

File No: LTD/1244

June 2006

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME
(NICNAS)**

FULL PUBLIC REPORT

Epikure 4501

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**Director
NICNAS**

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FULL PUBLIC REPORT

Epikure 4501

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

Dulux Australia Pty Ltd (ABN: 87 004 078 095)
1907 Princes Hwy
CLAYTON VIC 3168

and

Chemiplas Australia Pty Ltd (ABN: 29 003 056 808)
3/112 Wellington Pde
EAST MELBOURNE VIC 3002

NOTIFICATION CATEGORY

Limited: Polymer with NAMW ≥ 1000 (greater than 1 tonne per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication: Chemical name, CAS No., molecular and structural formulae, molecular weight, spectral data, constituents, purity, impurities, import volume, specific use and identity of recipients.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

No variation to the schedule of data requirements is claimed.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

Unknown

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Epikure Curing Agent 4501

MOLECULAR WEIGHT

Number Average Molecular Weight (Mn)	> 1000
Weight Average Molecular Weight (Mw)	> 1000
% of Low MW Species < 1000	< 20
% of Low MW Species < 500	< 10

METHODS OF DETECTION AND DETERMINATION

METHOD	Infrared spectroscopy
Remarks	A reference spectrum was supplied.

3. COMPOSITION

DEGREE OF PURITY

High

HAZARDOUS IMPURITIES/RESIDUAL MONOMERS

None that would render the polymer a hazardous substance.

NON HAZARDOUS IMPURITIES/RESIDUAL MONOMERS (> 1% by weight)

A non hazardous impurity has been identified.

ADDITIVES/ADJUVANTS

None

4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

The pure notified polymer will be imported in 25 kg plastic lined cardboard boxes.

MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Tonnes</i>	30 - 100	30 - 100	30 - 100	30 - 100	30 - 100

USE

A component of a powder coating.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, transport and storage

PORT OF ENTRY

Melbourne.

IDENTITY OF MANUFACTURER/RECIPIENTS

Paint manufacturers.

TRANSPORTATION AND PACKAGING

The 25 kg boxes containing the notified polymer will be transported from the wharf to the reformulation facilities and thence to powder coating factories usually via road.

5.2. Operation description

The notified polymer is typically weighed out into the mixing vessel of an extruder with other addenda. The mixture is heated and mixed then extruded, chipped, micronised and packed.

The powder coating (containing < 20% notified polymer) is sprayed onto objects hanging in specially designed spray booths and cured by heating.

5.3. Occupational exposure

Number and Category of Workers

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration (hrs/day)</i>	<i>Exposure Frequency (days/year)</i>
<i>Importation</i>			
Wharf	2	4	6
Transport to warehouse	2	4	6

<i>Distribution</i>			
Drum handling	6	2	240
<i>Customer site</i>			
Storage	5	1	300
Process workers	35	4	300
Laboratory analysis	5	4	300
Powder coating applicators	3000	5	300

Exposure Details

Warehousing and distribution of the notified polymer involves loading, moving and storing of packaged products containing the notified polymer. No exposure is expected except in the case of accident.

The coating powders containing the notified polymer are typically produced by blending and extruding resins, curing agents, pigments and additives using enclosed and automated systems. The resulting matrix is ground into a fine powder. The powder is stored in automatically sealed bags for use as required. Typically additions to the extruder are from hoppers under local exhaust ventilation to capture dust particles. Local exhaust ventilation is also typically used at the point where the powder is packed. There is potential for dermal and occasional ocular exposure during addition of the notified polymer to the hopper or cleaning up spills.

The powder coating of Medium Density Fibreboard (MDF) occurs in specially designed ovens where the MDF is preheated prior to powder application. The powder is electrostatically attracted to the MDF from residual moisture content after the particles are charged by the spray gun. Otherwise, the process resembles standard powder coating in which articles are hung from hooks, preheated, automatically sprayed, oven-cured and cooled. Typically, overspray is recycled and dust is captured in an enclosed booth. As powder coating onto MDF is more specialised than typical powder coating onto metal, it occurs in large specially designed workplaces and is less likely to involve walk in spray booths where operators may be subject to high exposure. Nevertheless, some inhalation exposure will occur from dust that escapes capture by exhaust ventilation. Dermal and occasional ocular exposure may occur during clean up of spills and cleaning spray booths, filters and other equipment and is typically controlled by the used personal protective equipment (PPE) including dust masks if required.

5.4. Release

RELEASE OF CHEMICAL AT SITE

The notified polymer will be imported into Australia, in sealed 25 kg plastic lined cardboard boxes. The notified polymer is stored and transferred to the formulation facility when required.

In formulation, the raw materials are mixed to form a powder coating of approximately 10% notified polymer. The formulation is a batch process. The mixing vessel is typically positively vented with a full extraction system. The mixed raw material are extruded, then chipped and micronised to form a very fine powder.

During formulation, there is a limited scope for accidental spillage (< 1%) and during cleaning there may be small release (1%). Any release during cleaning or spills will be disposed to landfill. Small volume will remain in the empty drums (1%), this will be disposed to landfill or may undergo incineration.

RELEASE OF CHEMICAL FROM USE

The mixture containing the notified polymer will be distributed to around 500 powder coating establishments. The application method is by electrostatic spraying. The quality of equipment used and the level of release are variable. In general, assembly lines in the large establishments use enclosed spray booths which contain most of the powder sprayed. Many of the smaller establishments use walk-in booths or booths which are not fully enclosed.

Environmental exposure of the notified polymer during powder coating application is expected to be low as electrostatic application is an efficient application method. Powder that does not reach the

target (2%) will be removed using dust extractors or cured in the original container before sending to landfill.

5.5. Disposal

A high proportion of the notified polymer in powder coatings will become immobilised through cross-linking in an insoluble matrix on the sprayed surfaces. At the end of their useful lives they will be disposed of by licensed contractors to landfill.

5.6. Public exposure

The public may be exposed to the notified polymer in the event of transport accident where packaging is breached. Otherwise, the public will only be likely to be exposed to the final cured film on architectural surfaces where the notified polymer will not be bioavailable.

6. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa Coarse white powder or granulates.

Melting Point/Freezing Point Glass transition temperature of 44°C

METHOD Differential Scanning Calorimetry.

Density 700 kg/m³

METHOD ASTM D 1895-96 test method A

Vapour Pressure Not determined

Remarks Expected to be low for a solid.

Water Solubility < 1 g/L at 20°C

METHOD The OECD TG 105 Water Solubility Guideline Method was adjusted to suite conditions at R&D Dulux, Clayton.

Remarks The notified chemical was ground, approximately 0.1 g was diluted in 10 mL of water, stirred for 20 min and allowed one week to dissolve. The same procedure was repeated using 100 mL and 200 mL of water.

Visual inspection of the mixtures showed that the notified chemical water solubility is low. Lumps of swelled material were observed after seven days in all three mixtures.

TEST FACILITY Dulux (2005)

Hydrolysis as a Function of pH Not provided.

Partition Coefficient (n-octanol/water) log P_{ow} = 0.1 to -0.41 (Phthalic acid)
log P_{ow} = 1.63 to -0.62 (Phthalic anhydride)

Remarks Material Safety Data Sheet

Adsorption/Desorption log P_{oc} = 1.56 (Phthalic anhydride)

Remarks Material Safety Data Sheet

Dissociation Constant Not provided but should exhibit dissociation typical of the acidic functionality.

Particle Size Particles less than 3 mm diameter.

Flash Point Not applicable.

Flammability Limits	Not flammable during hot extrusion process.
Autoignition Temperature	Not determined.
Explosive Properties	Not explosive during hot extrusion process.
Reactivity	The notified polymer does not contain highly reactive functional groups.

7. TOXICOLOGICAL INVESTIGATIONS

No toxicity data were submitted

8. ENVIRONMENT

8.1. Environmental fate

No environmental fate data were submitted.

8.2. Ecotoxicological investigations

No ecotoxicity data were submitted.

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

The notified polymer will be imported into Australia. During formulation there is a limited scope for accidental spillage (< 1%) and during cleaning there may be small release (1%). Any release during cleaning or spills will be disposed to landfill.

Small volume remaining in the empty drums (1%) will be disposed of to landfill or may undergo incineration.

The mixture containing the notified polymer will be distributed to around 500 powder coating establishments. Application will be done by electrostatic spraying with large establishments using enclosed spray booths which contain most of the powder sprayed. Many of the smaller establishments use walk-in booths or booths which are not fully enclosed.

Environmental exposure of the notified polymer during powder coating application is expected to be low as electrostatic application is an efficient application method. Powder that does not reach the target (2%) will be removed using dust extractors or cured in the original container before sending to landfill.

A high proportion of the notified polymer in powder coatings will become immobilised through cross-linking in an insoluble matrix. This will be disposed of by licensed contractors to landfill.

9.1.2. Environment – effects assessment

No ecotoxicity data were submitted. However, aquatic exposure is expected to be minimal during normal usage of the coating.

9.1.3. Environment – risk characterisation

The majority of the notified polymer will be incorporated at a low concentration level into coatings and, once applied and dried, poses little risk to the environment since a cured and inert matrix will be formed. Wastes generated during repackaging and applications are expected to be

landfilled or incinerated. The major loss (2%) in coating paint application is due to overspray, all of which will be disposed of by landfill.

If spilt on land, the notified polymer is expected to become immobilized in the soil layer. The polymer will remain bound within the soils and sediments of the landfill and be slowly degraded by abiotic processes. If wastes are incinerated then the notified polymer would be destroyed with the production of water vapour, and oxides of carbon.

Furthermore, the limited exposure of the notified polymer to the aquatic compartment due to its industrial settings, nonionic form, expected low water solubility and the relatively high molecular weight, is unlikely to have an adverse effect on aquatic organisms.

The majority of the notified polymer will be applied to surfaces and either share the fate of the surface at the end of its useful life (most likely to landfill).

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

Exposure of transport and storage workers to the notified polymer is not expected except in the event of an accident involving breach of containers.

Introduction of the notified polymer to the hopper of an extruder should result in limited inhalation exposure as the form of the polymer is a coarse powder or flake and LEV is expected to be employed. Dermal and occasional ocular exposure will normally be controlled by the use of standard PPE. Some minor exposure of laboratory workers may occur from sampling and testing and would be controlled by LEV and standard PPE.

Inhalation exposure of the fine powder when filling the hopper of a powder coating applicator is expected to be controlled by LEV and dermal and occasional ocular exposure will be controlled by standard PPE. Because the application of powder coating is expected to be automated, the concentration of dust in the workplace is expected to be minimised by the spray booth design. The most likely exposure scenarios involve cleaning up dust residues with an industrial vacuum cleaner and its emptying and cleaning. There is a possibility of dust generation requiring the use of a mask or respirator to control exposure while cleaning. Exposure to the notified polymer in these situations is also limited by its concentration in the powder coating (< 20%).

Once the objects have been coated and move into and out of the oven, the coating is cured and no longer bioavailable.

9.2.2. Public health – exposure assessment

The public may be exposed to the notified polymer in the event of transport accident where packaging is breached. Otherwise, the public will only be likely to be exposed to the final cured film on architectural surfaces where the notified polymer will not be bioavailable.

9.2.3. Human health – effects assessment

No toxicological data were available for the notified polymer. However, the polymer has a NAMW > 1000 and low levels of low molecular weight species. The MSDS shows that it contains 1% phthalic anhydride and is therefore classified as a skin sensitiser.

Based on the available data, the notified polymer **classified** as a hazardous substance in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004) and assigned the risk phrase R43: May cause sensitisation by skin contact.

9.2.4. Occupational health and safety – risk characterisation

The notified polymer as introduced is a coarse white powder or flake. The potential for dust formation is unknown but is controlled by the use of LEV. As the level of sensitising monomer borders the concentration cut off level, the risk of respiratory sensitisation can be considered to be low under these circumstances. This is also expected for skin sensitisation. When loading the hopper of an extruder, PPE would be expected to be used which should further reduce the risk of sensitisation. Once inside the extruder, the powder coating mixture is in an enclosed

environment and exposure should not be possible particularly as any fumes will typically be scrubbed and vented externally to the factory. Although packing off of the powder coating is conducted typically under LEV some dust may be expected to be released to the atmosphere. However, there should be a low risk of respiratory sensitisation from exposure to the low level of notified polymer in the dust.

Powder coating for specialised application to MDF will normally only occur in large establishments designed for the purpose. The hazard of dust in the atmosphere will most likely be due to nuisance dust and the notified polymer should not increase the hazard above this level. The exposure standard for nuisance dust (see <http://www.ascc.gov.au/applications/hsis/searches.aspx>) of 10 mg/m³ is unlikely to be reached in the workplace (see monitoring data in NICNAS PEC/1 for TGIC: <http://www.nicnas.gov.au/Publications/CAR/PEC/PEC1.asp>). There may be some potential for exposure while cleaning up dust residues but as this should be conducted using an industrial vacuum cleaner the majority of the dust should be collected into the vacuum cleaner itself and there should be little atmospheric dust generated.

Once the powder coating is cured on the surface of MDF it is no longer bioavailable and presents no health risk.

9.2.5. Public health – risk characterisation

The public should only be exposed to the notified polymer in the event of a transport accident where import containers are breached. The risk of sensitisation from a rare exposure event should be low. Normally the public will only be exposed to the non bioavailable form of the polymer in the final cured coating where the health risk is negligible.

10. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS

10.1. Hazard classification

Based on the available data the notified polymer is classified as hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances*. The classification and labelling details are:

R43: May cause skin sensitisation by skin contact

and

As a comparison only, the classification of notified polymer using the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS) (United Nations, 2003) is presented below. This system is not mandated in Australia and carries no legal status but is presented for information purposes.

Skin sensitisation Category 1: May cause an allergic skin reaction

10.2. Environmental risk assessment

The chemical is not considered to pose a risk to the environment based on its reported use pattern.

10.3. Human health risk assessment

10.3.1. Occupational health and safety

There is Low Concern to occupational health and safety under the conditions of the occupational settings described.

10.3.2. Public health

There is Negligible Concern to public health when used as described.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of the notified chemical provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC 2003). It is published here as a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

11.2. Label

The label for the notified chemical provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994). The accuracy of the information on the label remains the responsibility of the applicant.

12. RECOMMENDATIONS

REGULATORY CONTROLS

Hazard Classification and Labelling

- The Office of the ASCC, Department of Employment and Workplace Relations (DEWR), should consider the following health hazard classification for the notified chemical:
 - R43: May cause sensitisation by skin contact

CONTROL MEASURES

Occupational Health and Safety

- Employers should implement the following engineering controls to minimise occupational exposure to the notified chemical as introduced:
 - Local exhaust ventilation should be employed when adding the notified polymer to the hopper of an extruder and at the point of packing off powder coatings.
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified chemical as introduced, in particular when feeding and manipulating the hopper of an extruder:
 - Impervious gloves, goggles and protective clothing

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 chemical 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.

Disposal

- The notified chemical should be disposed of by burial in a licensed land-fill or incineration in a licensed apparatus.

Emergency procedures

- Spills or accidental release of the notified chemical should be handled by sweeping, shovelling or vacuuming. Place spilled material in clean dry, sealed, labelled containers.

12.1. 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(2) of the Act:

- if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

No additional secondary notification conditions are stipulated.

13. BIBLIOGRAPHY

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

NOHSC (2004) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(2004)]. National Occupational Health and Safety Commission, Canberra, AusInfo.

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