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

PUBLIC REPORT

Polymer in Desmolux U 680H

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (Cwlth) (the Act) and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the Department of Health and Ageing, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Department of Sustainability, Environment, Water, Population and Communities.

For the purposes of subsection 78(1) of the Act, this Public Report may be inspected at our NICNAS office by appointment only at Level 7, 260 Elizabeth Street, Surry Hills NSW 2010.

This Public Report is also available for viewing and downloading from the NICNAS website or available on request, free of charge, by contacting NICNAS. For requests and enquiries please contact the NICNAS Administration Coordinator at:

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**Director
NICNAS**

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SUMMARY

The following details will be published in the NICNAS *Chemical Gazette*:

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS SUBSTANCE	INTRODUCTION VOLUME	USE
LTD/1566	Bayer Material Science Pty Ltd	Polymer in Desmolux U 680H	ND	< 100 tonne per annum	Component of surface coatings

*ND = not determined

CONCLUSIONS AND REGULATORY OBLIGATIONS

Hazard classification

As toxicological data is not available the notified polymer cannot be classified as hazardous according to the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)].

Human health risk assessment

Under the conditions of the occupational settings described, the notified polymer is not considered to pose an unreasonable risk to the health of workers.

When used in the proposed manner, the notified polymer is not considered to pose an unreasonable risk to public health.

Environmental risk assessment

On the basis of the assessed use pattern, the notified polymer is not considered to pose an unacceptable risk to the environment.

Recommendations

REGULATORY CONTROLS

Material Safety Data Sheet

The MSDS of products containing the notified polymer should reflect the likely hazards of the polymer and the residual monomer. This is particularly important when the product does not contain other hazardous materials.

Health Surveillance

- As the notified polymer is likely to be a sensitiser, employers should carry out health surveillance for any worker who has been identified in the workplace risk assessment as having a significant risk of sensitisation.

CONTROL MEASURES

Occupational Health and Safety

- Employers should implement the following engineering controls where possible, to minimise occupational exposure to the notified polymer, as introduced and as reformulated for end-use:
 - Exhaust ventilation
 - Enclosed, automated processes

- Spray booths during coating application
- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer, as introduced and as reformulated for end-use:
 - Avoid skin and eye contact
 - Avoid inhalation of aerosols during spray application
 - Avoid contact with uncured coatings
 - Clean up spills promptly
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer, as introduced and as reformulated for end-use:
 - Gloves, goggles, coveralls
 - Respiratory protection during spray applications or where inhalation exposure may occur

Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- Spray applications should be carried out in accordance with the Safe Work Australia *National Guidance Material for Spray Painting* [NOHSC (1999)] or relevant State and Territory Codes of Practice.
- A copy of the MSDS should be easily accessible to employees.
- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004)] workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

Disposal

- The notified polymer should be disposed of to landfill.

Emergency procedures

- Spills or accidental release of the notified polymer should be handled by physical containment, collection and subsequent safe disposal.

Regulatory Obligations

Secondary Notification

This risk assessment is based on the information available at the time of notification. The Director may call for the reassessment of the chemical under secondary notification provisions based on changes in certain circumstances. Under Section 64 of the *Industrial Chemicals (Notification and Assessment) Act (1989)* the notifier, as well as any other importer or manufacturer of the notified chemical, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified polymer is listed on the Australian Inventory of Chemical Substances (AICS).

Therefore, the Director of NICNAS must be notified in writing within 28 days by the notifier, other importer or manufacturer:

- (1) Under Section 64(1) of the Act; if
 - the polymer has a number-average molecular weight of less than 1000;or
- (2) Under Section 64(2) of the Act; if

- the function or use of the polymer has changed from component of surface coatings, or is likely to change significantly;
- the polymer has begun to be manufactured in Australia;
- additional information has become available to the person as to an adverse effect of the polymer on occupational health and safety, public health, or the environment.

The Director will then decide whether a reassessment (i.e. a secondary notification and assessment) is required.

Material Safety Data Sheet

The MSDS of the product containing the notified polymer provided by the notifier was reviewed by NICNAS. The accuracy of the information on the MSDS remains the responsibility of the applicant.

ASSESSMENT DETAILS

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)

Bayer Material Science Pty Ltd (ABN 18 086 237 765)
17-19 Wangara Road
Cheltenham
VIC 3129

NOTIFICATION CATEGORY

Limited: Synthetic polymer with $M_n \geq 1000$ Da.

EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication: chemical name, other names, CAS number, molecular and structural formulae, molecular weight, polymer constituents, residual monomers/impurities, use details, and import volume.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed for all physicochemical properties.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None

NOTIFICATION IN OTHER COUNTRIES

None

2. IDENTITY OF CHEMICAL

MARKETING NAME(S)

Desmolux U 680H (product containing the notified polymer)

MOLECULAR WEIGHT

$M_n > 1000$ Da

3. COMPOSITION

DEGREE OF PURITY > 95%

4. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AT 20 °C AND 101.3 kPa: Yellowish liquid*

Property	Value	Data Source/Justification
Melting Point/Freezing Point	Not determined	Liquid at room temperature.
Boiling Point	Not determined	Expected to crosslink at elevated

Density*	1110 kg/m ³ at 20°C	temperatures.
Vapour Pressure*	0.7 kPa at 20°C	MSDS
Water Solubility	Not determined	MSDS
		Expected to have low water solubility based on its predominantly hydrophobic chemical structure and high molecular weight
Hydrolysis as a Function of pH	Not determined	The notified polymer contains functional groups that are expected to hydrolyse slowly in the environmental pH range (4-9) at ambient temperature
Partition Coefficient (n-octanol/water)	Not determined	Expected to partition to the octanol phase based on its anticipated low water solubility.
Adsorption/Desorption	Not determined	Expected to sorb to sludge, soil and sediment based on its expected low water solubility and high molecular weight
Dissociation Constant	Not determined	The notified polymer contains no readily dissociable functions
Particle Size	Not determined	Imported as a liquid.
Flash Point*	> 100 °C	MSDS
Autoignition Temperature*	~425 °C	MSDS
Explosive Properties	Not determined	Not expected to be explosive.

*For product Desmolux U 680H containing the notified polymer at 70-90%

DISCUSSION OF PROPERTIES

Reactivity

The notified polymer is expected to react as part of its intended end-use. It is sensitive to intense light and may undergo cross-linking when exposed to strong light. The notified polymer may also hydrolyse under extreme conditions.

Dangerous Goods classification

Based on the submitted physical-chemical data in the above table the notified polymer is not classified according to the Australian Dangerous Goods Code (NTC, 2007). However, the data above do not address all Dangerous Goods endpoints. Therefore, consideration of all endpoints should be undertaken before a final decision on the Dangerous Goods classification is made by the introducer of the polymer.

5. INTRODUCTION AND USE INFORMATION

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

The notified polymer will be imported either as a component of Desmolux U 680H at a concentration of 70-90% or in finished products at a concentration of 40-80%.

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>
Tonnes	< 10	< 30	< 30	< 100	< 100

PORT OF ENTRY

Melbourne and Sydney by wharf

TRANSPORTATION AND PACKAGING

The notified polymer will be imported in 205 L metal drums. It will be transported from the dock to the notifier's warehouse facility by road and then distributed to customer sites also by road.

USE

Desmolux U 680H containing the notified polymer at 70-90% will be used in the formulation of UV-curable and electron beam-curable coatings. The main area of application in Australia will be in an UV-curing sealer and topcoat for wood flooring, cork, parquet or furniture. Desmolux U 680H may be used as is or diluted with reactive thinners, solvents and photoinitiators to produce the final coating.

OPERATION DESCRIPTION

The notified polymer may be imported in a finished product (40 – 80% concentration) or it may be imported as a component of Desmolux U 680H (70 – 90% concentration) for local reformulation into coating products.

Reformulation

Reformulation of the notified polymer as a component of Desmolux U 680H into finished coating products will involve transfer from the import containers to the mixing vessel using a metering pump, and mixing the Desmolux U 680H product containing the notified polymer with other ingredients in a sealed vessel fitted with a high-speed mixer and local exhaust ventilation system. Workers will open drums and connect pumping equipment to transfer the contents to the mixing vessel. Once the transfer is complete, the pumping equipment is disconnected. Each batch will be quality checked and adjustments made as required. The finished paint (containing the notified polymer at 40-80%) will be filtered prior to being automatically dispensed into 0.5 to 20 L cans under exhaust ventilation for supply to customers. The finished coating products will be warehoused at the manufacturer's site and distributed to end-users.

End-use

The finished coating products containing the notified polymer at 40-80% will be applied by spray, roller or curtain methods. The majority of spray applications will occur in a spray booth. Furniture and wooden construction materials will be coated by spray or curtain methods. Wooden floors will be coated using rollers. After the coating has been applied the coatings will be cured using an UV or electron beam source.

Workers will open cans of the coating containing the notified polymer in a mixing room. If additional viscosity reduction (thinning) is required, the worker will transfer the coating to a container where additional reducer is added. For spray equipment application, the "as received" or reduced coating is then transferred to a reservoir that feeds the spray gun.

The worker will then take the coating into a spray booth, which could be a downdraft, partial downdraft or a cross-draft type of booth. The coating is then applied to the substrate. This may be done manually or robotically. After the coating has been applied a UV light source is used to cure the coating.

Excess coating not used would be disposed of into a hazardous waste container. Spray equipment would be cleaned with an appropriate solution or solvent. Washings would also be collected into hazardous waste container. Once spraying is completed or the topcoat has been exhausted, the spray equipment is drained and cleaned using solvents and rags. Cleaning equipment and the hazardous waste receptacle is typically located in the mixing room.

For coating of floors, the cans of coatings will be opened, stirred and the coating will be poured into a roller tray. The coating will then be applied to the floor manually using the roller. Once the coating has been completed, a UV light source is rolled over the surface to cure the product containing the notified polymer. Once dried, the surface is ready for normal use. Application equipment will be cleaned with an appropriate solution or solvent and the washings, together with any unused coating, will be collected in hazardous waste containers for disposal.

6. HUMAN HEALTH IMPLICATIONS

6.1. Exposure Assessment

6.1.1. Occupational Exposure

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration (hours/day)</i>	<i>Exposure Frequency (days/year)</i>
<i>Transport and storage</i>	2-4	1-2	20
<i>Reformulation</i>	2-4	4-8	20
<i>QC staff</i>	1-2	1	20
<i>Maintenance</i>	1-2	1-2	20
<i>Spray painting/Coating application</i>	100-1000	8	300

EXPOSURE DETAILS

Transport and storage

Transport and warehousing workers may come into dermal and ocular contact with the notified polymer if accidental leaks and spillages occur.

Reformulation

Workers may be exposed to Desmolux U 680H (70 – 90% notified polymer) and/or finished coating products (40 – 80% notified polymer) via dermal and ocular exposure due to spills and leaks, during charging of the mixer, blending, and when connecting filling lines. Workers will wear coveralls, goggles and impervious gloves. Aerosols may be released during blending, but inhalation exposure is likely to be reduced by use of local exhaust ventilation system and a closed mixing system if high speed stirring occurs. Where ventilation is inadequate a respirator will be worn. The paint is filled into drums under local exhaust ventilation and workers wear overalls, goggles and impervious gloves to control exposure.

Dermal and ocular exposure to drips, spills and splashes is possible during batch adjustment and when QC workers take and test samples. Workers wear laboratory coats, goggles and impervious gloves to minimise exposure.

There is the possibility of skin contact during equipment maintenance. Workers wear coveralls, goggles and gloves to control exposure.

End-use

Painters may come into contact with the notified polymer at a concentration of 40-80% in coatings, through dermal and ocular routes from direct contact with drips, spills and splashes during transfer of the coating to the spraying equipment, manual paint application, equipment cleaning and maintenance, or contact with uncured coating.

Inhalation exposure to coating aerosols containing the notified polymer during spray application may also occur. Exposure is expected to be limited as the spray is applied in a ventilated spray booth by workers using protective equipment.

Floor coating workers may come into contact with the notified polymer at a concentration of 40-80% in coatings, through dermal and ocular routes from direct contact with drips, spills and splashes during transfer of the coating to the roller tray and during rolling, equipment cleaning, or contact with uncured coating. These workers will wear overalls, gloves, safety glasses, respirator and safety shoes to control exposure.

After application and once cured, the notified polymer is reacted within an inert matrix and the polymer is unavailable for exposure.

6.1.2. Public Exposure

There is limited potential for exposure of the notified polymer to the public as it will not be sold to the public. The only likely exposure to the public would occur in the event of an accident during transportation of the imported product containing the notified polymer. The public may have contact with coated articles or floors, however after curing, the notified polymer is reacted into the coating and is not bioavailable..

6.2. Human Health Effects Assessment

No toxicity data were submitted

Based on the high molecular weight (>1000 Da) of the notified polymer, the potential of the notified polymer to cross the gastrointestinal (GI) tract by passive diffusion or to be dermally absorbed after exposure would be limited. However, the polymer contains a significant proportion of low molecular weight species (<1000 Da) that may be absorbed. In addition, given the hydrophobic nature of the polymer (and the significant proportion of lower molecular weight species), absorption across the respiratory tract is possible.

The notified polymer contains a functional group that has been associated with irritation and sensitisation effects (US EPA, 2010). The potential for these effects may be mitigated by the molecular weight (>1000) of the polymer. However, sensitisation and/or irritant effects following exposure to the notified polymer cannot be ruled out, particularly due to the presence of low molecular weight species. In addition, the notified polymer contains a hazardous impurity/residual monomer at a concentration of >1%, which may be irritating, harmful in contact with skin or result in skin or respiratory sensitisation.

Health hazard classification

As no toxicity data were provided for the notified polymer, it cannot be classified according to the *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004).

6.3. Human Health Risk Characterisation

6.3.1. Occupational Health and Safety

No toxicological data were provided for the notified polymer. However, due to the presence of structural alerts and a hazardous residual monomer, it may be irritating, harmful in contact with skin and result in skin or respiratory sensitisation.

There is potential for significant worker exposure to the notified polymer in Desmolux U680H (70 – 90%) and finished products (40 – 80%) during several processes: reformulation, dilution at point of application, application by spray, curtain or roller methods, and equipment cleaning. Contact with uncured coatings may also occur under certain circumstances.

Controls are proposed in order to reduce exposure during each of these processes. Reformulation will be carried out with exhaust ventilation and enclosed processes. Spray application will occur primarily in ventilated spray booths, and personal protective equipment (PPE) including respirators will be used. PPE only will be used while cleaning equipment and during manual roller application of coatings to floors.

As the product containing the notified polymer contains a hazardous substance, any controls in place for this material will also assist in reducing exposure to the notified polymer.

Provided that appropriate control measures are in place to minimise worker exposure, including engineering controls, safe work processes and PPE, the risk to the health of workers from use of the notified polymer is not considered to be unreasonable.

6.3.2. Public Health

The notified polymer is intended for use in industrial applications only. The public may come into contact with products to which the coatings have been applied and cured. However, the notified polymer in this form will not be bioavailable. Therefore, when used in the proposed manner, the risk to public health from the notified polymer is not considered to be unreasonable.

7. ENVIRONMENTAL IMPLICATIONS

7.1. Environmental Exposure & Fate Assessment

7.1.1. Environmental Exposure

RELEASE OF CHEMICAL AT SITE

The notified polymer will not be manufactured in Australia. It will either be imported in finished products or products that will be reformulated into finished coating products at the customer's paint manufacturing site. Releases to the environment are not expected to occur during transport, warehousing or reformulation except in the unlikely event of an accident. Spills, leaks and washings from process equipment (up to 1% of total imported notified polymer) are expected to be contained and collected using absorbent material (sand, soil, vermiculite etc) and disposed of to landfill.

RELEASE OF CHEMICAL FROM USE

Finished coating products containing the notified polymer will be applied to wood flooring, cork, parquet or furniture by spray, roller or curtain methods. After the coating has been applied the coatings will be cured using an UV or electron beam source. The majority of release of the notified polymer (up to 35% of the total import volume) will be due to overspray during spray operations. Most spray coating is expected to be performed in spray booths, where the overspray will be collected using filters and water scrubbers. The filters will be disposed of to landfill while notified polymer in the scrubber water is likely to cure as a component of the coating and eventually be disposed of to landfill. Small amounts of notified polymer may be released to sewage treatment plants (STPs) in scrubber water. Approximately 1% of the notified polymer is likely to be released from cleaning of equipment which is expected to be collected and disposed of to landfill.

RELEASE OF CHEMICAL FROM DISPOSAL

The majority of the notified polymer will be cured into an inert matrix with other chemical substances as part of the coating process and hence will be immobilised within a polymeric film on coated articles. The polymer incorporated in the coating will be disposed of along with the coated articles, at the end of their useful life, and are expected to be disposed of to landfill.

7.1.2. Environmental Fate

No environmental fate data were submitted. The majority of imported notified polymer will be immobilised within a polymeric film on coated articles and is therefore not expected to be bioavailable nor mobile. Bioaccumulation of the uncured polymer is unlikely due to its high molecular weight and limited potential for aquatic exposure. The majority of articles containing the notified polymer are anticipated to be disposed of to landfill, where the notified polymer is expected to eventually degrade by biotic and abiotic processes to form water and oxides of carbon and nitrogen. Based on its high molecular weight the small amount of notified polymer that reaches STPs is expected to sorb to sludge and sediment, and is not anticipated to be mobile in the environment.

7.1.3. Predicted Environmental Concentration (PEC)

The notified polymer is not expected to be present at significant concentrations in the aquatic environment because of the very low potential for direct release to surface waters when used in surface coatings. A PEC has therefore not been calculated.

7.2. Environmental Effects Assessment

No ecotoxicity data were submitted. The notified polymer has functionality that has the potential to be toxic to aquatic life. However, as the notified polymer is not expected to be readily bioavailable and has limited potential for release from its use as a curable coating, no significant exposure of the notified polymer to aquatic organisms is expected.

7.2.1. Predicted No-Effect Concentration

A Predicted No-Effect Concentration (PNEC) was not calculated as no ecotoxicological data were submitted and there will be very low potential for aquatic exposure.

7.3. Environmental Risk Assessment

A Risk Quotient ($Q = \text{PEC}/\text{PNEC}$) was not quantified as a PEC and PNEC were not calculated. The reported use pattern of the notified polymer indicates that there is no significant anticipated aquatic release. Moreover, after curing, the majority of the imported quantity of notified polymer will be incorporated into an inert matrix with other chemicals and is not expected to be mobile, bioavailable nor rapidly biodegradable. Hence, the environmental exposure is expected to be minimal. On the basis of the assessed use pattern, the notified polymer is not considered to pose an unreasonable risk to the environment.

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