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

**FULL PUBLIC REPORT**

**UVEB 3708**

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**Director  
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## **FULL PUBLIC REPORT**

<b>UVEB 3708</b>
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### **1. APPLICANT AND NOTIFICATION DETAILS**

#### APPLICANT(S)

Cytec Australia Holdings Pty Ltd (ABN 45 081 148 629)  
Suite 1, level 1, 21 Solent Circuit, Baulkham Hills, NSW 2153

IGT Intergraphic Technologies Pty Ltd (ABN 21 111 990 017)  
26 Ovata Drive, Tullamarine, VIC 3043

#### NOTIFICATION CATEGORY

Limited: Polymer with NAMW  $\geq 1000$  (greater than 1 tonne per year).

#### EXEMPT INFORMATION (SECTION 75 OF THE ACT)

Data items and details claimed exempt from publication:

Chemical Identity Data

Identity and Weight of Impurities/Additives/Adjuvants

Import Volume

Identity of Customers and Their Sites

Details of Polymer

Formulation details of end-use products

Concentration of the notified polymer in end-use products

#### VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)

Variation to the schedule of data requirements is claimed as follows:

Melting Point

Boiling Point

Density

Water Solubility

Vapour Pressure

Hydrolysis as a Function of pH

Partition Coefficient

Adsorption/Desorption

Dissociation Constant

Flammability Limits

Autoignition Temperature

Explosive Properties

#### PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)

None.

#### NOTIFICATION IN OTHER COUNTRIES

USA (1999)

### **2. IDENTITY OF CHEMICAL**

#### OTHER NAME(S)

Epoxyacrylate Resin

#### MARKETING NAME(S)

UVEB 3708

#### METHODS OF DETECTION AND DETERMINATION

REMARKS The notified polymer was characterised by GPC, NMR.  
TEST FACILITY Lab Frontier (2004) and CSS (2005a)

### 3. COMPOSITION

DEGREE OF PURITY  
> 99%

DEGRADATION PRODUCTS  
No information available

LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES  
None known. The polymer stability in acid and alkali was confirmed in the study below.

#### Polymer Stability Test

METHOD Gel Permeation Chromatography  
Remarks This test method is in accordance with the polymer test guideline issued by the National Institute of Environment Research of Korea. The purified polymer in UVEB 3708 did not show any significant changes in molecular distribution determined by GPC analysis after the test period compared to the untreated original sample. The range of pH tested was between pH 1.9 and 9. Therefore, it was concluded that the polymer is stable under acidic and basic conditions.  
TEST FACILITY Lab Frontier (2004)

### 4. INTRODUCTION AND USE INFORMATION

MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS  
The notified polymer will not be manufactured in Australia, but will be imported as < 65% component of an adhesive.

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	22-32	40-58	56-65	56-65	56-65

USE  
The notified polymer will be used as an ingredient in an adhesive in the manufacture of DVDs.

### 5. PROCESS AND RELEASE INFORMATION

#### 5.1. Distribution, transport and storage

PORT OF ENTRY  
Melbourne and Sydney

IDENTITY OF MANUFACTURER/RECIPIENTS  
The adhesive containing the notified polymer in drums will be imported by IGT Intergraphic Technologies Pty Ltd who will then re-distribute them in their original packaging to the formulators of adhesives, mostly in New South Wales and Victoria.

TRANSPORTATION AND PACKAGING  
The notified polymer will be imported in 20 L plastic drums as part of a formulated adhesive. The drums will be transported by road from the wharf to the importer's warehouses, to be stored until they are delivered to the applicators' warehouses. It is expected that the drums will be transported by road to individual recipients' sites.

#### 5.2. Operation description

At the application site, the adhesive will be applied in a highly automated enclosed system. The drum containing the ready-to-apply material will be moved by forklift to the production area where it will be opened and connected with a pump/hose. The rest of the production process from application to packaging is fully automated. The discs are moulded, coated, bound with adhesives, cured via UV light and then stacked before being packaged. All run-offs are collected and returned to the reservoir to be reused.

In case there is any change in adhesive, blank titles are run to flush out the previous adhesive and these discs complete the production cycle. These blank titles are discarded as waste material. No solvents or cleaning liquid is used for washing of the equipment.

The residue in drums is treated with UV light in order to initiate the curing process. Once curing is completed the empty drums are disposed of to landfill. Solvents are not used.

### 5.3. Occupational Exposure

#### *Number and Category of Workers*

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration</i>	<i>Exposure Frequency</i>
Transport and storage	10-15	1-10 hours/day	20 days/year
Manufacture of DVDs			
Replication Operators – operate DVD Replication Machines	9	8 hours/day	75 days/year
Replication Operators – replacement of empty adhesive drum	9	5 min/day	75 days/year
End use	> 1000	6-8 hours/day	300 days/year

#### *Exposure Details*

##### *Transport and storage*

Transport and warehouse workers will be exposed to the notified polymer only in the event of a spill or if packaging is accidentally breached.

##### *Manufacture of DVD and optical disc products*

Dermal and ocular exposure may occur when opening drums of adhesive containing < 65% of the notified polymer, and when connecting and disconnecting automated pumps during transfer operations. This will occur once per day and will take around 5 minutes to complete. The DVD manufacturing process is fully enclosed and automated, therefore further exposure would be limited. All of the workers involved in the production of DVDs will wear personal protective equipment including safety glasses, gloves and overalls. Dermal exposure may also result from workers cleaning drums. These workers will wear personal protective equipment including safety glasses, gloves and overalls to minimize any exposure

### 5.4. Release

#### RELEASE OF CHEMICAL AT SITE

The notified polymer will be imported by IGT Intergraphic Technologies Pty Ltd as part of a formulated product in either 18 kg or 200 kg open top steel drums. The drums will be transported by road from the wharf to the importer's or distributor's warehouses in trucks to be stored until they are delivered to the applicators' warehouses, which are located mostly in NSW and Victoria. It is expected that the drums will be transported by road to individual recipients' sites. No manufacture of the notified polymer or repackaging will be carried out in Australia.

At the applicator's site, the formulations are transferred to the work area using forklifts. The drums are opened and a pump introduced to siphon out the formulation into the application equipment. At the application site, the adhesive will be applied in a highly automated enclosed system. The cleaning of equipment is typically done only periodically (once every 2 weeks or more) using industrial solvents and only minimal contact with diluted product is expected. As the formulations do not contain solvents and do not spontaneously cure or dry up, the application equipment does not need to be washed very often and can be left overnight with unused formulation, provided they are properly covered to prevent

foreign material from settling. As the lines are fully enclosed, the wastage is expected to be minimal. All run offs are collected and returned to the reservoir to be reused. The lines are usually dedicated to a particular application. In case there is any change in adhesive, blank titles are run to flush out the previous adhesive and these discs complete the production cycle. These blank titles are discarded as waste material. No solvents or cleaning liquid is used for washing of the equipment. Some of the cured discs can be recycled, i.e., melted and remoulded. Other waste is collected and sent to a registered waste disposal company for disposal, usually by landfill.

#### RELEASE OF CHEMICAL FROM USE

As the polymer is fully cured at end use, no release of the polymer will occur at the consumer level. A radiation curable adhesive is a 100% solid formulation without water or solvents to remove. Every single component is expected to be cured to form a solid matrix. The degree of cure is dependent on the application technique, formulation, intensity of the energy source and expertise. Once the polymerisation reaction is initiated, there is no reversal and the adhesive hardens to a solid matrix, usually within seconds and without the need for thermal energy.

Articles coated with the UV-cured adhesives containing the notified polymer are expected to be disposed of to landfill. The environmental hazard from the disposal of the article containing the substance is rated as negligible as the cured matrix is not expected to degrade into hazardous degradation products.

The residue in drums is treated with UV light in order to initiate the curing process. Once the curing is completed the empty drums are disposed of to landfill. Solvents are not used. Disposal of waste finished products is by incineration at an approved waste handler. Any adhesive sludge or waste containing the notified polymer material should be disposed of through certified Transport, Treatment and Disposal facilities, as required. These wastes are then collected and sent for incineration. Complete incineration of the notified polymer will give rise to water, and oxides of carbon.

#### 5.5. Disposal

The major route for disposal of the notified polymer will be to the landfill after use. A very small proportion of the total imported quantity is expected to be disposed of to the STP, as any lab washings during quality control or accidental spills should go to the water treatment site.

#### 5.6. Public exposure

The notified polymer is for industrial use and will not reach the public. Public exposure to the notified polymer itself or in products as a result of transportation within Australia is unlikely unless there is an accident.

The notified polymer is cured and becomes an inert part of the adhesive material. While members of the public may make contact with the cured articles, the notified polymer is unlikely to be bioavailable in this form.

### 6. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance at 20°C and 101.3 kPa</b>	Light clear and viscous liquid with typical acrylate odour. Colour is on average, Gardner 1.6 and the specified value is < 2.5.
<b>Melting Point/Freezing Point</b>	Not Determined
Remarks	UVEB 3708 is a viscous liquid which will upon cooling vitrify like glass without crystallising.
<b>Boiling Point</b>	> 100°C at 101.3 kPa
Remarks	Estimation, no test report supplied.
<b>Density</b>	1190 kg/m <sup>3</sup> at 23°C
Remarks	Using a volume-calibrated flask (pycnometer)

Test Facility	CSS (2005)
<b>Vapour Pressure</b>	$< 1.5 \times 10^{-3}$ kPa at 20°C
Remarks	Calculated value by Raoult's law.
<b>Water Solubility</b>	$< 1$ g/L
METHOD	OECD TG 105
Remarks	Full test report not provided.
Test Facility	CSS (2005a)
<b>Water Solubility</b>	$< 0.01$ g/L
METHOD	UV Spectroscopy
Remarks	Full test report not provided. 0.25 g of notified polymer was dissolved in 100 mL of Milli Q water in 3 flasks. The solutions were stirred continuously at 30 °C. After respectively 1, 2, and 3 days the solution and blank were removed from oven and kept at 20 °C for a minimum of 24 hours in order to reach equilibrium. The solutions in the flask were filtered on a 0.45 µm filter. The concentration of the notified polymer in the clear aqueous phase is determined without dilution by UV spectrometer.
Test Facility	CSS (2005c)
<b>Hydrolysis as a Function of pH</b>	
REMARKS	Stable between pH 1.9 and 9 (see section 3 above)
<b>Partition Coefficient (n-octanol/water)</b>	Not determined.
Remarks	The retention time of the notified polymer is 80% greater than the retention time of a standard with log Kow of 4.2.
TEST FACILITY	CSS (2005a)
<b>Adsorption/Desorption</b>	No data was provided.
<b>Dissociation Constant</b>	Not Determined
Remarks	The polymer does not contain functional groups that are ionic in nature and thus not expected to dissociate in water.
<b>Particle Size</b>	Not Applicable.
Remarks	The polymer is a liquid.
<b>Flash Point</b>	$> 100^{\circ}\text{C}$
Remarks	Seta flash Closed tester (Full test report not provided).
Test Facility	CSS (2005a)
<b>Autoignition Temperature</b>	Not Determined
Remarks	The notified polymer is not expected to autoignite below 370 °C, based on the properties of a component.
<b>Explosive Properties</b>	Not Determined
Remarks	The product is not expected to be explosive or have the potential to detonate as a



<b>Reactivity</b>	
Remarks	<p>The notified polymer is stable under normal conditions and is not reactive with water or air. The product containing the notified polymer should not be stored at temperatures exceeding 40 °C or exposed to direct sunlight. Uncontrollable polymerisation can result in the generation of heat and pressure build-up in containers which could lead to violent rupture. However there are no hazardous decomposition products and the end result is gelation of the product to become a solid mass.</p> <p>Contact with polymerisation initiators including peroxides, strong oxidizing agents, copper, copper alloys, carbon steel, iron, rust and strong bases should be avoided.</p>
<b>Viscosity</b>	
	3,000 – 4,500 mPa.s at 60°C
Remarks	In the range of average 3660cP by Brookfield Viscosity sp28, 60rpm, 60°C (Full test report not provided)
Test Facility	CSS (2005a)
<b>Acid No.</b>	
	On average 1.3.
Remarks	The specified value is < 3.

<i>Endpoint and Result</i>	<i>Assessment Conclusion</i>
Rat, acute dermal LD50 > 2000 mg/kg bw	low toxicity

TEST SUBSTANCE	Notified polymer
METHOD	OECD TG 402 Acute Dermal Toxicity.
Species/Strain	Rat/Wistra strain, CrI:WI (SPF Quality)
Type of dressing	Occlusive
Remarks - Method	There were no deviations from the protocol.

<i>Group</i>	<i>Number and Sex of Animals</i>	<i>Dose mg/kg bw</i>	<i>Mortality</i>
1	5 M	2000	0
2	5 F	2000	0

LD50	> 2000 mg/kg bw
Effects in Organs	No abnormalities were found at macroscopic post mortem examination of the animals.
Remarks - Results	No mortality occurred. Hunched and/or flat posture, chromodacryorrhea, piloerection, ptosis and/or quick breathing were noted in the majority of animals between day 1 and 4. Maculate or general erythema, scales and/or scabs were seen in the treated skin-area of the majority of animals during the observation period. In addition, necrosis, thickened area, scars, fissures with bleeding and/or scratching were noted in the treated skin-area of some females during the observation period.
CONCLUSION	The notified polymer is of low toxicity via the dermal route.
TEST FACILITY	NOTOX B.V. (2005)

## 8. ENVIRONMENT

No environmental fate or toxicities data were submitted.

## 9. RISK ASSESSMENT

### 9.1. Environment

#### 9.1.1. Environment – exposure assessment

The notified polymer will be imported as a component of a formulated adhesive product which is suitable for industrial use only. No manufacture of the notified polymer or repackaging will be carried out in Australia.

Disposal of waste finished products is by incineration at an approved waste handler. Any adhesive sludge or waste containing the notified polymer material should be disposed of through certified Transport, Treatment and Disposal facilities, as required. These wastes are then collected and sent for incineration. Complete incineration of the notified polymer will give rise to water, and oxides of carbon.

Notified polymer that is disposed of to landfill is expected to associate with the organic phases of the soil matrix and therefore be immobile. Over time, the notified polymer should degrade by biotic and abiotic processes to form simple carbon, nitrogen and oxygen containing compounds.

In sewer, the notified polymer is expected to be associated with suspended particles and sediment. In landfill, the notified polymer is not expected to be mobile and should adsorb to sediment, where over time it should slowly degrade through biotic and abiotic processes to simple carbon and nitrogen based compounds.

The polymer is highly water insoluble, and is likely to preferably strongly partition to sediments and the organic fraction of soils. The high molecular weight indicates a low potential to bioaccumulate.

#### 9.1.2. Environment – effects assessment

No ecotoxicological data were submitted.

Non-ionic polymers of NAMW > 1000 are of low concern to the aquatic compartment.

#### 9.1.3. Environment – risk characterisation

During use, the notified polymer is unlikely to be released into the environment except during unanticipated spill incidents, which will be collected for disposal by incinerator or landfill and very small amount could reach the STP. In the longer term, most of the notified polymer used in adhesives will eventually be sent to landfill for disposal following its lifecycle.

### 9.2. Human health

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

Dermal and ocular exposure can occur during transfer operations of adhesive containing the notified polymer. However, exposure to significant amounts of the notified polymer is limited because of the fully enclosed and automated nature of the DVD manufacturing process and the engineering controls in place during the process. Personal protective equipment worn by workers will further reduce exposure.

After application and drying, the adhesive containing the notified polymer is cured into an inert matrix and is hence unavailable to exposure.

During transport and storage, workers are unlikely to be exposed to the notified polymer except when packaging is accidentally breached.

#### **9.2.2. Public health – exposure assessment**

The notified polymer is intended for an industrial user and will not be available for general consumer use. Members of the public may make dermal contact with the UV-cured adhesive containing the UVEB 3708. However, exposure is expected to be negligible because the notified polymer is bound within a chemically stable matrix and unlikely to become bioavailable.

#### **9.2.3. Human health – effects assessment**

Few toxicological data have been provided for the notified polymer. It was found to be of low acute toxicity via the dermal route in rabbits. Effects on the skin in this study suggest that it has irritating properties.

The polymer has been classified as hazardous by the notifier on the basis of residual levels of an impurity with corrosive, toxic and sensitising properties. It also contains low levels of other hazardous impurities.

The classification applied by the notifier on the basis of the main impurity is:

Xn: Harmful

R 21: Harmful in contact with skin

R 36/38: Irritating to eyes and skin.

R 43: May cause sensitisation by skin contact.

The polymer has a high number average molecular weight of  $\geq 1000$ , and is unlikely to cross biological membranes. The notified polymer contains pendent high concern reactive functional groups, resulting in probable irritant and sensitising properties.

Despite the fact that US EPA no longer expects to make a potential unreasonable risk to human health findings for many of the new acrylates, especially higher molecular weight and polymeric substances, EPA still recommends the use of engineering controls of personal protection equipment to reduce exposures in the workplace in recognition of their potential as irritants and sensitisers.

The notifier has claimed the notified polymer as irritant.

Based on the limited data available, the notified polymer is likely to be classified as a hazardous substance in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC 2004):

R 36/38: Irritating to eyes and skin.

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

Based on limited hazard data, the notified polymer itself is likely to have irritant properties. An

identified impurity present at > 1% is a skin and eye irritant, a skin sensitiser, and is harmful via dermal exposure. The polymer may undergo uncontrolled polymerisation if stored above 40°C, leading to rupture of the containers.

Worker exposure to the notified polymer during transportation and storage is expected to be very low except in the case of accidental spillage or leakage from containers of adhesive containing the notified polymer at < 65%.

At the DVD manufacturing site, some exposure due to accidental spillage and during transfer or cleaning could occur but would be limited by the use of PPE. Due to the automated nature of the coating process, minimal exposure to the notified polymer is expected at this stage.

After application and curing of the adhesive on DVD products, the notified polymer is unlikely to be bioavailable and as such exposure to the notified polymer from contact with the DVD is expected to be negligible.

The risk to workers at the application site would be reduced by the small number of operations carried out where exposure could occur, and by use of PPE. It would be further reduced by adoption of safe work practices. The risk of hazardous polymerisation would be controlled by appropriate storage conditions.

#### **9.2.5. Public health – risk characterisation**

Once the adhesive containing the notified polymer is applied to the DVD, the notified polymer is bound within a chemically stable matrix and is not bioavailable. Therefore no significant exposure to the public is expected and the risk to public health is low.

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

#### **10.1. Hazard classification**

Few toxicological data have been provided for the notified polymer and therefore the substance cannot be classified in accordance with the NOHSC Approved Criteria for Classifying Hazardous Substances (NOHSC, 2004).

and

The classification of notified polymer using the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS) (United Nations 2003) cannot be presented as few toxicity data were submitted.

#### **10.2. Environmental risk assessment**

The notified 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 Negligible Concern to public health when used in the proposed manner.

### **11. MATERIAL SAFETY DATA SHEET**

#### **11.1. Material Safety Data Sheet**

The MSDS of the notified polymer and a product containing the notified polymer provided by

the notifier were in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC 2003). They are 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 polymer and a product containing the notified polymer provided by the notifier were 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

#### Health Surveillance

- As the notified polymer is a potential skin 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 note the likely irritant and sensitising properties of the notified polymer in classifying mixtures and in preparing MSDS.
- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer as introduced:
  - Avoid contact with skin and eyes
  - 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:
  - safety glasses
  - impermeable laminated multi-layer plastic gloves or nitrile-butadiene-rubber gloves
  - 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 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.

#### Disposal

The notified polymer should be disposed of by:

- Disposal of empty drums is to land fill.
- Disposal of waste finished products is by incineration at an approved waste handler. Any adhesive sludge or waste containing the UVEB 3708 material should be disposed of through certified Transport, Treatment and Disposal facilities, as required. These wastes are then collected and sent for incineration. Complete incineration of the notified polymer will give rise to water, and oxides of carbon.

#### Emergency procedures

- Accidental spills/release of the notified polymer should be handled as described below:
  - Small spills of notified polymer can be wiped with a dry cloth or absorbent paper which should then be discarded as scheduled hazardous waste as per national requirements. To remove residues, small spill areas should be mopped with water. The watery residues from cleaning small spills can be disposed of to the water treatment facility.
  - Larger spills of notified polymer should be cleaned up promptly using absorbent materials such as mineral filler such as sand, diatomaceous earth etc. These materials should be placed into containers for disposal by a licensed waste disposal company. To remove residues, the spill area should be hosed with water, and the watery residues prevented from entering waterways.
  - In case of accidental skin and eye contact, avoid concurrent exposure to the sun or other sources of UV light, which may increase the sensitivity of the skin or eyes.

#### Storage

- The following precautions should be taken by the notifier and end-users regarding storage of adhesive formulations containing the notified chemical:
  - Store drums below 40 °C to avoid hazardous polymerisation that may lead to pressure buildup and possible rupture of the drums.

#### 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 any form other than as  $\leq 65\%$  of an adhesive formulation; or
  - if toxicity data is available on the notified polymer; or
  - if the notified polymer is imported in the absence of the main hazardous impurity.

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.

### 13. BIBLIOGRAPHY

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