BIOflex® FL film #7450 provided was tested for biodegradation according to ASTM procedure D-5526-94 — Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under Accelerated Landfill Conditions. The test was conducted at 35°C for 104 days, at three moisture levels in an inoculum substrate prepared from municipal solid waste. Apparent net decomposition of the test material was calculated from the cumulative biogas-carbon evolved from the test vessels after subtracting the biogas-carbon evolved from the blank inoculum substrate at the same dry-matter level.

Apparent net decomposition of the BIFOlex FL material at the end of the test period at the 45% dry-matter (DM) test conditions was 14.5%. BIFOlex FL decomposition at 35% DM rose to 18% at day-35, then declined steadily to negative values, indicating inhibition of the inoculum substrate decomposition at that point. Biogas evolution from the BIFOlex FL vessels at 60% DM was slower than the corresponding blanks for the first 60 days, with cumulative net decomposition of negative 9% indicating slight inhibition of the inoculum substrate.

The cellulose powder reference material showed 16% net decomposition in the 60% DM conditions, and net negative decomposition (apparent inhibition) at 35% and 45% DM.

Biogas evolution from the blanks indicated that total decomposition of the organic carbon in the inoculum substrate was 21%, 28%, and 18% in the 35%, 45%, and 60% dry-matter conditions, respectively.

Conclusion

Addition of BIFOlex FL to a landfill does not interfere with its digestion of other materials. Woods End data per ISO 13641-1 indicate that it improves this ability.

BIFOlex FL contains no detectable heavy metals and no zinc (which is ecotoxic). The plasticizer used is derived from a natural product and is completely consumed by the landfill. In an anaerobic landfill, BIFOlex FL loses molecular weight to the point where microbes can consume it. No detectable monomer is formed.

The Woods End ASTM D5526 data show that the ratio of the fraction of organic carbon and hydrogen from BIFOlex FL release to the air, and the fraction delivered to the solid biomass varies with landfill conditions, such as temperature and water content. The fraction released to the air is mostly methane, which can be harvested for fuel, along with the methane released by other components of the landfill, such as paper. Variability in the ratio of end product to the air and to the biomass is also typical of other land-filled materials, such as paper.

Most of the chlorine content of BIFOlex FL is converted by the landfill to soluble chloride, which improves its value as fertilizer. A small fraction is taken up by the biomass as one of the essential trace elements. The minor amount of refined calcium carbonate in BIFOlex FL also adds to fertilizer value in the landfill.

For a complete copy of the ASTM D-5526 please contact your Ultraflex Sales Representative.
BIOflex® Frequently Asked Questions

Product Specifications

Q. What percentage of BIOflex is biodegradable?
A. The patented formula for the biodegradable PVC coating makes up 65% of the product. The remaining 35% is from the polyester scrim.

Q. Can BIOflex be welded?
A. Yes. BIOflex works with heat and RF welders. It has been tested with Miller Weldmaster and Leister-Malcom. Copies of machines settings can be acquired by contacting your Ultraflex Sales Representative.

Q. How durable is BIOflex?
A. This product has a woven 1000 x 1000 denier scrim which is one of the strongest in the market and is tear and fade resistant. It can last years in indoor and outdoor applications depending on weather conditions.

Q. What inks are compatible with BIOflex?
A. UV, solvent, eco-solvent and screen printers.

Q. Why is BIOflex so expensive?
A. The technology used in making BIOflex is new. The cost of creating this kind of innovative product must be re-coup by amortizing the cost over a period of time.

Q. What is the good side to using PVC medias?
A. PVC is strong. It is resistant to oil, chemicals, sunlight and weathering. PVC is also flame resistant, easily decorated and low in cost.

Formula Details

Q. Is BIOflex made with any toxic materials?
A. BIOflex is RHOS compliant. It contains no heavy metals, pesticides, bleaching agents, DOP or similar plasticizers, glycol ether or carcinogenic coloring agents.

Q. What is BIOflex made with?
A. Fine particle limestone that provides opacity and plasticizers of organic origin that provides flexibility. 80% of the content of BIOflex is derived from sources other than petroleum.

Q. How does the PVC biodegrade in the landfill?
A. Within landfills there are microbes, heat, pressure and little moisture. These microbes utilize the BIOflex PVC as their food source. This has been tested according to ASTM D5526.

Q. What happens to the carbon and hydrogen content of BIOflex?
A. The content is partly consumed by the biomass organisms living in the landfill and is partly released as methane from fermentation.
Q. What happens to the methane released from BIOflex?
A. In a well-managed landfill the methane is harvested for use as fuel.

Q. What happens to the chlorine content of BIOflex?
A. The content is partly consumed and partly converted to soluble chloride.

Q. Why is converted soluble chloride positive?
A. Soluble chloride has value as fertilizer since it makes soil nitrogen more rapidly available to plants. In experiments using landfill into which BIOflex had decomposed, as compost in potting soil, vegetables sprouted more rapidly than in controlled vegetable specimens.

Q. How long does it take for the PVC to biodegrade?
A. BIOflex PVC will begin to breakdown within 90 days in landfill conditions and depending on thickness and quantity the PVC will vanish in 3 to 5 years.

Q. Does printing on BIOflex change the biodegrading process?
A. No. BIOflex PVC will still degrade.

Q. Will BIOflex begin to degrade in application?
A. No. BIOflex requires the absence of water and air in order to begin biodegrading. This process begins after the product is disposed into a controlled landfill.

Testing & Patents

Q. What testing has been done on BIOflex?
A. BIOflex has been tested by an accredited laboratory using the ASTM D5526 and ISO 13641-1.

Q. What conclusions can be made from the ASTM D5526?
A. The data shows that when BIOflex is added to a landfill it does not interfere with its digestion of other materials but rather improves this ability. The ratio of the fraction of organic carbon and hydrogen released into the air and the fraction delivered to the solid biomass varies with landfill conditions such as temperature and water content. The fraction released to the air is mostly methane, which can be harvested for fuel, along with the methane released by other components of the landfill, such as paper.

Q. Are copies of these test available?
A. Yes. Copies of these tests can be acquired by contacting either your Ultraflex Sales Representative or the Ultraflex Marketing department.

Q. What fire testing has BIOflex passed?
A. BIOflex has passed the NY MEA; NFPA701 and the CA Fire Marshal Title 19 test. Copies of these tests can be acquired by contacting either your Ultraflex Sales Representative or the Ultraflex Marketing department.

Q. Does Ultraflex hold the patent for BIOflex?
A. Yes. A copy of the Ultraflex Patent can be viewed by visiting the US Patent Website at www.uspto.gov. The patent number is 7390841.