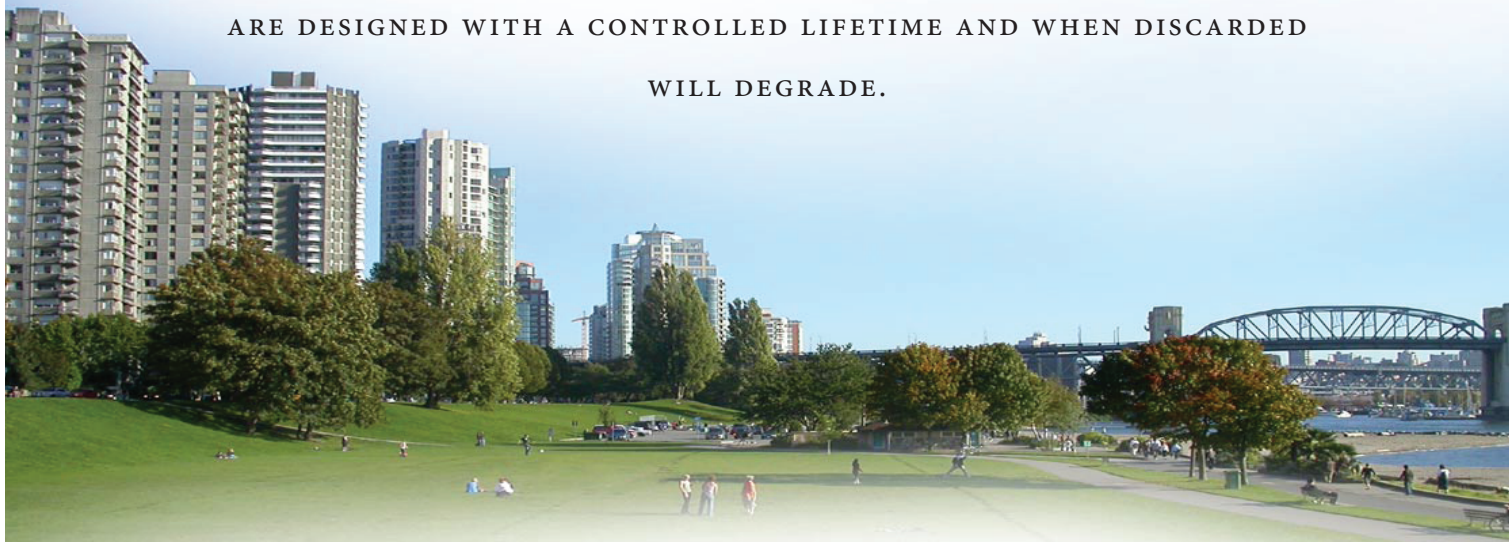


# OxoBiodegradable<sup>TM</sup> Plastics

PRODUCTS INCORPORATING **TDPA<sup>®</sup>**, **TOTALLY DEGRADABLE PLASTIC ADDITIVES**  
 ARE DESIGNED WITH A CONTROLLED LIFETIME AND WHEN DISCARDED  
 WILL DEGRADE.



## Why *OxoBiodegradable* Plastics?

### LITTER CONTROL

- Reduces plastic pollution
- Limits government intervention
- Non-toxic residues
- Reduced corporate branded litter
- Environmentally friendly
- Carbon retention in soil

### LANDFILL DISPOSAL

- Reduces landfill volume
- Minimizes organic waste entombment
- Environmentally responsible
- Easy implementation / adoption
- Cost / performance / infrastructure

### TECHNOLOGICAL MERITS

- Scientifically substantiated
- FDA and EFSA compliant applications
- Controlled product life cycle
- Cost effective over alternatives
- Recyclable
- Proven performance
- Compatibility — no re-tooling or productivity loss

## How does *OxoBiodegradability* work?

**1. TDPA<sup>®</sup>** additives are blended into the commodity PE, PP, PS resins during production to render the plastic with special degradation properties without impacting productivity or product integrity.

**2.** After use, when the product is disposed of in landfills, compost sites, arable land, or inadvertently as litter, these products undergo oxidative degradation much more rapidly than ordinary plastics.

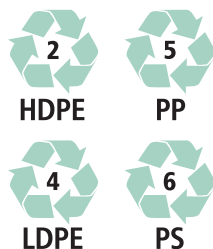
**3.** Mechanisms that trigger this process

are heat input, sunlight (UV light) and mechanical stress.

**4.** For PE products in the presence of moisture, microorganisms, oxygen, and soil these products will ultimately biodegrade (per ASTM D6954-04).

The addition of **TDPA**<sup>®</sup> does not prevent the performance of otherwise recyclable plastics including:

1. Commodity polyethylene (**PE**) plastics



2. Commodity polypropylene (**PP**) plastics  
3. Commodity polystyrene (**PS**) plastics

**TDPA**<sup>®</sup> incorporated in:

**PE** plastic products include plastic bags of all forms i.e. trash, refuse, kitchen, produce, carrier bags. As well as thin wall containers for food.

**PP** plastic products include many refrigerated containers, clear produce bags, most bottle tops, some food wrap.

**PS** plastic products include many throwaway utensils, food and protective packaging.

## Why use EPI's Totally Plastic Degradable Additives (**TDPA**<sup>®</sup>)?

*Researched and proven technology*  
*Quality Assurance Program*  
*QA audits of licensed production facilities*  
*Pioneers of OxoBiodegradable Technology*

*OxoBiodegradable Institute founding member*  
*Pre-production testing of degradation*  
*FDA / EFSA food safe compliant*  
*MSDS product safety statements with every shipment*

*Customer due diligence*  
*International Scientific Advisory Board (ISAB)*  
*Full laboratory and testing facility*  
*Member of ASTM D6954 -04 committee*

### ENVIRONMENTAL CLAIMS STATEMENTS (ECS) AS USED BY LICENSEES

Application	Statement	Qualifying Statement	<i>*Resellers &amp; manufacturers need to be aware of California State Bill 1749</i>
PE Films	OxoBiodegradable	*Control Lifetimes of the product	
	OxoBiodegradable*	*According to ASTM D6954-04.	
	OxoBiodegradable*	*ASTM D6954-04	
PE Films	Totally Degradable*	*This environmentally responsible bag is based upon Oxo-Biodegradable technology and will first degrade, then ultimately biodegrade in the presence of moisture, microorganisms, oxygen, and soil.	
All	Degradable*	*Products incorporating <b>TDPA</b> <sup>®</sup> provide the same performance characteristics as ordinary plastics during their useful life.	

*ECS claims must comply with applicable laws within markets degradable products are sold.*

## Frequently Asked Questions:

1. WHAT IS THE DIFFERENCE BETWEEN DEGRADABLE AND BIODEGRADABLE PLASTICS?

Degradable plastics are designed to undergo significant changes in chemical structure under specific environmental conditions, resulting in a loss of product integrity. Molecules are oxidized and break down into smaller molecules, and then the plastic disintegrates. Biodegradation occurs as a result of the action of naturally occurring microorganisms such as bacteria, fungi and algae as they consume the smaller plastic fragments.

2. WHAT IS OXOBIODEGRADATION OF A PLASTIC?

OxoBiodegradation is a two-stage process in which, first the plastic is converted by reaction with oxygen in the air to molecular fragments that are water wetttable and second, these smaller oxidized molecules are biodegraded (converted into CO<sub>2</sub>, H<sub>2</sub>O, and biomass).

3. WHAT PRODUCTS CAN BE MADE DEGRADABLE?

Most short term, single-use plastic packaging products.

4. CAN **TDPA**<sup>®</sup>-BASED DEGRADABLE PLASTICS BE RECYCLED?

Yes. **Recycling** in-plant material is entirely possible. Recycling post-consumer degradables is possible if they are based on **TDPA**<sup>®</sup> technology, and provided degradation has not started.

5. WHAT IS THE DIFFERENCE BETWEEN EPI **TDPA**<sup>®</sup> TECHNOLOGY AND STARCH-BASED TECHNOLOGY?

In specific PLA (*Poly-lactic Acid*) starch-based technology, the plastic is derived from plant starch. Though this sounds reasonable it has serious implications including:

- Major use of energy to produce the product.
- Rapid release of CO<sub>2</sub> limiting humus production.
- High costs compared to commodity PE, PP and PS blended with **TDPA**<sup>®</sup>.

6. WHAT IS THE SIGNIFICANCE OF ASTM D6954-04 AS APPLIED TO OXOBIODEGRADABLE PLASTICS?

ASTM D6954-04 formally recognizes the technology internationally. For single use throwaway plastic products it offers a controlled lifetime to items that are not being recycled yet, and when discarded, they will degrade.



**EPI Environmental Products Inc.**

Tel: +1.604.738 6287 (North America)

+44(0)20.8757 8770 (Europe)

Email: [info@epi-global.com](mailto:info@epi-global.com)

Website: [www.epi-global.com](http://www.epi-global.com)



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