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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

LUMIFLON LF-710F

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

LUMIFLON LF-710F

1. APPLICANT

ITOCHU Australia Ltd of 530 Collins Street MELBOURNE VIC 3000 and Dulux Australia of McNaughton Road CLAYTON VIC 3168 have submitted a limited notification statement in support of their application for an assessment certificate for LUMIFLON LF-710F.

2. IDENTITY OF THE CHEMICAL

LUMIFLON LF-710F is not considered to be hazardous based on the nature of the chemical and the data provided. Therefore the chemical name, chemical abstract service number, molecular and structural formulae have been exempted from publication in the Full Public Report and the Summary Report.

Trade name:	LUMIFLON LF-710F
Method of detection and determination:	the notified polymer is separated by gel permeation chromatography and identified by infrared (IR), ultraviolet/visual and nuclear magnetic resonance spectroscopy.

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	pale yellow solid
Odour:	none
Melting Point:	71 - 77°C (softening range)
Glass-transition Temperature:	220°C (approximately)
Density:	1380 kg/m^3 at 22.5°C
Vapour Pressure:	not applicable
Water Solubility:	< 0.1 g/kg at 20°C (1)
Partition Co-efficient (n-octanol/water):	log P_{ow} > 6

Hydrolysis as a function of pH:	not determined
Adsorption/Desorption:	not determined
Dissociation Constant:	pKa not determined
Flash Point:	not determined
Flammability Limits:	not highly flammable
Combustion Products:	thermal decomposition products: carbon monoxide, carbon dioxide, halogen, halogen acids and smoke
Explosive properties:	non-explosive.
Autoignition Temperature:	not auto-flammable
Explosive Properties:	not considered to present any risk of explosion
Reactivity:	oxidising properties not determined; no incompatibility with other substances is known
Particle size distribution:	5-10 mm flakes 10-100 μm (product)

Comments on physico-chemical properties

The test procedure for water solubility was based on the new OECD Draft Guideline: "Solution/Extraction Behaviour of Polymers in water". The content of water extractable parts was determined to be < 0.05 $g.kg^{-1}$. The company concluded the water solubility to be < 0.1 $g.kg^{-1}$.

Hydrolysis was not performed as the water solubility is expected to be very low and there is no suitable analytical method. Hydrolysis under environmental conditions is not expected. There are no groups usually considered as hydrolysable.

The partition coefficient was estimated by calculation using the Leo-Hansch method. The solubilities in water and n-octanol are so poor that a partition experiment by any technique is not possible.

Based on the notified polymer's low water solubility and high log P_{OW} it is likely to adsorb to or be associated with soil/sediment and organic matter and be immobile in soils.

The polymer does not contain ionisable groups and therefore a dissociation constant is not relevant.

4. INDUSTRIAL USE

The notified polymer will not be manufactured in Australia, but will be imported as a component of a pre-formulated powder coatings. The balance of the import will be the polymer itself, with the formulation of the powder coating occuring in Australia. The estimated import volume is > 1 tonne for the next five years.

The notified polymer is used as a component (maximum concentration approximately 60%) in high durability powder coating.

5. OCCUPATIONAL EXPOSURE

The notified polymer will be imported packed in metal drums. The preformulated product will be stored at a warehouse awaiting distribution. The notified polymer will be transported by road to one establishment for formulation into powder coatings. A total of 20 - 25 operators, in three shifts, will weigh the raw materials including the notified polymer, pigments and additives into process hoppers. The ingredients are then dry blended, melt mixed in an extruder, cooled and finally milled to a powder form, sieved and packaged for sale. This process involves dry blending the raw materials, including the notified polymer, which are then melt mixed in an extruder, cooled and milled into powder form, sieved and packaged for sale. Approximately 4 - 5 quality control personnel and 4 - 5 research and development personnel will be exposed to the notified polymer while testing formulated products containing LUMIFLON LF-710F. Each potential source of dust, will be equipped with local exhaust ventilation.

An estimated maximum of 50 workers will apply formulated powder coatings using a low pressure electrostatic powder gun, in ventilated spray booths. Exposure to the notified polymer is possible when loading the feed hopper and cleaning the application equipment and the working area.

6. PUBLIC EXPOSURE

There is some potential for public contact with the notified polymer from the final manufactured articles. However, the notified polymer will be present as a crosslinked hard film polymer matrix with a very high molecular weight and very low water solubility, and this, together with its relatively inert properties, should minimise the public health effects arising from the exposure.

7. ENVIRONMENTAL EXPOSURE

. Release

Releases to the environment from accidents during transporting are expected to be negligible when handled according to the Material Safety Data Sheet (MSDS).

During formulation of powder coating in Australia, release may come from accidental spillage and/or clean-up operations. Airborne polymer dust will be captured by local exhaust ventilation and ducted to a fabric filter baghouse, where all exhaust air is filtered before release. Total process material losses average 4.5% of materials processed and are recovered at an efficiency better than 99%. All process waste will be packed in heavy walled polyethylene bags and disposed to landfill at an approved site.

During application, overspray that is not deposited on the article will be recovered and recycled. Approximately 95% of the powder is utilised, with the remainder collected in dust filters which are disposed of to landfill. Waste water from cleaning operations is processed through settling tanks before discharge to the sewer. This water is regularly tested to water specifications. The settled solids are placed in steel drums and disposed of to landfill at an approved site.

. Fate

Disposal of the notified polymer to landfill is unlikely to result in contamination of surface and ground waters. Its low water solubility and high log P_{ow} indicates it is unlikely to leach.

The products coated with the powder coating containing the notified polymer would be subject to "wear and tear" in everyday use. Chips and dust of the coating would be diffusely dispersed in the environment and form part of the soil or sediments.

The products coated with the powder coating would eventually be disposed of to landfill or recycled by smelting resulting in incineration substances. The final cured product will breakdown at an extremely low rate, if at all.

Combustion of the notified polymer in the presence of excess air will generate oxides of carbon, hydrogen fluoride and chloride, and water.

Contaminated packaging should be disposed of according to local and national regulations.

8. EVALUATION OF TOXICOLOGICAL DATA

Toxicological data are not required for polymers of number-average molecular weight (NAMW) >1000 according to the Act. However, the following study was submitted for the notified polymer.

8.1 Genotoxicity

8.1.1 Induction of Point Mutations (1)

Strains:	*Salmonella typhimurium* TA 1535, TA 100 (base pair substitution) TA 1537, TA 98, (frameshift type) and *Escherichia coli WP2 uvrA* (base pair substitution)
Concentration range:	10, 50 100 500 1000 and 5000 µg/plate
Toxicity to bacteria:	> 5000 µg/plate
Metabolic activation:	Aroclor 1254-induced rat liver S9-mix
Solvent:	acetone
Negative control:	acetone
Positive controls:	2-(2-furyl)-3-(5-nitro-2-fury)acrylamide, sodium azide, 9-aminoacridine,(without metabolic activation) benzo[a]pyrene and 2-aminoanthracene (with metabolic activation)showed a marked mutagenic activity.
Test Method:	based on OECD Guidelines for Testing Chemicals (2)
Result:	no toxicity was exhibited to any of the strains of bacteria used; no significant increases in the number of revertant colonies of bacteria were recorded for any of the strains of bacteria used, at any dose level, either with or without metabolic activation; the positive control substances produced marked increases in the number of revertant colonies with and without metabolic activation

8.4 Overall Assessment of Toxicological Data

LUMIFLON LF-710F was not mutagenic in an Ames *Salmonella* reverse mutation assay in the presence or absence of metabolic activation.

On the basis of submitted data, the notified chemical would not be classified as hazardous in accordance with Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)] in relation to mutagenic effects.

9. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided, which is acceptable for polymers of NAMW > 1000 according to the Act.

The notified polymer is not expected to show ecotoxicity effects as it should not cross membranes and is of low concern (3).

10. ASSESSMENT OF ENVIRONMENTAL HAZARD

The low environmental exposure of the polymer as a result of normal use indicates that the overall environmental hazard should be negligible. The cured polymer will be inert and bound to the article to which it coats.

The main environmental exposure arises from landfill disposal of 1500 kg per annum (worst case) of recovered waste from the air filters during formulation and application processes. As the polymer is expected to be insoluble in water, the polymer waste consigned to landfill is unlikely to degrade or leach and will stay in the landfill. The polymer's neutral form and high molecular weight would ensure it does not cross or react with biological membranes. The environmental hazard from the disposal of the product containing the polymer is rated as negligible.

A small quantity of the polymer could be released from the waste water discharged to the sewer, where it will be diluted by several orders of magnitude and partition to the sludge and trapped in the solids at the sewage treatment works. The solids are disposed by incineration or landfill.

Any polymer particles not trapped by air filters during the formulation and application processes will enter the environment and form part of the soil or sediments. Due to the insoluble nature and its high molecular weight, this is unlikely to pose an environmental hazard.

Instructions in the MSDS are adequate to limit the environmental exposure from spills, and therefore the environmental hazard from possible accident spills should be low.

The overall environmental hazard from the use of the polymer is rated as low.

11. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified polymer is not expected to be a health hazard as the high NAMW (>1000) should preclude absorption of the molecules across biological membranes. The purity of the notified polymer is reported as >99.5%, and residual monomers and other other hazardous impurities are estimated to be present at < 0.2%. Levels of the residual monomers should not render the polymer a health hazard.

As the notified polymer will be formulated in one establishment and each potential source of dust being equipped with local exhaust ventilation, occupational exposure is expected to be low. Potential for exposure occurs during loading the feed hopper and cleaning the application equipment and the working area, but is controlled by simple work practices to minimise dust generation and good hygiene practices.

Given the low hazard of the notified polymer and the likely lack of exposure of the public, under normal conditions the risk of adverse effects on public health is expected to be minimal.

In the case of accidental spillage during transport accompanied by fire, the public may be exposed to toxic materials in smoke. This should be minimised by the use of emergency service procedures which keep members of the public away from the accident area.

12. RECOMMENDATIONS

To minimise occupational exposure to LUMIFLON LF-710F the following guidelines and precautions should be observed:

. if engineering controls and work practices are insufficient to reduce exposure to LUMIFLON LF-710F to a safe level, then the following personal protective equipment which conforms to Australian Standard (AS) or Australian/New Zealand (AS/NZS) should be worn:

  Safety glasses should selected and fitted in accordance to AS 1336 (4) to comply with AS/NZS 1337 (5).

  Impermeable gloves or mittens conforming to AS 2161 (6) and AS 3765.1 (7).

  Industrial clothing must conform to to the specifications detailed in AS 2919 (8)

. in the event of an accidental spill, effective decontamination, vacuuming dust and cleaning of contaminated walls and surfaces must be carried out.

. avoid generation of dust.

. good personal hygiene should be observed.

. a copy of the MSDS should be easily accessible to empolyees.

13. MATERIAL SAFETY DATA SHEET

The MSDS for the notified chemical was provided in accordance with the Code of Practice for the Preparation of Material Safety Data Sheets (9).

This MSDS was provided by the applicant as part of their notification statement. The accuracy of this information remains the responsibility of the applicant.

14. 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.

15. REFERENCES

1. M. Kato., M. Kitahata., 1994, *Salmonella/Escherichia coli plate incorporation mutagenicity assay,* Genetic Laboratory, JBC, Inc., Saitama-ken, Japan.

2. Organisation for Economic Co-operation and Development, OECD *Guidelines for Testing of chemicals*, OECD, Paris, France

3. J. V. Nabholz, P. Miller and M. Zeeman, "*Environmental Risk Assessment of New Chemicals Under the Toxic Substances Control Act TSCA Section Five", in Environmental Toxicology and Risk Assessment*, W. G. Landis, J. S. Hughes and M. A. Lewis (Eds), pp 40-55

4. Australian Standard 1336-1982, *Recommended Practices for Eye Protection in the Industrial Environment*, Standards Association of Australia Publ., Sydney, 1982.

5. Australian Standard 1337-1984, *Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, 1984.

6. Australian Standard 2161-1978, *Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ., Sydney, 1978.

7. Standards Australia 1987, *Australian Standard 2919-1987, Industrial Clothing Clothing,* Standards Association of Australian Publ., Sydney.

8. Standards Australia 1990, *Australian Standard 3765.1-1990, Clothing for Protection against Hazardous Chemicals Part 1 Protection against General or Specific Chemicals,* Standards Association of Australia Publ., Sydney.

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