes, and the overspray would be cured before disposal by incineration or landfill.

8. ENVIRONMENTAL EXPOSURE

Release

Except in the case of accident, no release or exposure to the environment is expected from this polymer during transportation, and the Material Safety Data Sheet (MSDS) for the new resin gives adequate instructions for cleaning up such spills.

It is estimated that up to 5% of the paint may be left in the tins after use and another 5% may be left in the spraying equipment. However, the major release will be as a consequence of overspray during application, which may be as high as 50% of total paint used, despite the claim that the new material will be used only by qualified professional spray painters. Assuming maximum annual imports of 20 tonnes, around 12 000 kg of the new polymer could be released during spray paint application in one year for all sites. It is expected that this release would be on a nationwide basis, with the amount released not significant at any one site.

Material left in cans could be expected to be mixed with residual hardener (at least when used in dedicated spray painting shops), and disposed of with the empty containers into landfill. Paint and solvent residues removed from spray equipment can be collected and reprocessed by a solvent reclamation companies. It is assumed that the entrained solids would be recovered during this process and sent to landfill or incinerated.

Paint residues from spray booths (ie the overspray) would be in the form of dried aggregates or flakes. These would be captured by air filters or on masking paper as solid waste, or washed away with water and discharged to the sewer - possibly after treatment to remove solids. Dried paint captured in air filters could be combined with other solid waste and removed to landfill by qualified licensed contractors, or could possibly be incinerated.

Fate

The notifier indicates that any spilt uncured topcoat formulation containing the new polymer would be expected to associate and assimilate with the organic component of soils and sediments because of its predominantly hydrophobic nature. Biological membranes are not permeable to polymers of very large molecular size, so bioaccumulation of the notified polymer would not be expected following the release of quantities of uncured polymer into the water compartment.

Once applied to the metal panels of vehicles, the notified polymer will be incorporated in a hardened paint matrix and be bound to the surface of metal panels of the vehicles. Any fragments, chips or flakes of the dried paint will be of little concern as they are expected to be inert. The metal panels coated with the polymer are likely to be either recycled for steel

reclamation or be placed into landfill at the end of their useful life. When recycled, the polymer would be destroyed in the blast furnaces and converted to water vapour and oxides of carbon. When deposited into landfill with used paint tins or on discarded panels, the organic components of the cured paint including the new polymer would be inert and immobile, but could nevertheless be expected to be very slowly degraded through the biological and abiotic processes operative in these facilities.

Any of the notified polymer that is released to the sewer would be entrained within insoluble particles and flakes of a cured polymer matrix (paint). These could become associated with the sewer plant sludge and deposited into landfill or incinerated.

9. EVALUATION OF TOXICOLOGICAL DATA

No toxicology data data were submitted. This is acceptable for synthetic polymers of low concern with NAMW > 1 000.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were submitted. This is acceptable for synthetic polymers of low concern with NAMW > 1 000.

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

It is possible that up to 60% (ie a maximum of 12,000 kg per annum) of the new polymer could be released as a consequence of paint application, but as this is expected to be nationwide, it will not be significant at any one site. The majority of the material would be encapsulated in a cured polymer matrix and is expected to be insoluble and inert. Most of this solid waste would be deposited into landfill. However, some of the cured waste paint may be released into sewers as a consequence of cleaning spray equipment or wash down of spray booths. Here it would become incorporated into sewer plant sludge and eventually be either incinerated or placed into landfill.

The polymer is unlikely to present a hazard to the environment when it is incorporated into the paint, applied to solid substrates and cured. The painted objects will be consigned to metal reclamation plants or landfill at the end of their useful lives and the paint containing the notified substance will share their fate.

The main environmental hazard would arise through spillage in transport accidents that may release small quantities of the polymer to drains and waterways. However, the polymer should quickly become immobile on association with the soil/sediment layer.

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

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

Polymer in Synocure 866SD has been notified and accepted as a synthetic polymer of low concern. It can be considered as a low hazard to human health.

Transport and storage workers would not to be exposed to the notified polymer except in the event of accidental spillage.

The polymer solution will be reformulated by the paint manufacturer to make a one part (Part A) of a two-pack polymer coating. The notifier has not provided any detailed information on paint reformulation. If typical industry processes for coating automotive parts are followed, the polymer solution would be pumped into an enclosed mixing vessel fitted with vapour extraction. Following mixing with various additives, the paint components would be drummed off via an automated process into final use containers. This would limit exposure to the hazardous solvents and the notified polymer. The notifier states those coming into contact with the polymer solution or paint will be wearing suitable organic vapour masks, PVC gloves, goggles and industrial footwear.

The imported formulation contains ethyl-3-ethoxypropionate at 23 to 27%. This is not included in NOHSC *List of Designated Hazardous Substances* (National Occupational Health and Safety Commission, 1994). Supplementary summary literature information obtained for this assessment, indicates that ethyl-3-ethoxypropionate is a skin and eye irritant (Sax and Lewis, 1996), and that it may be absorbed rapidly through the gastrointestinal tract (Deisinger *et al,* 1990 Abstract) and can be absorbed via the skin (Barber *et al,* 1992 Abstract). The MSDS lists a number of potential health effects on the skin, namely defatting, drying, cracking, irritation and dermatitis. These are assumed to relate mainly to the solvent, rather than the notified polymer.

Parts A and B of the two-pack polymer coating are mixed by spray painters immediately prior to spraying. Other thinners and hardeners may be added. The potential for inhalation exposure to spray is high unless ventilated spray booths are employed. Some exposure may also occur during clean-up and maintenance. Therefore end users of the paints will need to adopt stringent engineering controls, including ventilation, and the use of personal protective equipment to guard against exposure and health effects of solvents used in spray painting. This level of protection will provide adequate protection against the notified polymer. The use of the paint containing the notified polymer should be in accordance with the NOHSC *Draft National Code of Practice for Spray Painting* (National Occupational Health and Safety Commission, 1991).

There is negligible potential for public exposure to the notified polymer arising from its use in paints. There may be public contact with the notified polymer on the painted surfaces of automobiles, and to a lesser extent with industrial metal coatings, but its adhesion to the substrate and the physico-chemical properties of the cured paint will be sufficient to preclude absorption across the skin or other biological membranes. Therefore, based on its use pattern and physico-chemical characteristics, the notified chemical will not pose a significant hazard to public health.

13. RECOMMENDATIONS

To minimise occupational exposure to Synocure 866SD the following guidelines and precautions should be observed:

- Employers should ensure that NOHSC exposure standards for all of the components of the final paint mix are not exceeded in the workplace;
- Safety goggles should be selected and fitted in accordance with Australian Standard (AS) 1336 (Standards Australia, 1994) to comply with Australian/New Zealand Standard (AS/NZS) 1337 (Standards Australia/Standards New Zealand, 1992);
- Industrial clothing should conform to the specifications detailed in AS 2919 (Standards Australia, 1987) and AS 3765.2 (Standards Australia, 1990);
- Impermeable gloves or mittens should conform to AS 2161 (Standards Australia/ Standards New Zealand, 1998);
- All occupational footwear should conform to AS/NZS 2210 (Standards Australia/ Standards New Zealand, 1994);
- 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;
- Good personal hygiene should be practised to minimise the potential for ingestion;
- A copy of the MSDS should be easily accessible to employees.

14. MATERIAL SAFETY DATA SHEET

The MSDS for the product containing the notified chemical was provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (National Occupational Health and Safety Commission, 1994b).

This MSDS was provided by the applicant as part of the notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of the applicant.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act, secondary notification of the notified chemical shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

16. REFERENCES

Deisinger P.J. Boatman R.J. Guest D. (1990) The metabolism and disposition of 3-ethoxypropionate in the rat, Xenobiotica; Vol 20, pp 989-97.

National Occupational Health and Safety Commission (1991) Draft National Code of Practice for Spray Painting. Australian Government Publishing Service, Canberra.

National Occupational Health and Safety Commision (1994a) List of Designated Hazardous Substances [NOHSC:10005(1994)]. Australian Government Publishing Service, Canberra.

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

Standards Australia (1987) Australian Standard 2919-1987, Industrial Clothing. Standards Association of Australia, Sydney.

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, Sydney.

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

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, Sydney/Wellington.

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

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, Sydney/Wellington.

Sax N.I. and Richard L. Dangerous Properties of Industrial Materials, 7th Edition Van Nostrand Reihold 1996.

Barber E.D., Teetsel N.M., Kolberg K.F. and Guest D. (1992) A comparative study of the rates of in vitro percutaneous absorption of eight chemicals using rat and human skin, Fundam Appl Toxicol; Vol 19, pp 493-7.