



TECHNICAL INFORMATION SHEET 8

Factors affecting the initial rate of embrittlement of Reverte oxo-biodegradable masterbatches.

"It has been well known for many years that the presence of certain metal ions in polymers such as polyethylene and polypropylene can accelerate the degradation of these polymers.

In the presence of oxygen the metal ions catalyse the breakdown of the polymer, causing oxidative chain scission and subsequent polymer embrittlement and degradation.

When the polymer molecular weight is sufficiently reduced it becomes available for microbial attack which further breaks down the polymer into Carbon dioxide, water and biomass.

This complete process is known as oxo-biodegradation. Reverte products are unique because they are formulated to control the reaction kinetics and additionally contain a secondary biodegradation initiator to speed up the final biodegradation phase.

In common with any chemical reaction, the speed of the breakdown reaction is dependent on the light levels, ambient temperature and some other natural variables. For example, a 10°C reduction in temperature will double the time to embrittlement. On the other hand a 10°C rise in temperature will halve this rate.

In addition to differences in initial dwell time caused by climatic variables, different polymer grades can exhibit variations in embrittlement time due to the presence of additive packages included in the polymer grade by its manufacturer.

These additives may be process aid antioxidants, UV protection packages or even slip, antistatic and other product enhancers.

The use of so-called "barefoot" grades of polymers, where no such additives are added to the polymer at its manufacturing stage, can eliminate or minimize such effects.

The use of such grades is recommended wherever possible but it is appreciated that choice can be limited. If there is no choice then it should be understood that theoretical dwell times and embrittlement times may be extended, but that this effect should only be small and that the overall degradation of the polymer will still inexorably proceed, albeit possibly at a reduced rate.

Reverte products have been designed to introduce an oxo-biodegradable property to plastic products. We can confirm that this is what they will do, but that their precise performance may be dependent not only on natural conditions but also on the polymer grade chosen."

Andrew Barclay
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