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Life Expectancy of Products Manufactured with ECM MasterBatch Pellets™

The life expectancy of plastic products that are manufactured with at least a one percent (1%) load, by weight, of our ECM MasterBatch Pellets can be explained through two types of life expectancies. The first type of life expectancy is the life expectancy of the plastic when it is on the warehouse or store shelf, in regular usage as packaging or other normal plastic usage. The second type of life expectancy has to do with the situation when the same plastic has been put in conditions wherein it has constant contact with other materials that are biodegrading.

Plastic products manufactured with ECM MasterBatch Pellets will have the same life expectancy as the same plastic product manufactured without our additives under all but the conditions mentioned above wherein they are placed in constant contact with other materials that are biodegrading (i.e. on or buried in the ground). This is a major reason why our technology for having biodegradable plastic products is so successful.

The principles concerned with the degradation of plastics that make use of our additive technology are truly involved with "bio"-degradation. Our technology does not rely on the use of photosensitivity or thermal sensitivity to photodegrade or thermally break down the plastics. For this reason, a blow-molded HDPE shampoo bottle or motor oil bottle manufactured with one of our additives will last in the warehouse and on the store shelf as long as it would without our additives. There is a considerable amount of interest in our additives for the plastics for the automotive and aviation industries for this reason.

There is the real concern for the technologies that make use of thermal or photodegradation that they are simply leaving smaller particles of plastic in the soil rather than having the material truly become the organic components of soil. This is especially of concern in the agricultural industry and for those needing erosion control products. Agricultural films, erosion control nettings, and other such products manufactured with our additives will last long enough to get the required use but will completely biodegrade into the soil; such plastic products completely biodegrade in a period of from 9 months to 5 years or less. It is not a "poof, it's gone" system but simply makes the plastic product biodegrade as if it were a stick or a branch off a tree rather than "sticking around" for hundreds of years.

To summarize the concept, the key to our technology is that the right conditions for biodegradation are not those found when the plastic product is in use, is on the store shelves or is being warehoused somewhere. Just like a wood bowl or a piece of wood furniture, which can be used for a lifetime or more, a plastic product with our additives can be used for essentially the same period of time as the same plastic product without our additives could be used.

Concerning the life expectancy of the plastic products manufactured with our additives once they are placed in constant contact with other biodegrading materials, we certify the full biodegradation of most all plastic products manufactured with at least a one percent load of our additives. We can certify this situation due to the internal and external studies that have cost us hundreds of thousands of dollars. Our additives have been tested in all of the types of polyolefins, EVAs, PVCs, PETs, PSs, PUs and combinations thereof, with much of the testing having been performed using the various world-standardized tests in independent laboratories by independent scientists. We have had the various test data analyzed by independent scientists and their conclusions and some of the data have been sent to you in the presentation package and are what we base our certification on.

The basic concept is that biodegradation is a natural process that occurs around the world but at various speeds due to various conditions. Plastics with our additives behave like sticks, branches or trunks of trees. Due to this fact, we do not guarantee any particular time because the time depends on the same factors that the biodegradation of woods and most other organic materials on earth depend - ambient biota and other environmental conditions - but the time frame of between nine months to five years will give a good general idea for most conditions. Under specific composting conditions with additional accelerants sprayed on them, some customers have reported biodegradation in as little as a couple of months. Under the more usual, commercial composting conditions using high heat processes, a time frame of around one year is a reasonable expectation.

Petrochemical plastics would normally take hundreds or thousands of years or even longer to "biodegrade"; with our additives, these same plastic formulas biodegrade in a hundredth of that time or less.

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Do not be confused by the claims of some companies that say that their resins fully biodegrade in 2 months or 3 months. They are speaking of biodegradation under very specific conditions. This has led to some confusion when the plastic products are in the end-consumers' hands, such as in the Kassel project in Germany when the bags and other plastic products marked with a "compostable" label were found not to be compostable by the town's citizens in their backyard compost heaps (they were only "compostable" under the very specific commercial composting standards where there is high heat, oxygenation, moisture control and high levels of microorganisms). When I spoke at the Biodegradable Plastics Conference in Frankfurt, Germany a few years ago, I argued with the companies involved in that project that they should be careful in not trying to confiscate generic terms for too specific conditions (i.e. they should label items as "Commercially Compostable" rather than simply "Compostable" when such conditions are required). As the use of our technology continues to grow to become

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the world's leading technology for the production of biodegradable plastics, our viewpoint will continue to gain more and more adherents.

Plastics manufactured with our additives will fully biodegrade in home compost heaps, commercial composting operations (both high heat and low heat, or even in vermiculture, processes), buried in the ground, buried in landfills, tilled into the soil, having been littered, etc. Most importantly, our process is by far the least expensive, most widely applicable, proven technology for the biodegradation of plastics in the world.

Again, we certify the biodegradation of polyolefins (any of the polyethylenes and polypropylenes), EVAs, PVCs, PETs, PSs, PUs and any combination of these resins, manufactured with at least a 1% load of our additives. We base this certification on more than ten years of testing worldwide by us, by universities, by customers, by prospects and by competitors.