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August 2001

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**Lotader AX 8900**

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Director  
Chemicals Notification and Assessment

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**FULL PUBLIC REPORT****Lotader AX 8900****1. APPLICANT**

Eastman Chemical Ltd of Level 8, 15 Talavera Rd, North Ryde NSW 2113 (ABN 72 001 313 417) and Atofina (Australia) Pty Ltd of 270-280 Hammond Rd, Dandenong South VIC 3175 (ABN 44 000 330 772) have submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC) Lotader AX8900.

**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.

**Trade names:** Lotader AX8900  
Eastapak PET 21182 CP001C (notified polymer in PET)

**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. The notified polymer contains the high concern epoxide functional group with a Functional Group Equivalent Weight (FGEW) < 5000, but as the notified polymer has a Number Average Molecular Weight (NAMW) > 10000, this does not preclude it being assessed as a PLC.

## 5. PHYSICAL AND CHEMICAL PROPERTIES

Property	Result	Comments
<b>Appearance</b>	solid colourless pellets with a slight acrylic odour	
<b>Melting point</b>	65 - 73°C	Eastapak PET 21182 softening point 250–255°C
<b>Density</b>	940 kg/m <sup>3</sup>	
<b>Water solubility</b>	< 0.1 g/L at pH 1 1.8 g/L at pH 7 3.8 g/L at pH 10 at 35°C	see comments below
<b>Particle size</b>	5 mm granules	
<b>Flammability</b>	not flammable	
<b>Autoignition temperature</b>	> 450°C	
<b>Explosive properties</b>	not expected to be explosive	
<b>Stability/reactivity</b>	stable under normal environmental conditions	
<b>Hydrolysis as function of pH</b>	not determined	the notified polymer contains a reactive functional group which is expected to hydrolyse readily; other groups within the notified polymer are not expected to hydrolyse under normal environmental conditions
<b>Dissociation constant</b>	no dissociable functional groups are present	

### 5.1 Comments on physical and chemical properties

The water solubility of the notified polymer was determined using a procedure modified from OECD TG 105. Twenty grams of the notified polymer was weighed in a flask and 60 g of solvent was added (using distilled water at pH 7; hydrochloric acid solution at pH 1; and sodium or potassium hydroxide solution at pH 10). The flask was then closed and maintained at 35°C under agitation. After extraction, the flask content was filtered and the water soluble fraction was determined after solvent evaporation (at 50°C, under nitrogen). The results presented are based on measurements taken at 72 and 148 hours, which are the same according to the accuracy of the method.

## 6. USE, VOLUME AND FORMULATION

### Use:

The notified polymer will be used as an impact modifier in polyethylene terephthalate (PET) food trays for frozen pre-prepared meals.

### Manufacture/Import volume:

The notifier estimates that the import volume for the notified polymer will be in the range of 40 – 60 tonnes notified polymer per annum in each of the first five years of importation.

### Formulation details:

The notified polymer will be imported in the form of a polymer masterbatch (Eastapak PET 21182 CP001C) containing < 45 % notified polymer in > 55 % PET, with other additives also present. The notified polymer will be crosslinked with the PET of the masterbatch, although some reactive functional groups may remain. The masterbatch will be in the form of approximately 5 mm granules. These will be imported in either 545 kg boxes or 850 kg bulk bags with PET liners. The notified polymer will be reformulated by mixing with PET, melting and extruding as a sheet which is then thermoformed to produce the food trays, containing less than 10 % notified polymer.

## 7. OCCUPATIONAL EXPOSURE

Exposure route	Exposure details	Controls indicated by notifier
<b>Reformulation</b>		
<i>Plant Operators (80-200 workers, 2 hr/day, 10 days/year)</i>		
dermal, inhalation (masterbatch)	possible dermal or inhalation exposure to the masterbatch may occur during bag opening, weighing and transfer; dermal contact with the reformulated sheet or finished articles	enclosed mixer and extruder; dust extraction used during weighing and mixing dust masks, gloves, overalls; safety glasses or face mask used during weighing and mixing
<i>Laboratory Technicians (4-10 workers, 1 hr/day, 10 days/year)</i>		
dermal, inhalation (masterbatch)	possible dermal or inhalation exposure while sampling small quantities and performing quality control tests	laboratory coat, safety glasses and gloves
<b>Transport and storage</b>		
<i>Waterside Workers (5-10 workers, 2-3 hr/day, 10-20 days/year)</i>		
none	no exposure expected except in case of an accident	none

*Transport Drivers (5-10 workers, 2-3 hr/day, 10-20 days/year)*

none	no exposure expected except in case of an accident	none
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## **8. PUBLIC EXPOSURE**

No public exposure to the notified polymer in the form of the masterbatch Eastapak PET 21182 CP001C is expected during transport, storage or reformulation.

There will be widespread public exposure via dermal contact with frozen food trays containing the notified polymer. There will also be ingestion of food which has been in contact with food trays containing the notified polymer.

## **9. ENVIRONMENTAL EXPOSURE**

### **9.1. Release**

During formulation the notifier estimates that up to 5 % or 3000 kg per annum of notified polymer waste will be generated. This will be derived from:

Residues in the import containers:	1200 kg per annum
Spills, production wastage and off-cuts:	1800 kg per annum

After formulation, if the wastes generated from spills, production wastage and off-cuts (1800 kg per annum) are recycled, the notifier estimates that 600 kg of the notified polymer, bound within the PET polymer matrix, will be released as a result of waste generated from the recycling process.

The remainder of the notified polymer, up to 56.4 tonnes per annum, will be incorporated into frozen meal food trays.

### **9.2. Fate**

The fate of the waste notified polymer will depend upon whether it is present as unformulated residues and spills, or formulated waste from off-cuts, reprocessing or other sources.

Residues from the import containers and polymer masterbatch granules spilt prior to formulation will be swept up and disposed of to landfill as industrial waste via a licensed waste contractor. The reactive functional group of these unformulated waste products will remain unreacted. If exposed to water in the landfill environment, these groups may hydrolyse to produce unreactive functionalities.

Notified polymer wastes from formulated sources will also be disposed of to landfill as industrial waste via a licensed waste contractor. The notified polymer present in the formulated wastes should have crosslinked to a large degree with other components in the PET food trays and no free reactive groups should remain. In this case, it is unlikely that any notified polymer will leach from the PET food trays due to its expected high molecular

weight and hydrophobicity. If any notified polymer were to leach from formulated waste, it would be expected to become associated with the soil matrix and would not be expected to leach into the aquatic environment.

The majority of the notified polymer, which is contained in PET food trays, will ultimately make its way into domestic landfill as household garbage. The notifier expects that the notified polymer is unlikely to leach from the PET food trays to a significant degree in the landfill environment, given its high molecular weight (> 10000) and its low concentration (< 10 % w/w) in the food trays. Crosslinkages between the notified polymer and the PET components should also minimise the likelihood of the notified polymer leaching from the PET food trays. If any notified polymer were to leach from the PET food trays it would be expected to become associated with the soil matrix and would not be expected to leach into the aquatic environment.

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

## **10. EVALUATION OF HEALTH EFFECTS DATA**

No toxicological data were submitted.

The notified polymer contains no residual monomers, impurities or additives and adjuvants at concentrations where any hazards would be expected. The notified polymer contains a reactive functional group which could result in hazardous properties such as skin or eye irritation, but the hazard is expected to be low due to the physical state of the notified polymer and its encapsulation within an inert PET matrix.

## **11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA**

No ecotoxicological data were submitted.

## **12. ENVIRONMENTAL RISK ASSESSMENT**

Minimal release to the aquatic environment is expected during the formulation of the notified polymer as a stabiliser in PET food trays.

Approximately 2 % of the total import volume of the notified polymer will be released to landfill as masterbatch granules, generated from either spills or import container residues.

The remaining notified polymer waste (approximately 3 %), from sources such as off-cuts and reprocessing wastes will be released to landfill as formulated material. As such, minimal release to the aquatic environment is expected due to the high degree of crosslinking to the PET components and thus high molecular weight and hydrophobicity. The polymer is unlikely to be mobile in the soil environment and would be expected to slowly degrade to gases such as carbon dioxide through abiotic and biotic processes. The environmental hazard

of the notified polymer in landfill is expected to be low. If incinerated, the polymer would be rapidly destroyed and converted to water vapour and oxides of carbon.

Similarly, minimal release to the aquatic environment is expected through the disposal of PET food trays to domestic landfill. As the food trays gradually degrade, the resulting end polymer is likely to become part of the soil particle matrix and not leach from the soil by water due to its expected high molecular weight and hydrophobicity. The notified polymer is unlikely to be mobile in the soil environment and would be expected to slowly degrade to gases such as carbon dioxide through abiotic and biotic processes. In the event of accidental release of the notified polymer into soils or waterways, the correct Material Safety Data Sheet (MSDS) procedures should be followed.

Given the above considerations, the overall environmental hazard is expected to be low. The notified polymer is not likely to present a hazard to the environment when it is stored, transported and used in the proposed manner.

## **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 NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999). The notified polymer is not expected to be a hazardous substance as it is imported in the form of pellets of a polymer masterbatch, with the notified polymer being encapsulated in a PET matrix. This, along with the high molecular weight of the polymer (NAMW > 10000) will minimise direct exposure to the notified polymer, which contains a reactive functional group which may otherwise result in hazardous properties such as skin and eye irritation.

### **13.2. Occupational health and safety**

Worker protection against the hot molten polymer is required. On cooling, drips and spills of polymer will harden and immobilise the polymer.

Under normal conditions of use of the notified polymer, little inhalation exposure is expected as the polymer is in the form of large granules. Some dust may be present in the imported material, and dust extraction will be used where this is handled. Dermal contact with the granules may occur when scooping the granules during the weighing process. Workers are stated to wear dust masks and gloves during the weighing and mixing processes. Once processed by mixing with PET and extrusion, the polymer is in solid form and immobile. Contact with the molten polymer is not expected due to the high temperatures involved. Therefore, due to its high molecular weight and low potential for exposure, the notified polymer is not likely to pose a significant occupational health hazard.

The major occupational hazard associated with the use of the polymer is the use of elevated temperatures in processing. Little absorption of the notified polymer is expected due to its physical form and the notified polymer is not expected to pose a major occupational health and safety risk.



### **13.3. Public health**

It is expected that public exposure to Eastapak PET 21182 CP001C containing < 45 % notified polymer will be minimal except in the case of a spill. There will be a high degree of exposure to PET frozen food trays containing < 10 % notified polymer, including ingestion of food which has been in contact with the trays. The notified polymer in PET food trays formed by extrusion and thermoforming will be encapsulated within an inert, very high molecular weight matrix. This will render the notified polymer biologically unavailable, consequently the public hazard from exposure to the notified polymer through all phases of its life cycle is expected to be low, and the notified polymer will not pose a significant hazard to public health when used in the proposed manner.

## **14. MSDS AND LABEL ASSESSMENT**

### **14.1. MSDS**

The MSDS of the product containing the notified polymer, Eastapak PET 21182 CP001C, 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 the notified polymer, Eastapak PET 21182 CP001C, 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**

### *Control Measures*

#### Occupational Health and Safety

- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer:
  - Spillages should be swept up promptly to avoid slip hazards.
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer:
  - A face shield, industrial clothing and footwear and heat resistant gloves should be used during occupational use of molten products containing the notified polymer; where engineering controls and work practices do not reduce particulate exposure to safe levels, an air fed respirator should also be used.

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.

### 15.1 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.

## 16. REFERENCES

Connell D. W. (1990) General characteristics of organic compounds which exhibit bioaccumulation. In Connell D. W., (Ed) *Bioaccumulation of Xenobiotic Compounds*. 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.

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