

## TECHNICAL INFORMATION SHEET 22

### The effect of Reverte masterbatch addition on the physical properties of PE films.

#### 1. Introduction

Reverte oxo-biodegradable additive masterbatches are added to polyolefin products such as polyethylene packaging to impart an oxo-biodegradable property to the final article.

The special technical characteristics of the Reverte additive ensure that the product has a useful, pre-programmed, fit-for-purpose lifetime followed by a post disposal breakdown process that consists of embrittlement, microfragmentation and, finally, complete biodegradation to Carbon dioxide, water and biomass.

The normal addition rate of Reverte products for PE packaging films is 1.0% by weight. Although this is a very low addition rate and is, therefore, unlikely to measurably affect the physical properties of the film as manufactured, work was carried out to determine certain key physical properties of films with and without the addition of Reverte.

These properties included elongation at break, tensile strength, tensile modulus and Melt flow index.

This work was carried out by a customer of Wells and made available to us for publication.

#### 2. Results

##### 2.1 Effect of Addition on Physical Properties

Sample	Final MFI (g/dmin)	Elongation at break (%)	Tensile Modulus (MPa)	Tensile Strength (MPa)
Control (no Reverte)	0.9	150	82	11.8
1% Reverte addition	0.8	185	74	12.2

#### 4. Discussion

It can be seen that the addition of 1% Reverte masterbatch has had a negligible effect on the physical properties of the films produced.

The Melt Flow Index of the polymer has not significantly changed, slightly decreasing from 0.9 to 0.8 g/dmin. If any polymer degradation had occurred then the MFI would be expected to increase, so this result is strongly indicative of a total retention of this property.



#### 4. Discussion (continued)

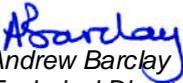
The Elongation at break has shown a slight increase, again not a significant change. The Elongation at Break would be expected to decrease if the polymer is degraded and this property was found to slightly increase with the Reverte sample. This is again indicative of no premature degradation taking place.

The Modulus (stiffness) dropped insignificantly from 82 to 74MPa and the Tensile Strength increased from 11.8 to 12.2 MPa. These changes were certainly not significantly different and are not indicative of any degradation of properties.

#### 5. Conclusion

The results demonstrate that the physical properties of polyethylene films (and so products manufactured from these films) have not been adversely affected by the addition of Reverte oxo-biodegradable masterbatch.

This enables us to state that PE products, when manufactured with the inclusion of Reverte additive, have very similar physical characteristics to unmodified products and will, therefore, deliver the same quality of use in service within the fit-for-purpose lifetime associated with the Reverte product.

  
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