

## Degradable Additives Used in Plastic Bottles, Thermoforms, and Films

**APR POSITION:** As a representative of companies participating in every aspect of the plastic recycling value chain, APR is concerned that use of degradable additives in plastics collected for recycling may have negative effects on some products of its members, namely recycled plastic where the secondary use requires demanding physical properties or a long service life.

Degradable additives might be used in PET, polyethylene or polypropylene and might be classified as bio-degradable, oxo-degradable or oxo and bio-degradable, aerobic or anerobic. Each additive type may not be suitable for use with all plastics. Regardless of their mode of action and compatibility in the first use of a plastic product, degradable additives may present technical challenges for the mechanical recycling process and future uses of the product produced from that process.

### Technical Considerations:

**Processability:** As plastics degrade, they typically lose molecular weight, the loss of which impacts the processing and physical property characteristics of postconsumer plastic. This loss can reduce certain required physical properties of molded parts manufactured from the degraded plastic.

The following reference is provided for those wishing to understand this potential loss of properties in more depth: The International Journal of Polymer Science Volume 2018, Article ID 2474176 <https://doi.org/10.1155/2018/2474176>

**Variability:** Through sourcing and other means, recyclers strive for low variability in processing performance. Variable amounts of additives that promote degradation may work against the goal of consistently maintaining the mechanical and rheological properties that allow recycled plastic to have commercial value.

**Acceptance:** Without understanding the level of these additives or having to compensate for their presence through increased stabilization, it is possible that the integrity and/or useful life of plastic packaging or durable products made from recycled resins that contain these additives could be compromised. Those interested in making products from postconsumer plastic resins with long term service lives may perceive and may be reluctant to accept a risk to long-term performance which may in turn reduce the value of postconsumer resins for long-term, demanding uses. If the demand for recycled plastic were to decline because of these technical performance considerations it could result in fewer end use applications for postconsumer plastics.

**Limiting Degradation:** Recycled plastics are frequently used in applications that exhibit similar conditions to those that certain degradable additives require and could, therefore, limit the service life of the item made from these plastics. Recycled plastic items could have substantial exposure to sunlight, heat, soil and moisture; conditions that provide the opportunity for degradation. Certain degradable additives may hasten this process. The addition of stabilizers to counter the activity of these additives could add technical challenges and cost to recycling processes and recycled products.

**Isolating degradable additives from other streams:** APR is not aware of any automated means available today to distinguish traditional plastics that are widely recycled containing degradable additives from those that do not within a mixed stream. As a result, it may not be possible to simply sort plastics with degradable additives from currently recycled streams. APR is not aware of any data on whether these additives, regardless of type, are capable of being removed from recycled resin during the recycling process.

**Legislation:** Further underscoring the long-term challenges to recycling are laws on the books in the European Union and a limited number of states in the U.S. that prevent the labeling of a plastic container that contains degradable additives as recyclable. APR welcomes these laws, to the extent that they address our technical challenges by keeping these containers out of the recycling stream.

**Other:** Due to the foregoing considerations, encouraging the recycling of containers that include degradable additives may be contrary to the goals of the recycling process for

traditionally recycled PET, polyethylene, or polypropylene containers. In consideration, thereof, APR has removed the test protocol for degradable additives from its portfolio. APR cautions companies to carefully review the Federal Trade Commission Green Guides and state law when considering whether to label these traditionally recycled plastic containers as both degradable and recyclable.

**Alignment:** APR's Position does not differ substantially from other global and European organizations working in the plastics recycling space Including

- *Ellen MacArthur Foundation* <https://emf.thirdlight.com/link/kfivzcx91l81-86a71k/@/preview/1>
- *Recyclass*: "Oxo- and bio-degradable plastics consist of polymers that are incompatible with today's conventional plastic polymers. That hence cannot be mixed with standard polymers because they have a strong negative impact on the recycled plastic properties." [https://recyclass.eu/wp-content/uploads/2022/06/Recyclass\\_methodology\\_version-2.1\\_May-2022-2.pdf](https://recyclass.eu/wp-content/uploads/2022/06/Recyclass_methodology_version-2.1_May-2022-2.pdf)

Updated March 2023