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

**FULL PUBLIC REPORT**

**Polymer in Surlyn HPF 2000**

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**Director  
NICNAS**

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**FULL PUBLIC REPORT****Polymer in Surlyn HPF 2000****1. APPLICANT AND NOTIFICATION DETAILS**

## APPLICANT (S)

DuPont (Australia) Ltd (ABN: 59 000 716 469)  
168 Walker Street  
NORTH SYDNEY NSW 2060

## NOTIFICATION CATEGORY

Polymer of Low Concern

## 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  
Manufacture/Import Volume  
Site of Manufacture/Reformulation

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

No variation to the schedule of data requirements is claimed.

## PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT (S)

Nil

## NOTIFICATION IN OTHER COUNTRIES

USA (1999)  
Korea (2003)  
Canada (2002)

**2. IDENTITY OF CHEMICAL**

## MARKETING NAME (S)

Surlyn HPF 2000

**3. COMPOSITION**

## PLC CRITERIA JUSTIFICATION

The notified polymer does not contain any moderate or high concern reactive functional groups.

<i>Criterion</i>	<i>Criterion met (yes/no/not applicable)</i>
Molecular Weight Requirements	Yes
Functional Group Equivalent Weight (FGEW) Requirements	Yes
Low Charge Density	Yes
Approved Elements Only	Yes

Stable Under Normal Conditions of Use	Yes
Not Water Absorbing	Yes
Not a Hazard Substance or Dangerous Good	Yes

The notified polymer meets the PLC criteria.

#### 4. INTRODUCTION AND USE INFORMATION

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

The notified polymer will be imported into Australia as an ingredient of polymer pellets of DuPont Surlyn HPF 2000 in poly-lined, 25 kg Kraft paper bags.

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

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Tonnes</i>	<200	<300	<500	<500	<500

##### USE

The notified polymer is intended for high impact applications including golf ball construction.

#### 5. PROCESS AND RELEASE INFORMATION

##### 5.1. Operation Description

The notified polymer will be imported by sea to Sydney where it will be transported by truck to DuPont warehousing at Wetherill Park NSW.

The Surlyn HPF 2000 will be packed in 25 kg Kraft paper bags to customers, or 500 kg cardboard box on pallet depending on customers' equipment and specification. Deliveries may be by the 25 kg poly lined Kraft paper bag, pallet (40 x 25 kg bags) or Poly lined Bulk box (typically 500 kg).

The Surlyn HPF 2000 is stored in a humidity controlled, heated drying room or dehumidifying dryer for a minimum of 24-hours at 50 °C to ensure moisture does not affect moulding quality.

Once dried, the resin is loaded into the drying hopper either manually or by suction where the Surlyn HPF 2000 resides till gravity fed into the pre-heating chamber of the moulding machine, then screw fed into the heating chamber immediately prior to extrusion or injection moulding as articles.

#### 6. EXPOSURE INFORMATION

##### 6.1. Summary of Occupational Exposure

Surlyn HPF 2000 containing the notified polymer is supplied by DuPont in the form of polymer beads and is not considered hazardous according to the criteria of NOHSC. Skin contact will be the primary route of potential exposure with mechanical abrasion being the only perceivable form of injury.

Molding Surlyn HPF 2000 requires heating the resin and molding machine above 220 °C. Care should be taken to protect the hands and other exposed parts of the body when handling molten polymer or recently molded parts.

Transport and warehouse workers may come into dermal and ocular contact with the notified polymer through accidental breakage of the poly-lined, Kraft paper bag. The solid, clear to translucent, white to pale-yellow, pellets of Surlyn HPF 2000 provide a potential slipping hazard and in limited circumstances may cause physical abrasion when the inert pellets touch the skin or eyes.

Workers will use mechanical assistance or vacuum to transfer the polymer pellets from the suppliers bag or box to the moulding devices drying/holding hopper, which is set at a minimum of 50 °C with a recommended residence time of 24-hours to ensure elimination of atmospheric moisture.

The product is fed into the automatic moulding machine. An exhaust/filter system is situated above the machine inlet and outlet to capture any off gassing created by a small amount (> 0.1 %) of polymer naturally degrading in the moulding equipment prior to extrusion.

Workers operating moulding equipment should wear heat resistant gloves, eye protection and heat resistant industrial clothing. The high pressures and temperature range of 220 °C–280 °C at which the moulding equipment operates, requires caution by operators and maintenance staff to prevent injury from hot polymer or hot parts before they cool.

Workers following the MSDS recommendations for PPE will be protected from any hazards from hot polymer or the associated moulding machinery.

## 6.2. Summary of Public Exposure

The notified polymer is intended for use as a moulding resin and will only be available to the general public in its final form as a moulded article (golf ball) that has only intermittent contact with the users skin. The polymer analogue HPF 1000 demonstrates insolubility.

## 6.3. Summary of Environmental Exposure

### 6.3.1. Environmental Release

#### Manufacturing of moulded articles:

During manufacture by injection moulding, there is potential for small releases through sprue waste. The polymer of the sprue is cut or broken from the moulded article and ground down into pellets to be recycled. Typically the waste polymer for disposal will be the 1-2 kg charge in the extruder required to “flush out” any residual polymers.

The expected release to the environment will be:

- 1) Initial purge to start-up the extrusion process.
- 2) < 10 g per sprue, which is reground and recycled therefore this step is zero release.
- 3) 2 kg purge to changeover the extruder to new polymer at the end of run.
- 4) Any substandard or defective moulding will be recycled therefore almost zero release.
- 5) Residual pellets in the bag or box used to supply the Surlyn resin.
- 6) In a worst case scenario where the polymer is not recycled (as recommended) the total release to the environment to be land filled as refuse is between 160–200 kg per annum. With recycling the total polymer land filled will be < 10 kg per annum.
- 7) The above volume may be disposed as an extender into low quality polypropylene moulding.

### 6.3.2. Environmental Fate

Solubility is critical to creating systematic toxicity to the aquatic environment. The polymer is not water soluble, and if released to water, would partition to sediments. The high molecular weight and insolubility underpin a predicted low potential for bioaccumulation.

The dispersed use pattern combined with the volume lost to the environment will be exceedingly low. The notified polymer contains no hydrolysable groups in the environmental pH range. In landfill, solid wastes containing the polymer will be immobile and will not be expected to leach into the aquatic compartment, but should slowly degrade and become associated with the soil matrix.

## ESTABLISHMENT OF LOW PHYSICAL AND CHEMICAL HAZARD

<b>Appearance at 20°C and 101.3 kPa</b>	Clear glass-like solid
<b>Melting Point/Glass Transition Temp</b>	Freezing Point (DTA) 39 °C (102 °F) ASTM D3418
<b>Density</b>	0.96 g/cm <sup>3</sup> ASTM D792 ISO 1183
<b>Water Solubility</b>	< 1 mg/L at 20 °C from analogue test data HPF1000 thus insoluble.
<b>Dissociation Constant</b>	N/A, insoluble
<b>Particle Size</b>	Pellets

**Reactivity**

Not an oxidiser. Not expected to be reactive under normal environmental conditions.

**Degradation Products**

At recommended processing temperatures, small amounts of fumes may evolve from the resins. When resins are overheated, more extensive decomposition may occur. Adequate ventilation should be provided to remove the fumes from the work area.

CO, CO<sub>2</sub> and Metal oxide are typically released when Surlyn HPF 2000 compound is burnt. Typically Surlyn's do not degrade until the temperature is considerably greater than 280 °C.

**8. HUMAN HEALTH IMPLICATIONS****8.1. Toxicology**

No toxicological data were submitted.

**8.2. Human Health Hazard Assessment**

The notified polymer meets the PLC criteria and can therefore be considered to be of low hazard.

**9. ENVIRONMENTAL HAZARDS****9.1. Ecotoxicology**

No toxicological data were submitted

**9.2. Environmental Hazard Assessment**

Polymers that have MW > 1000 and conforming to PLC guidelines are of low concern. The insolubility of the notified polymer in the environmental pH range means that it will not be readily released into the aquatic environment.

**10. RISK ASSESSMENT****10.1. Environment**

The environmental risk posed by use of the notified polymer is expected to be low. The majority of the notified polymer will be incorporated into the internal parts of a moulded object and hence will be mostly unavailable for exposure to the environment. Wastes generated during article manufacture are expected to be minimal and are estimated at a maximum of 0.08 tonnes per annum. Will be preferably disposed of by recycling or alternately by landfill in a dispersed manner as a solid insoluble form thereby minimising the environmental risk. Waste containing the notified polymer may be disposed by incineration to recover fuel value.

At end of life the used polymer will be disposed to landfill where it will slowly degrade and become associated with the soil matrix. All degradation products are expected to be relatively inert and non-ecotoxic.

**10.2. Occupational Health and Safety**

The OHS risk presented by the notified polymer is expected to be low, based on low hazard of polymer meeting the definition of PLC due to high MW and low solubility combined with low opportunity for exposure, engineering controls and personal protective equipment used by workers.

**10.3. Public Health**

The general public will use the articles manufactured using Surlyn HPF 2000. The properties of the notified polymer meet the criterion for classification as a polymer of low concern. Therefore, the notified polymer is non-hazardous to human health. Furthermore, the risk to public health will be negligible because the notified polymer is bound within a matrix and will not be bio-

available.

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

### **11.1. Environmental Risk Assessment**

The notified polymer is not considered to pose a risk to the environment based on controls in manufacture limiting uncontrolled escape to the environment, the notified polymers reported insolubility, diffuse use pattern of the final moulded article, molecular weight, and expected breakdown products.

### **11.2. Human Health Risk Assessment**

#### **11.2.1. Occupational health and safety**

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

#### **11.2.2. Public health**

There is Negligible Concern to public health when used in the proposed manner.

## **12. MATERIAL SAFETY DATA SHEET**

### **12.1. Material Safety Data Sheet**

The notifier has provided MSDS of the notified polymer in the imported resin, in accordance with the schedule item B 12 of the *ICNA Act*. The accuracy of the information on the MSDS remains the responsibility of the applicant.

## **13. RECOMMENDATIONS**

### **CONTROL MEASURES**

#### **Occupational Health and Safety**

- Engineering controls, work practices and personal protective equipment should be selected on the basis of all ingredients and high temperature processes in the manufacture thermoplastic moulding.
- Extrusion/injection moulding equipment should have extractor fans off-take cowls positioned over the machine inlets and output heads, as small amounts of thermally degraded polymer form hot gases that should be exhausted from the building.
- 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.

#### **Environment**

- The following control measures should be implemented by the moulder/manufacturer to minimise environmental exposure during product manufacture using the notified chemical:

- Undertake work in designated areas only.
- Collect all wastes and recycle where possible, otherwise contain in open drums and allow material to be recycled, burnt or dispose of to landfill.
- The following control measures should be implemented by moulders/manufacturers to minimise environmental exposure during use of the notified polymer:
  - Exhaust ventilation of all drying hoppers and moulding machines.
  - Do not empty polymer waste into general refuse.
  - Ensure no residual pellets remain in packaging before disposal.

#### Disposal

- Spill clean up with broom or vacuum.
- Disposal of scrap may be incorporated with polyethylene waste for low quality molding, use as molding machine purge, landfill as a non hazardous waste or incineration in a properly operated incinerator. Disposal to landfill should comply with local, state, and federal regulations using only approved waste management contractors.

#### Emergency procedures

- Spills/release of the notified polymer should be absorbed with sand, vermiculite or paper and put into suitable container for disposal.
- Do not allow spills to enter watercourses or drains.
- Organize emergency training on an annual basis.

### 13.1. 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 subsection 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 subsection 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.