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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

Polymer in Luphen LD 6617

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FULL PUBLIC REPORT**Polymer in Luphen LD 6617****1. APPLICANT**

BASF Australia Ltd of 500 Princes Highway Noble Park VIC 3174 (ACN 008 437 867) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC) Polymer in Luphen LD 6617.

2. IDENTITY OF THE CHEMICAL

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

Marketing name: Luphen LD 6617

3. POLYMER COMPOSITION AND PURITY

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

4. PLC JUSTIFICATION

The notified polymer meets the PLC criteria.

5. PHYSICAL AND CHEMICAL PROPERTIES

The notified polymer is produced in aqueous solution and is never isolated. The physico-chemical properties given below are for a 30 – 40 % aqueous solution.

Property	Result	Comments
Appearance	colourless to yellow liquid with a specific odour	
Melting point	not determined	

Density	1036 kg/m ³	
Water solubility	80 mg/L (pH 10) 50 mg/L (pH 1)	results for an analogue polymer
Flammability	not flammable	
Flammability	not determined	the notified polymer is only imported in solution and is never isolated
Autoignition temperature	> 200°C	
Explosive properties	not explosive	
Stability/reactivity	stable under normal environmental conditions	
Hydrolysis as function of pH	not determined	
Dissociation constant	not determined	solution pH 7 – 9 at 20°C

5.1 Comments on physical and chemical properties

No water solubility data for the notified polymer were submitted. The notifier states that the notified polymer is not soluble but is dispersible in water. The notifier supplied information on a water solubility test performed on an analogue polymer, Astacin Grund LD 6588, although no test report was submitted. This analogue contains a number of the groups present in the notified polymer. The test was performed according to OECD TG 120, in which the Total Organic Carbon of the water extractable content was determined at different pH. At pH 1 the result was 50 mg polymer/kg and at pH 10 it was 80 mg polymer/kg. From this it was determined that the water solubility of the analogue is < 0.01 %. The notified polymer may be assumed to have similar water solubility.

The polymer contains linkages that could be expected to undergo hydrolysis at extreme pH. However, due to the low water solubility, this is unlikely in the environmental pH range of between 4 and 9.

6. USE, VOLUME AND FORMULATION

Use:

The notified polymer will be used as a binder in waterproofing membrane formulations, either alone or in conjunction with a styrene-acrylic dispersion.

Manufacture/Import volume:

The notifier estimates that the import volume for the notified polymer will be in the range of 10 – 100 tonnes per annum for the first five years of importation.

Formulation details:

The notified polymer will be imported as a 30 – 40 % (w/v) aqueous dispersion, initially in 120 L polyethylene drums, and possibly later in 1 tonne bulk tanks. It will be reformulated in Australia by the addition of styrene-acrylic dispersion (if used) and fillers in a ribbon blender. The finished waterproofing membrane formulation, containing 12 – 20 % notified polymer, will be packaged in 20 kg, 10 kg or 4 kg plastic pails for sale to waterproofing contractors and the public. The formulation will be applied by roller or brush, and will then dry and harden.

7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
Reformulation		
<i>Blending and Filling Operators (4 workers, 15 min/day, 26 days/year)</i>		
dermal, 30 – 40 % solution	exposure to drips and spills while connecting and disconnecting transfer hoses and where manual handling of containers is required	local exhaust ventilation employed as required; little worker exposure due to the nature of the blending equipment used coveralls, safety goggles, boots, face shield, apron and impervious gloves to be worn
<i>Laboratory Technicians (2 workers, 15 min/day, 26 days/year)</i>		
dermal, 12 – 20 % solution	exposure to small quantities during sampling and testing	not indicated
End use		
<i>Waterproofing Contractors (not stated)</i>		
dermal, 12 – 20 % solution	possible widespread dermal exposure while applying the formulations with roller or brush	not indicated
Transport and storage		
<i>Transport of Luphen LD 6617(1-2 workers)</i>		
none	no exposure expected except in the case of an accident involving rupture of containers	none
<i>Storage of Luphen LD 6617(3-4 workers, 15 min/day, 26 days/year)</i>		
none	no exposure expected except in the case of an accident involving rupture of containers	none
<i>Transport, Storage and Retail of Waterproofing Formulations (not stated)</i>		
none	no exposure expected except in the case of an accident involving	none

8. PUBLIC EXPOSURE

The final product containing the notified polymer will be sold to trade and to the public through retail stores, for use as a waterproofing paint film for application to shower recess areas at both domestic and commercial building sites. When construction is complete, the waterproofing membrane is underneath the tiles and public contact with the notified polymer will be negligible. Therefore, the public exposure with the notified polymer will mainly occur during application of the final product.

9. ENVIRONMENTAL EXPOSURE

9.1. Release

There is potential for release during the coating reformulation and application. The reformulation process will take place at one customer site. Any spilt material will be contained by the plant bunding and collected for disposal to landfill or incineration and the notifier estimates that < 48 kg per annum of the notified polymer will be released in this way.

The empty plastic drums used to import the polymer dispersion will be disposed of to landfill along with the 0.5 % (< 500 kg per annum) of polymer residues remaining in these drums after they are emptied. Additionally, the notifier estimates that cleaning of the reformulation equipment will release < 1 % (up to 1 tonne per annum) of the notified polymer as aqueous plant effluent to the sewer system.

The waterproof membrane coating containing the notified polymer will be used by professional applicators and home handymen as a waterproofing agent for shower recesses. The notifier estimates that approximately 0.5 % (up to 500 kg per annum of the notified polymer) of the coating product will be released due to cleaning of the application equipment (brushes and rollers), and 99 % of this (495 kg per annum) will be disposed of to landfill as building waste, with < 1 % (5 kg per annum) being disposed of to the sewer.

It is expected by the notifier that up to 20 kg per annum of the polymer may be spilt, cleaned up and disposed of to landfill. The notifier also estimates that 0.2 % (up to 200 kg per annum of the polymer) of the coating would remain as residue in the plastic pails after emptying. This will be disposed of to landfill along with the containers.

9.2. Fate

The waste generated in the reformulation process from residues remaining in the plastic import drums (0.5 % or up to 500 kg per annum) and from spills (up to 48 kg per annum) will be disposed of to landfill or incinerated, as will the waste generated in the application process, from residues remaining in the plastic pails (0.2 % or up to 200 kg per annum), from spills (up to 20 kg per annum) and 99 % of the waste polymer adhering to the application brushes and rollers (up to 495 kg per annum). Leaching of the polymer from landfill is unlikely, given

the low solubility of the notified polymer. If incinerated, the polymer will be destroyed by conversion to oxides of carbon and nitrogen and water vapour.

The waste from equipment cleaning during the reformulation process (1 % or up to 1 tonne per annum) and a small amount from the application process (up to 5 kg per annum) will be washed down the drain with water and end up in the sewer. The notified polymer would be expected to remain suspended or dispersed in the water fraction until such time as the amine partitions to the water and the polymer gradually becomes insoluble and drops out of solution due to its high molecular weight. It will eventually associate with the sediments in the rivers and creek beds or ocean floor. Some may be removed during the sewage treatment process, although the extent is hard to predict due to the lack of information or data regarding the conditions and time involved in the settling process.

The polymer waterproof membrane will dry to form an inert coating on the surface of the shower recess, which will then be tiled over during the building or renovating process. It will remain in the shower recess until the end of its useful life when it will likely be removed during demolition and disposed of to landfill with the building rubble.

The notified polymer is not expected to cross biological membranes, due to the low solubility and high molecular weight, and should not bioaccumulate (Connell, 1990).

10. EVALUATION OF HEALTH EFFECTS DATA

10.1 Acute Toxicity

Eye and skin irritation studies were provided by the notifier for the similar product Astacin Grund LD 6588, which is an aqueous solution of an analogue polymer which contains a number of the groups present in the notified polymer.

The health hazards of the constituents and hazardous impurities, additives and adjuvants are tabulated below.

Chemical	Health hazards	Regulatory controls
Constituents		
No residual monomers are present at concentrations where they may present a hazard in the use of the notified polymer.		
Hazardous impurities		
methyloxirane (present at well below concentrations where it may present a hazard in the use of the notified polymer).	R45(2) may cause cancer (carcinogen category 2); R20/21/22 harmful by inhalation, in contact with skin and if swallowed;	exposure standard 20 ppm TWA (NOHSC, 1995)

R36/37/38 irritating to eyes,
respiratory system and skin.
(NOHSC, 1999a)

Additives/adjuvants

No additives and adjuvants are present at concentrations where they may present a hazard in the use of the notified polymer.

Summary of the acute toxicity of Astacin Grund LD 6588

<i>Test</i>	<i>Species</i>	<i>Outcome</i>	<i>Reference</i>
skin irritation	rabbit	non-irritant	Kirsch, 1990a
eye irritation	rabbit	slight irritant	Kirsch, 1990b

10.1.1 Skin Irritation (Kirsch, 1990a)

Species/strain: rabbit/White Vienna

Number/sex of animals: 2 male, 1 female

Observation period: 3 days

Method of administration: semi-occlusive patch; 4 hour exposure; dose 0.5 mL test substance

Test method: OECD TG 404

Draize scores:

<i>Time after treatment (days)</i>	<i>Animal #</i>		
	<i>1♂</i>	<i>2♀</i>	<i>3♂</i>
<i>Erythema</i>			
4 hr	^a 1	1	1
1	0	0	0
2	0	0	0
3	0	0	0
<i>Oedema</i> all Draize scores were zero			

^a see Attachment 1 for Draize scales

Result: the test substance was non-irritating to the skin of rabbits

10.1.2 Eye Irritation (Kirsch, 1990b)

<i>Species/strain:</i>	rabbit/White Vienna
<i>Number/sex of animals:</i>	2 male, 1 female
<i>Observation period:</i>	3 days
<i>Method of administration:</i>	0.1 mL test substance was instilled in the conjunctival sac of the right eye; the left eye served as control
<i>Test method:</i>	OECD TG 405

Draize scores of unirrigated eyes:

<i>Animal</i>	<i>Time after instillation</i>											
	<i>1 hour</i>			<i>1 day</i>			<i>2 days</i>			<i>3 days</i>		
<i>Cornea</i>	all Draize scores were zero											
<i>Iris</i>	all Draize scores were zero											
<i>Conjunctiva</i>	<i>r</i>	<i>c</i>	<i>d</i>	<i>r</i>	<i>c</i>	<i>d</i>	<i>r</i>	<i>c</i>	<i>d</i>	<i>r</i>	<i>c</i>	<i>d</i>
1♂	1	0	0	1	0	0	1	0	0	0	0	0
2♀	1	0	1	1	0	0	0	0	0	0	0	0
3♂	1	0	0	1	0	0	0	0	0	0	0	0

¹ see Attachment 1 for Draize scales

o = opacity a = area r = redness c = chemosis d = discharge

Result: the test substance was slightly irritating to the eyes of rabbits

10.2. Overall Assessment of Toxicological Data

The notified polymer is of high molecular weight and is not expected to be absorbed across biological membranes. It contains low levels of residual monomers and hazardous impurities; any residual methyloxirane will be decomposed completely in aqueous solution. It also contains low levels of low molecular weight species which may be absorbed across biological membranes.

The notifier provided eye and skin irritation study reports for a product containing an analogue polymer, which contains similar functionality to the notified polymer. The analogue polymer was a slight eye irritant, with conjunctival redness resolving by day 3. All skin effects had resolved by 24 hours.

Based on the analogue data and the properties of the notified polymer, the notified polymer is not classified as a hazardous substance in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (Approved Criteria) (NOHSC, 1999b).

11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA

No ecotoxicological data were provided for the notified polymer. However, a fish toxicity test was provided by the notifier for the analogue polymer, Astacin Grund 6588.

This test was performed on the fish species, *Leuciscus idus* L., Golden variety, at the nominal concentration of 10000 mg/L under a static test methodology (Munk, 1991). The test solution was cloudy throughout the test. The temperature was maintained at 22°C, pH was 7.5-8.1 and oxygen level was 7.2-8.2 mg/L. Ten fish were placed in the test solution and control solution, and observations were performed at 1, 4, 24, 48, 72 and 96 h. No mortalities or abnormalities occurred in the fish in the test solution or control. Therefore, the test results are:

LC50 > 10000 mg/L
NOEC = 10000 mg/L.

This data indicates that the analogue polymer, Astacin Grund LD 6588, is not toxic to fish up to the limits of its water solubility.

12. ENVIRONMENTAL RISK ASSESSMENT

The environmental hazard presented by the importation and use of the notified polymer is expected to be low.

The products containing the notified polymer are likely to be used throughout Australia. Some environmental exposure to the polymer will come from disposal of waste from spills and container residues during reformulation (up to 550 kg per annum) and application (up to 220 kg per annum). These should be of low hazard to the environment as the polymer will remain bound within the soils and sediments of the landfill to be slowly degraded by the abiotic processes that occur in these sites.

The waste polymer produced during equipment cleaning in the reformulation and application processes is likely to be discharged in domestic wash waters to waste water treatment systems. The waste water produced during the reformulation process will be discharged into the sewer system and is likely to be treated in the North Head Treatment Plant in Sydney. The daily discharge from this plant is approximately 250 ML/day. If it is presumed as a worst case scenario that there is no removal of the polymer in the sewage treatment plant, the resultant Predicted Environmental Concentration (PEC) in receiving waters would be:

Amount released to sewer (annually):	1000 kg
Amount released to sewer (daily at 5 d/wk and 48 wk/y):	4.2 kg
Discharge Volume at TP/day:	250 ML
Dilution factor in receiving water:	1:10
PEC in receiving water:	1.68 µg/L

The calculated PEC value is well below the toxicity levels to fish given for the analogue polymer. Adsorption to sludge, soil and sediment as well as swift dilution in receiving waters should reduce environmental concentrations to negligible levels. The notified polymer is not

expected to persist in the aquatic environment, being removed through a combination of sorption to particulates and eventual chemical degradation.

If the polymer is spilt on land, either during usage or transport, it is expected to become immobilised in the soil layer. Contaminated soil can then be collected and disposed of to landfill. Polymer disposed of to landfill either from spills or as drum residues will similarly remain bound in the soil and sediments.

Given the above, environmental exposure and the overall environmental hazard is expected to be low.

13. HEALTH AND SAFETY RISK ASSESSMENT

13.1. Hazard assessment

No toxicological information has been provided for the notified polymer and therefore the substance cannot be assessed against the Approved Criteria. An analogue to the notified polymer was a slight eye irritant and non-irritating to skin when tested in rabbits. Due to the high molecular weight and low reactivity of the polymer, the toxicological hazard of the notified polymer is expected to be low. The polymer is not expected to be hazardous by dermal exposure as the high molecular weight will preclude absorption through the skin.

The Material Safety Data Sheet (MSDS) indicates that the product Luphen LD 6617 is not classified as a hazardous substance, but indicates that eye contact and repeated or prolonged skin contact may cause slight irritation, and that ingestion may cause slight gastric disturbance. The residual monomer concentrations in the finished polymer are below the cutoff levels for classification as a hazardous substance.

13.2. Occupational health and safety

There is little potential for significant occupational exposure to the notified polymer in the transport and storage of the polymer solution or the waterproofing membrane formulation containing this polymer. There will be exposure during production of the waterproofing membrane formulation, and in the use and disposal of the formulation.

During the reformulation processes, the main exposure route for the notified polymer will be dermal. The formulations will be viscous, and ready formation of aerosols is not expected. The polymer is not expected to be hazardous by dermal exposure as the high molecular weight will preclude absorption through the skin, however irritation may occur on dermal or ocular exposure to the product Luphen LD 6617. The engineering controls and personal protective equipment specified in the notification (gloves, safety goggles or face shield and coveralls, apron and boots) will provide a high level of protection against the notified polymer. No significant OHS risks are expected when control and protective measures are implemented.

Occupational exposure during the sale and professional use of the waterproofing membrane formulation is likely to be widespread. Dermal contact during handling and application of the formulation is likely. The occupational health and safety risk associated with dermal contact with the notified polymer as a component of the waterproofing membrane formulation will be low, due to the low toxicological hazard of the polymer.

Conclusion

Luphen LD 6617 is of low concern to human health and safety and no specific risk reduction measures are necessary.

13.3. Public health

The final products containing the notified polymer will be sold to customers through retail and trade stores for use as waterproofing membrane in shower recess areas. The public will be exposed to product containing the notified polymer during the application of the product. However, once construction is complete, the waterproofing membrane is underneath the tiles and public contact with the notified polymer will be negligible. Given its low toxicity, the risk to the public health induced by the notified polymer is considered to be low.

14. MSDS AND LABEL ASSESSMENT

14.1. MSDS

The MSDS of the product containing notified polymer, Luphen LD 6617, 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 product containing notified polymer, Luphen LD 6617, 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

To minimise occupational exposure to Polymer in Luphen LD 6617, the following guidelines and precautions 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; where engineering controls and work practices do not reduce vapour and particulate exposure to safe levels, an air fed respirator should also be used;
- 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;
- 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, 1999b), 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) and 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 chemical) 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

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