

OxoBiodegradable™ Plastics

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

Why *OxoBiodegradable* plastics?

LANDFILL DISPOSAL

- Reduces landfill volume
- Reduces greenhouse gas effects
- Minimizes organic waste entombment
- Environmentally responsible
- Easy implementation /adoption
- Cost / performance / Infrastructure

LITTER CONTROL

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

TECHNOLOGICAL MERITS

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

How does *OxoBiodegradability* work?

1. TDPA® additives are blended into the commodity PE, PP, PS resins during production to impregnate 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.

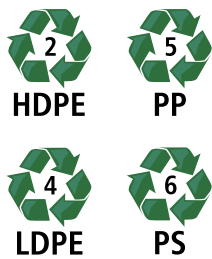
3. Mechanisms that trigger this process

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).

TDPA[®] does not hinder the performance of otherwise **recyclable** plastics including:

1. Commodity polyethylene (PE) plastics



2. Commodity polypropylene (PP) plastics

3. Commodity polystyrene (PS) plastics

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 Degradable Plastic Additives (TDPA[®])?

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 / SCF 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 & manufacturers need to be aware of California State Bill 1749</i>
PE Films	OxoBiodegradable	_____	
	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 biodegrade in the presence of moisture, microorganisms, oxygen, and soil.	
All	Degradable*	*Products incorporating TDPA [®] provide full performance similar to non-degradable 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 wettable and second, these smaller oxidized molecules are biodegraded (converted into CO₂, H₂O, and biomass).

3. WHAT PRODUCTS CAN BE MADE DEGRADABLE?

EPI's primary focus is on short-term, single use products.

4. CAN TDPA[®]-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[®] technology, and provided degradation has not started.

5. WHAT IS THE DIFFERENCE BETWEEN EPI TDPA[®] TECHNOLOGY AND STARCH-BASED TECHNOLOGY?

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

- Use of fossil fuels to produce the product.
- Rapid release of CO₂ limiting humus production.
- High costs compared to commodity PE, PP and PS blended with TDPA[®].

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, when discarded, will degrade.



EPI ENVIRONMENTAL PRODUCTS INC.

