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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

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**Director  
Chemicals Notification and Assessment**

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**FULL PUBLIC REPORT****Polymer in Primal Binder U-61****1. APPLICANT AND NOTIFICATION DETAILS**

## APPLICANT

Rohm and Haas Australia Pty Ltd (ABN 29 004 513 188)  
4<sup>th</sup> Floor, 969 Burke Road  
Camberwell, Victoria

## NOTIFICATION CATEGORY

The notified polymer meets the PLC criteria.

## EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data, details of the polymer composition, customer sites and identity, and exact import volume.

## 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

None known

## NOTIFICATION IN OTHER COUNTRIES

None known

**2. IDENTITY OF CHEMICAL**

## MARKETING NAME

Polymer in Primal Binder U-61

## METHODS OF DETECTION AND DETERMINATION

ANALYTICAL      IR Spectra

METHOD

TEST FACILITY      ACTC (2001)

**3. COMPOSITION**

## DEGREE OF PURITY

>98 %

## HAZARDOUS IMPURITIES/RESIDUAL MONOMERS

None

**4. INTRODUCTION AND USE INFORMATION**

## MODE OF INTRODUCTION OF NOTIFIED CHEMICAL OVER NEXT 5 YEARS

The notified polymer will be imported as a component of Primal Binder U-61 (41% w/w).

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

Up to 25 tonnes/annum will be imported by year five.

#### USE

The notified polymer will be imported as a component of Primal Binder U-61 polymer solution that will be used in the manufacture of topcoats for leather finishing. The formulated topcoat will be spray applied to leather and dried in ovens prior to further finishing of the leather. These leather products will be used in furniture manufacture, automotive upholstery, and sports shoes. The majority (>60%) of the notified polymer will be contained in a variety of leather articles. The notified polymer will be used at commercial premises and will not be sold for use by the public.

## 5. PROCESS INFORMATION

### 5.1. Distribution, Transport and Storage

The notified polymer will be imported in 200L steel drums as a component of Primal Binder U-61.

### 5.2. Operation Description

The notified polymer will be imported as a component of the product, Primal Binder U-61, comprising 41% of the product.

#### Formulation of topcoats

Topcoats are manufactured in stainless steel mixing vessels in quantities from 50 to 1,000 kg. The product is transferred into the mixing vessel by decanting or placing a spear into the drum and pumping the contents out. The finished topcoat may be gravity fed or pumped into 200 L drums or 20 L pails and then transported into the spray line.

#### Use by spray operators

The topcoat will be applied to leather via rotary spray application at a commercial application facility. The spray unit consists of several spray nozzles attached to a horizontal rotation frame that is mostly enclosed in a metal cabinet. A conveyer belt carries the leather product into the cabinet where the topcoat is applied and then into a heated drying tunnel to dry.

#### Leather handlers

Untreated leather is placed on the conveyor belt, which passes through the spray unit and then continues to a drying tunnel. Leather handlers remove the dried leather from the conveyor line and stack the hides for storage until further treatment.

### 5.3. Release

#### *Storage sites:*

The notified polymer in Primal Binder U-61 will be stored in banded warehouses at the transport depot and customer sites. In the event of a spill the notified polymer will be taken up with adsorbent material and sent for disposal at licensed waste landfill(s).

#### *Topcoat Formulation:*

Accidental spills of the notified polymer during formulation will be contained in banded areas and taken up with adsorbent material and sent for disposal at licensed waste landfill(s).

During formulation, a fraction (approximately 0.5%) of the notified polymer may potentially collect in wash water within the formulation plant. Wash water from formulation equipment will be re-used in subsequent batches where possible. Approximately 50% of the notified polymer in the wash water will be re-used in subsequent batches. Otherwise, it will be treated on-site in a waste water treatment plant (WWTP) during which it is estimated that >90% of the notified polymer in the wash water will be precipitated in treatment plant sludge and subsequently sent to landfill for disposal. Less than 50 tonnes of the notified polymer will be sent to landfill for disposal each year. The remaining <10% in the WWTP supernatant water will be released into the sewerage system at the formulation facility. A fraction (0.5%) of the notified polymer will remain in drums as residue, probably in a dried form. The drums will either be recycled, re-used or sent to landfill(s) for disposal.

*Topcoat Application:*

During application, approximately 33% of the notified polymer will be lost as over-spray and will not be added to leather. Of this 33%, approximately 50% (i.e. 16.5% of application tonnage) will be trapped in the spray booth water reservoir and 50% will be removed by air scrubber unit.

The spray booth water reservoir will be periodically drained and the wastewater treated on site at a WWTP. The majority of the notified polymer will be removed off-site as sludge to landfill(s) for disposal. Greater than 90% of the notified polymer will compartmentalise into WWTP sludge. Approximately 10% of the notified polymer sent to the WWTP is contained in WWTP supernatant. This supernatant is discharged to sewer.

All other non-liquid wastes generated during the application of the topcoat, including the waste obtained from the periodic cleaning of scrubber baffles and filters will be sent to landfill(s) for disposal.

*Use of Leather:*

The majority (>66%) of the notified polymer will be applied into finished leather products as a component of the topcoat.

**5.4. Fate**

The majority of the notified polymer wastes from spills, cleaning, and in wash water sludges will go to landfill(s) for disposal, and the majority will probably be in a stable (acid) form. Therefore, it is not likely to be mobile due to the low water solubility in its acid form and it will probably sorb to the soil or waste matrix. A fraction of the total waste stream that may potentially occur in the salt form, as found in the formulation prior to application, may be more soluble and may potentially be more mobile in the landfill leachate. This process may potentially be enhanced if the notified polymer encounters alkaline soils, leachate or groundwater. However, this mobile form is expected to represent only a fraction of the total waste stream and is expected to revert to the more stable form over time.

In sewerage treatment plants, the notified polymer is expected to sorb to particulates and precipitate with other bio-solids.

In the unlikely event that the notified polymer enters waterways, it would be expected to associate with the sediments if in the acid form. If present as the salt, which is soluble in water, the polymer would be expected to dilute, disperse, revert to the acid form, and eventually partition to the sediments due to its polyanionic charge. The polymer is not expected to cross biological membranes due to its high molecular weight. Therefore the notified substance is not expected to bioaccumulate in aquatic ecosystems if discharged there (Connell, 1990).

The notified polymer in treated leather products will slowly degrade on their disposal in landfills through abiotic and biotic processes to oxides of nitrogen and carbon.

**6. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance at 20°C and 101.3 kPa</b>	Hazy, colourless liquid
<b>Melting Point</b>	Not determined
<b>Density</b>	1070 kg/m <sup>3</sup> (solution as supplied)
<b>Water Solubility</b>	Variable with pH- soluble ≥pH 8 Dried polymer 8.7 ppm

Remarks	Water solubility of Primal Binder U-61 Polymer was assessed by Tran (2002) using a Total Organic Carbon Method (TOC). A sample of the binder was coated to a piece of 4.5 cm x 10.5 cm, 20-mesh, stainless steel support, producing a film. The film was air dried for 4 hours and placed in a vacuum at room temperature overnight. The dried film was placed in water (Milli-Q) to cover the film for 24 hours, constantly stirred. After 24 hours, TOC of the test water was determined by Anatel TOC instrument, Model A-2000, using the 10-20 ppb calibration range. Analyses were performed in triplicate.
	In alkaline solutions (pH >8) the notified polymer will be present as a salt and as such is expected to be soluble in water. However on drying and conversion to the corresponding acid, and in environmental conditions of pH <8, the notified polymer is expected to have a low solubility due to its high molecular weight and hydrophobic composition
<b>Particle Size</b>	Not determined
Remarks	Aqueous solution
<b>Flammability</b>	Variable
Remarks	Aqueous solution is not flammable. The dried polymer may support combustion.
<b>Stability/reactivity</b>	
Remarks	The polymer is expected to be stable under normal conditions
<b>Explosive Properties</b>	Not explosive
<b>Hydrolysis as a Function of pH</b>	
Remarks	Hydrolysis of the urethane linkages is possible but would not be expected under environmental conditions and range of pH 4 to 9.
<b>Partition Coefficient (n-octanol/water)</b>	Not determined
Remarks	Given the notified polymer's expected low water solubility and likely hydrophilic nature it would partition into the aqueous phase, except if present as the acid where it would be more lipophilic.
<b>Adsorption/Desorption</b>	Not determined
Remarks	In its acid form the notified polymer is expected to adsorb to, or be associated with, soil/sediment and organic matter and be immobile in soil due to its low water solubility.
<b>Dissociation Constant</b>	Not determined
Remarks	Carboxylic acid are known to have pKas between 4-5.

## 7. TOXICOLOGICAL INVESTIGATIONS

No toxicological data were submitted.

## 8. ECOTOXICOLOGICAL INVESTIGATIONS

No environmental media quality assessment guidelines were available for the notified polymer.

## **9. RISK ASSESSMENT**

### **9.1. Environment**

#### **9.1.1. Environment – exposure assessment**

Refer to Section 5

Under the proposal, the majority (>66%) of the total amount of notified polymer available will be applied and contained in various leather goods. The notifier indicates that wastes generated during formulation and application processes will contain <34% of the total quantity of notified polymer available. The majority of the wastes (containing 32% of the notified polymer) will be sent to landfill(s) for disposal and a fraction of the notified polymer waste generated in WWTP supernatant (containing <1.5% of the total amount of notified polymer) will be discharged to sewer. Eventually, treated leather products will most likely be sent to landfills for disposal. Over time the notified polymer in leather products will slowly degrade through abiotic and biotic processes to oxides of nitrogen and carbon.

Less than 1% of the total quantity of notified polymer may potentially be spilt or otherwise converted to waste during formulation and prior to application to leather products, leaving >99% of the notified polymer available for application to leather products.

Approximately 33% of the notified polymer will be contained in wastes generated at the formulation and application facilities. Most waste will be generated during application. All of these wastes will be sent to waste disposal/treatment facilities, with most (32%) sent to landfills and a fraction (<1.5%) in liquid form sent to sewerage treatment plants linked to the formulation and application facilities.

As treated leather products are discarded or replaced over time, much of the notified polymer in these leather products will be sent to landfills for disposal. The notified polymer in these products will slowly degrade through abiotic and biotic processes to oxides of nitrogen and carbon.

In landfills, the notified polymer is expected to be immobile, due to the low water solubility of its acid form, and to sorb to the soil and waste matrix. In addition, managed landfill facilities typically have environmental monitoring and leachate collection and treatment systems to minimise off-site leachate migration and environmental pollution.

No information was available regarding the number, type or location(s) of the landfills that may receive wastes containing the notified polymer. However, it is conceivable that the majority of the wastes that contain the notified polymer that are generated at the formulation and application facilities would be sent to appropriately licensed landfill(s) that are local or otherwise convenient to these facilities. Liquid wastes containing the notified polymer (i.e. WWTP supernatant) will be discharged to sewers linked to the formulation and application facilities.

#### **9.1.2. Environment – hazard assessment**

No ecotoxicological data were provided. No environmental media quality assessment guidelines were available for the notified polymer.

#### **9.1.3. Environment – risk characterisation**

The notified polymer is not likely to present an unacceptable risk to the environment when it is stored, transported, formulated, applied and wastes are managed in the proposed manner. Under the proposal, uncontrolled emissions to the environment will be unlikely, with pollution controls and waste management and emergency response procedures established at storage, formulation and application facilities. These include bunding, overspray capture, air scrubber equipment, wastewater treatment plant (WWTP) and waste disposal procedures.

The expected low mobility of the notified polymer in landfills indicates that the notified polymer is unlikely to migrate with groundwater from landfills. Most if not all licensed landfills have leachate, groundwater and surface water monitoring systems and monitor these environmental media for chemicals under licence conditions permitted by regulatory authorities. In addition, most landfills have leachate collection systems to capture and treat leachate to acceptable levels. Thus, off-site migration of contaminated landfill leachate is unlikely.

The fraction of notified polymer wastes sent to sewer is expected to form a minor component of the total sewage waste stream and is unlikely to pose an unacceptable risk to the environment. The notified polymer is expected to sorb to particulates and precipitate with other biosolids.

Under the proposed use pattern, contamination of aquatic ecosystems is unlikely. Polymer entering waterways would be expected to associate with the sediments due to its polyanionic nature. If present in aquatic ecosystems, the notified polymer is not expected to bioaccumulate.

## 9.2. Human health

### 9.2.1. Occupational health and safety – exposure assessment

<i>Category of Worker</i>	<i>Number</i>	<i>Exposed to</i>	<i>Exposure Duration and Frequency</i>
Waterside workers	5	Polymer solution 41%	
Transport and warehouse workers	5-10	Polymer solution 41%	
Formulators	2-3	Polymer solution and topcoat (41 and 8%)	100 days/year (4-6 hrs/day)
Spray machine operator	2-3	Topcoat 8%	100 days/year (6-8 hrs/day)
Leather handlers	2-3	Topcoat >8%	100 days/year (6-8 hrs/day)

#### *Exposure Details*

The potential for worker exposure by the dermal, ocular or inhalation route to the notified polymer will be during manufacture of the topcoat, transfer, use and when cleaning equipment.

Workers may come in contact with the notified polymer by accidental spills and splashes during manufacture, when transferring the product containing notified polymer (41%) into the mixing vessel, and when transferring the mixed solution into drums or pails. Mixing vessels are situated in a bunded area with local exhaust ventilation.

Potential exposure may also occur during spray application. However, limited exposure is expected as the topcoat containing 8% notified polymer is pumped directly from drums or pails into the spray unit, which is mostly enclosed in a metal cabinet. The notifier indicates that exhaust ventilation and air purification systems are to be employed. If the spray unit is not enclosed, inhalation exposure to the notified polymer as aerosol droplets may occur.

Leather handlers may be exposed to the notified polymer from accidental splashes while placing untreated leather on the conveyor belt. Handling dried leather is not expected to result in exposure to the notified polymer since the topcoat is dry when removing the dried leather from the conveyor belt.

Operators are expected to wear safety glasses, impervious gloves, coveralls and safety boots when handling coatings and raw materials.

Waterside, transport and warehouse workers would only be exposed to the notified polymer in the event of a spill. The notifier indicates that spills will be taken up by absorbent material and disposed of to a landfill site.



### 9.2.2. Public health – exposure assessment

It is expected that during transport, storage and industrial use, exposure of the general public to the notified polymer will be low, except in the event of an accidental spill. These are contained and absorbed with inert material and collected into appropriately labelled containers for re-use or disposal.

There will be no sale of notified polymer or aqueous topcoat to the public. Aqueous topcoat containing 8 % of the notified polymer will be applied to leather and overcoated with additional polymer topcoats. This leather will be used for furniture and automotive upholstery and sports shoes. Although the availability of leather products containing the notified polymer may be widespread in the public domain, the aqueous top coat containing notified polymer will be overcoated with additional polymer top coats (containing no notified polymer), consequently public exposure by dermal contact is likely to be limited.

### 9.2.3. Human health - effects assessment

No toxicology reports were submitted with the application. Under “Toxicological Information” on the Primal Binder U-61 Material Safety Data Sheet supplied, n-methyl pyrrolidone has acute oral and dermal LD<sub>50</sub>s of 3914 and 8000 mg/kg, in rats and rabbits respectively, and is a slight skin and a moderate eye irritant in rabbits.

The notified polymer meets the PLC criteria and therefore low hazard is expected due to the small number of reactive groups and the inability of the polymer to penetrate biological membranes.

### 9.2.4. Occupational health and safety – risk characterisation

The OHS risk presented by the notified polymer is expected to be low considering that:

- 1) The polymer is considered to be of low hazard;
- 2) Engineering controls (such as local exhaust ventilation) are used at the formulation plant and application is performed in mostly enclosed areas; and,
- 3) The notified polymer is present in the product at low concentrations (8%).

The notified polymer may be present in formulations containing hazardous ingredients. Appropriate safety measures will be used to reduce the risk of adverse effects from exposure to ingredients contained in the formulation other than the notified polymer.

### 9.2.5. Public health – risk characterisation

Finished leather articles, eg. furniture and automotive upholstery and sports shoes, with an aqueous top coat containing 8% notified polymer will be available for retail sale in the public domain. However, the notified polymer aqueous topcoat will be over coated with additional topcoats, restricting any potential dermal contact with the notified polymer. Consequently, the health risk from public exposure to the notified polymer on finished leather articles is considered to be low.

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

### 10.1. Hazard classification

Based on the available data the notified polymer is not classified as hazardous under the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999).

### 10.2. Environmental risk assessment

The polymer 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 No Significant Concern to public health from contact with the finished leather articles containing low amounts of notified polymer.

## 11. MATERIAL SAFETY DATA SHEET

### 11.1. Material Safety Data Sheet

The MSDS of the imported product Primal Binder U-61 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 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 imported product Primal Binder U-61 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.

## 12. RECOMMENDATIONS

### CONTROL MEASURES

#### Occupational Health and Safety

- No specific engineering controls, work practices or personal protective equipment are required for the safe use of the notified polymer itself, however, these should be selected on the basis of all ingredients in the formulation.

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

- Ensure that the spray units are enclosed
- A copy of the MSDS for the imported product should be easily accessible to employees.
- If products and mixtures containing the notified polymer 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.

#### Environment

- Contain spills of the notified polymer with inert materials (i.e. sand, earth). Transfer liquids and solid material to separate suitable containers for recovery or disposal. Keep spills and cleaning runoff out of municipal sewers and open water bodies of water.
- Dispose of contaminated solids and liquids in accordance with local, State, Territory and Federal Regulations.

### 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(1) of the Act; if
- the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

or

- (2) 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

ACTC (Analytical and Computational Technology Center) Saucy and Tran (2002a). Molecular weight oligomer fraction and water absorbability for Vithane 3948 Infra red Spectra of Primal Binder Vithane U-61 and U-71 for PMN. Technical Document No TD2002-128.

ACTC (Analytical and Computational Technology Center) Xie W. (2002b). Infra red Spectra of Primal Binder Vithane U-61 and U-71 for PMN. Technical Document No TD2002-128.

ACTC; Tran, T. (2002c). *Water Solubility of Primal Binder U-61 Polymer*. April 2002. Unpublished consultancy report by Analytical and Computational Technology Center. Technical Document No. TD2002-152.

Connell, D.W. (1990). General Characteristics of Organic Compounds Which Exhibit Bioaccumulation. In: *Bioaccumulation of Xenobiotic Compounds*, pp. 47-57. CRC Press, Boca Raton, USA.

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

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

National Occupational Health and Safety Commission (1999) Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1999)]. Australian Government Publishing Service, Canberra.