







## Biodegradable FAQs


### 1. **What is Compostable? Biodegradable? Oxo-Biodegradable?**

-  ASTM defines “Compostable” as capable of undergoing biological decomposition in a compost site as part of an available program, such that plastic is not visually distinguishable and breaks down to carbon dioxide, water, inorganic compounds, and biomass, at a rate consistent with known compostable materials (e.g. cellulose).
-  ASTM defines “Biodegradable” as capable of undergoing decomposition into carbon dioxide, methane, water, inorganic compounds or biomass in which the predominant mechanism is the enzymatic action of microorganisms that can be measured by standardized tests, in a specified period of time, reflecting available disposal condition.
-  Oxo-Biodegradable Plastics contain a catalyst which speeds the decomposition of long molecular chains into shorter molecular chains which then can be consumed by microorganisms in a biodegradation process. Often these catalysts are salts of transition metals such as cobalt. They rely on exposure to heat above 140° F or sunlight (UV) to begin the oxidation process. Once the oxidation process starts, it cannot be stopped.
-  Anaerobic refers to microorganisms that are active in the absence of free oxygen.
-  Aerobic refers to microorganisms that are active only in the presence of free oxygen.


### 2. **In what environments will our film biodegrade?**

-  Our films can biodegrade in both aerobic and anaerobic environments. However, the most common disposal environment for our products would be in a landfill.


### 3. **How long does it take to biodegrade?**

-  ASTM D5511-02 testing is utilized to show evidence of biodegradability within a 120 day time period under controlled conditions. Biodegradation does not occur in a predictable, straight-line fashion. Rather it occurs in a series of stops and starts as various microorganisms participate in the biodegradation process. This and variability of microorganism type and quantity from landfill to landfill make it impossible to put a firm number on how long it will take to biodegrade. In general, one can safely say cast polypropylene (CPP) film with EcoPure™ should biodegrade in landfills within “years” as opposed to “100’s of years” for CPP without EcoPure™.


### 4. **What testing has been done to prove our film is biodegradable?**

-  We have tested a clear 5 mil CPP film under ASTM D5511-02 conditions. The test was conducted for 90 days and the result was about 30% biodegradation of our film. Biodegradation percent is calculated per the ASTM D5511-02 method which measures the net gaseous carbon produced from a test vessel minus the net gaseous carbon from a blank vessel only containing innoculum (innoculum is derived from anaerobic digesters operating only on pretreated household waste).


### 5. **What is ASTM D5511-02?**

-  ASTM D5511-02 is a test method that determines the degree and rate of anaerobic biodegradation of plastic materials in a high-solids anaerobic environment. Test materials are placed in an innoculum that is derived from anaerobic digesters operating only on *pretreated household waste*. Testing is conducted over a specified period of time so no estimates can be made as to *when* the plastic material will *fully* biodegrade.


**6. Do we have any data to back it up?**

 Yes, we do have valid test data from an independent laboratory that shows one of our polypropylene films produced with the EcoPure™ additive did biodegrade under ASTM D5511-02 conditions over a test period of 90 days.


**7. Are all your films biodegradable or just certain ones?**

 The EcoPure™ additive can be added to almost any of our products, except those that would impart an antimicrobial effect to the films' surface. However, we should explore each opportunity in depth with our customers instead of making a blanket statement that EcoPure™ can be added to any film. This may not be true due to temperature or FDA restrictions, for example.


**8. Does this biodegradable additive affect some properties of the film?**

 Based on our experience with the EcoPure™ additive, it does not have much, if any, affect on mechanical properties such as stiffness, tear, or heat sealability. We have noticed a minor impact on optical properties. Haze is increased slightly and gloss is decreased slightly on clear films. No noticeable effect has been observed on opaque products.


**9. What is ASTM 6400?**

 ASTM D6400-04 covers plastics and products made from plastics that are *designed to be composted in municipal and industrial aerobic composting facilities*. According to the standard, a plastic product must disintegrate during composting so that the remaining plastic material is not distinguishable from other organic materials. For satisfactory disintegration, the plastic material must retain 10% or less than its original dry weight after 12 weeks at test conditions. In addition, 60% of the organic carbon of a single polymer product (like our Super Clear or Tear Seal films) must be converted to carbon dioxide within the 12 week test.


**10. Does the additive alter the shelf life of the film?**

 Films made with EcoPure™ have the same shelf life as our films without EcoPure™. The additive should not have a negative effect on the shelf life of the film.


**11. Is the film FDA Compliant?**

 Our film containing EcoPure™ can be made suitable for food-contact applications. The components of EcoPure™ have been reviewed by Keller & Heckman, a respected law firm covering food packaging, and we have a letter stating their opinion that EcoPure™ is compliant with all applicable FDA requirements. FDA compliant should not be confused with FDA approved. Discussions regarding your unique application would be necessary.

**12. Can the film be printed on?**

 Yes. American Profol offers corona treatment on one or both sides of the film – enabling the film to be ink receptive. EcoPure™ should not have a negative impact on the printability of our films.


**13. What claims can we use on our finished products?**

 American Profol has independent ASTM D5511-02 test results that we can share. Your company will need to review that information to determine what claims you are comfortable with or if you will need to conduct tests on your specific film.


**14. Can we utilize the Eco Pure™ Logo?**

 Yes, we encourage the use of the EcoPure™ logo and we can provide you with digital logos, as well as guidelines for its use.


**15. Are any toxic materials produced when the material breaks down?**

 Unlike some other technologies, there are no toxic materials produced when the film breaks down. Our film biodegrades into carbon dioxide and methane gas in a closed landfill.


**16. Can the film be recycled?**

 Yes, our film with EcoPure™ can be recycled under the #5 recycling code designated for polypropylene.

**17. Advantages over PLA**

 Films made from polylactic acid (PLA) are compostable but there are very few municipal compost facilities in North America. PLA requires the presence of heat and aerobic conditions to biodegrade. This combination is not present in sealed landfills. PLA films are extremely stiff and noisy, as evidenced by the new packaging for one of the leading brands of snack foods. American Profol films with EcoPure™ are designed for landfill disposal where biodegradation can occur after the landfill is sealed. EcoPure™ does not impart any negative physical properties to polypropylene films.

**18. Advantages over Oxo-Biodegradable technology**

 Oxo-Biodegradable films utilize catalysts containing salts of transition metals such as cobalt. Exposure to heat of 140° F or more and/or exposure to sunlight (UV) starts the oxidation process (embrittlement) and it cannot be reversed. Shelf life is unpredictable as the Oxo-Biodegradable film could be exposed to these conditions during transit, converting or on-shelf conditions. American Profol Films with EcoPure™ do not contain these types of catalysts. Biodegradation starts only when the film is safely in a landfill environment in contact with microorganisms. Therefore, incidental exposure to (UV) light (or temperatures above 140°F) will not adversely affect shelf life of the product any more than our standard polypropylene without EcoPure™.