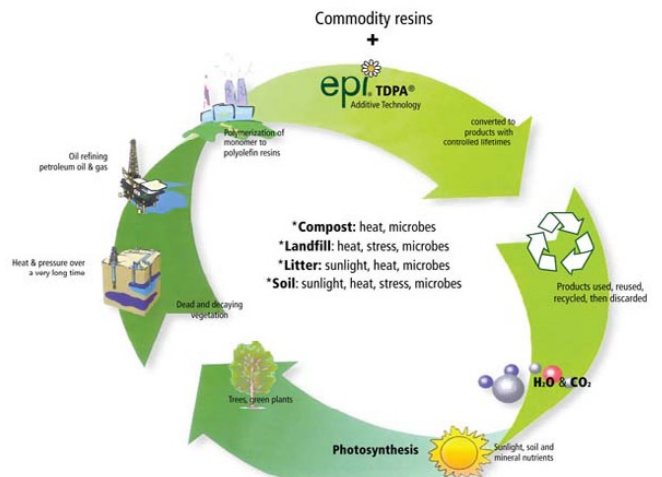


{ 100% Degradable plastic }



Illustration of photo and thermal degradation of a shopping bag incorporating EPI's TDPA® Additive (top row) vs. a bag without EPI's TDPA™ Additive (bottom row). Test procedures follow ASTM D5272 "Outdoor Exposure Testing of Photo Degradable Plastics" Guidelines.

Plastic incorporating EPI additives fit into the natural biocycle.



*Products became biodegradable when converted to different materials by oxidative degradation. This conversation can be made to happen rapidly or slowly, depending on end use requirements.

Symphony Environmental Ltd
Elstree House, Elstree Way
Borehamwood
Hertfordshire WD6 1LE
England

+44 (0)20 8207 5900 Telephone
+44 (0)20 8207 5960 Facsimile
www.degradable.net
info@degradable.net

CERTIFICATE OF ANALYSIS

TO WHOM IT MAY CONCERN

Product Code: 93224/A

Job No: A06543

Description: PE DEGRADABLE
ADDITIVE

MFG Date: 28/04/2008

This is to certify that the aforementioned product has been analysed and has met customer and/or Symphony Environmental Ltd specification with the following results:

<u>Test</u>	<u>Unit</u>	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Melt Index (190°C/2.16kg)	g/10min	19.5	21.4	17.5
Moisture (Karl Fischer)	%	0.10	0.13	0.09
Ash Content (600°C/3min)	%	60.0	60.7	59.0
Pellets per Gram		42	44	40
Bulk Density	g/l	749	770	730

Printed Date: 18-Jun-08



The information and recommendations contained in this document are based upon data collected by Symphony and believed to be correct. However, no warranty of fitness for use or any other guarantees or warranty of any kind, express or implied, is made to the information contained herein, and Symphony assumes no responsibility for the results of the use of products and processes described herein.



d₂w™ grade 93114 is a high clarity oxo-biodegradable additive based on a polypropylene carrier resin and is suitable for use in blown and cast film applications where product clarity is an important consideration. Typical applications include high clarity films for food and non food packaging.

PHYSICAL PROPERTIES¹

Carrier Resin	Polypropylene
Appearance	Light brown pellet
Melt Index (190/2.16kg : g/10min)	30
Specific Gravity	0.910
Bulk Density (g/l)	550
Moisture Content (ppm)	<2000

PROCESSING INFORMATION

The material is suitable for conversion on conventional processing equipment by the following manufacturing routes.

Blown Film	15-120 µm
Cast Film	20-200 µm

APPLICATION

Commodity for products made for carrier bag and refuse sack

STORAGE

93114 is supplied in 25kg opaque polyethylene sacks on pallets of 1000kg. Pallets are IPSM 15 compliant.

The product should be stored in cool dry conditions away from strong sources of light and heat. Storage temperatures should not exceed 30°C. Under normal storage conditions the product has a shelf life of 14 months from the date of manufacture which is printed on the sack.

Part used bags should be discarded.

FOOD CONTACT STATUS

EC

93114 complies with EU directive 2002/72 EC and its amendments (related to plastic materials intended to come into contact with foodstuffs) subject to any restrictions imposed by specific migration limits.

FDA

The polymers and additives used in the composition of d₂w™ 93114 appear in the regulations published by the Food and Drug Administration (USA):
CFR Chapter 21 sections 175.300, 177.1520, 178.2010 and are therefore suitable for use in food contact applications subject to any restrictions described in the regulations.

Please contact our technical office for further information on food contact.

¹ These are typical properties and should not be regarded as a sales or technical specification.

Disclaimer: Symphony Environmental Technologies provides this information in good faith, but makes no representation as to its comprehensiveness or accuracy. Individuals receiving this information must exercise their independent judgement in determining its appropriateness for a particular purpose. Accordingly Symphony Environmental Technologies will not be responsible for damages resulting from the use or reliance upon this information.



1. Identification of the substance/Preparation and of the company

Product name: 93114
Company: Symphony Environmental Elstree House Borehamwood
Hertfordshire WD6 1LE
Telephone: +44 (0)2082075900 Fax: +44 (0)2082075960

Use: Polymer Degradation Additive

2. Composition/Information on ingredients

Product description: Polypropylene based degradable masterbatch

Component	CAS-Reg.No
Polypropylene carrier resin	90003-07-0
Degradation promoters	Proprietary
Stabilisation package	Proprietary

3. Hazards Identification

This product presents no hazard to health under normal conditions of use.

4. First Aid Measures

Skin Contact:

Wash with soap and plenty of water. Do not use organic solvents. Molten material can cause severe burns. Do not try to peel molten polymer from the skin. Cool affected area under water immediately. When the product is cold seek medical attention. Treat the affected areas as thermal burns.

Eye Contact:

Particles can cause eye irritation. Wash immediately with copious amounts of water for at least 15 minutes and seek medical attention if irritation persists. On contact with hot product cool eyes rapidly with cold water and seek immediate medical attention.

Inhalation:

If dust or vapours inhaled during processing remove to fresh air and keep body temperature normal. If breathing difficulties are experienced seek medical attention.

Ingestion:

Pellets can constitute a choking hazard and should not be ingested. In case of accidental ingestion wash out mouth with water, drink plenty of water and if adverse symptoms persist seek medical attention.

5. Fire Fighting Measures

Suitable extinguishing media: carbon dioxide, dry chemical or foam.

Fire Fighting Protective Equipment: a self-contained breathing apparatus and suitable protective clothing should be worn in fire conditions.

6. Accidental Release Measures

Spilt pellets can cause a slipping hazard. Sweep up with a broom and shovel and put in to sealed containers for disposal.

7. Handling and Storage

Handling:

Observe the usual precautions for handling chemicals. Avoid ingestion, inhalation, skin and eye contact. Do not eat, drink or smoke when handling material. In case of thermal processing provide for extraction of the vapours or adequate ventilation. Avoid dust formation and inhalation.

Storage:

Store in cool dry area away from sources of moisture and heat.



8. Exposure Controls/Personal Protection

Exposure control:

Use of local exhaust ventilation recommended.

Exposure limits:

No data available.

Personal Protection:

In line with good practice wear protective goggles, gloves, closed footwear and overalls when handling material. Wear dust mask if appropriate. In case of insufficient ventilation wear suitable respiratory equipment.

9. Physical and Chemical Properties

Appearance: Pale brown pellets

Melting temperature: Polypropylene carrier: 130-165°C (estimated)

Density: 0.91g/cm³ (estimated)

Bulk density: 550g/l

Decomposition temperature: > 350 °C (estimated)

Flash point: Not determined

Ignition temperature: > 350 °C (estimated)

Solubility (water): Insoluble.

10. Stability and Reactivity

Stability: Stable under normal conditions of use.

Materials to avoid: Strong oxidising agents.

Hazardous decomposition products: Oxygenated hydrocarbons, carbon monoxide, carbon dioxide, carbon particulate and possibly other toxic gases and vapours.

11. Toxicological Information

Product is non-toxic by composition. However it should be treated as a nuisance particulate therefore avoid breathing dust or fumes that may be generated during processing.

12. Ecological Information

Product has a biodegradable characteristic but uncontrolled releases should be avoided.

13. Disposal Considerations

Incineration or landfill according to local regulations, e.g. send waste to an authorised industrial incinerator or to a landfill authorised for industrial waste.

14. Transport Information

Not classified as Dangerous for Transport.

Classification: None

15. Regulatory Information

Not classified as Dangerous for Supply/Use.

16. Other Information

The details contained herein are based on our present knowledge and experience and are to characterise our product with regard to any possible safety requirements. We do, however, pass them on without any warranty or property assurances.





EUROPEAN COMMISSION
DIRECTORATE-GENERAL
ENVIRONMENT
Directorate G - Sustainable Development and Integration
ENV.G.4 - Sustainable Production & Consumption

Brussels, 01.10.2009
Ares (2009) 260094

Mr Cosmin COSTAS

Subject: Standards for compliance with the essential requirements of the EU Packaging Directive

Dear Mr Costas,

Thank you for your query on the recognition of international standards aiming to demonstrate compliance with the essential requirements of Directive 94/62/EC on packaging and packaging waste (Packaging Directive)¹. Please accept our apologies for the delay in the reply.

The Packaging Directive is addressed to the Member States which are responsible for its implementation. Article 9 of this Directive lays down essential requirements which all packaging placed on the market of the European Union must comply with. The national authorities of the country where the product was placed on the market are competent for checking compliance of this packaging with the essential requirements of the Packaging Directive. Member States may not prohibit the use of a certain technology or type of packaging if it is in line with the essential requirements of the Packaging Directive.

The Packaging Directive does not provide for a compulsory use of standards, European or other, in relation to packaging materials. However, the Directive requires Member States to presume conformity with the essential requirements for packaging complying with the harmonized standards developed by the European Committee for Standardisation (CEN). The only Community recognised standard on organic recovery is a harmonised standard EN 13432:2000². Consequently, packaging produced in conformity with this standard would automatically comply with the essential requirements of the Packaging Directive. This presumption of conformity is not automatic in the case of the international standard ASTM D6954 – 04.

¹ Official Journal L 365, 31.12.1994 p.10-23

² See Commission Communication 2005/C 44/13

As to the question of oxo-biodegradable technologies, according to CEN scientific analysis confirmed that the addition of oxo-biodegradable plastic in a classically biodegradable mixture does not meet the criteria of the harmonized standard EN 13432:2000. Hence, at this moment, the Commission services are not planning to approve any harmonised standards concerning oxo-biodegradable technologies for treating waste packaging.

Should you have any further questions concerning standardisation, please do not hesitate to contact Mr Thierry Legrand at the CEN, European Committee for Standardisation (e-mail: thierry.legrand@cen.eu) or Ms Diana Oancea (diana.oancea@ec.europa.eu) for issues related to the Packaging Directive.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'K. KOEGLER', with a stylized flourish at the end.

Klaus KOEGLER
Head of Unit