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Conservation of the key properties of polyolefins during melt conversion

*Catherine Malchaire*¹








⁽¹⁾ SONGWON International AG (Switzerland)



How to select the best stabilization package for polyethylene?






Polyolefins are the most common of all polymers. They can be found in applications varying from packaging films to those requiring greater durability, such as automotive or construction. Polyolefins are, however, highly sensitive to heat, shear and oxygen. If they are not stabilized during conversion, they immediately degrade.

Polyolefins can be converted using different processes, including extrusion (to produce cast or blown films), molding and lamination. Each process shows a certain degree of resistance to temperature and shear that will affect the properties of the polymer to a greater or lesser extent. In melt conversion of polyethylene, careful selection of stabilization additives is required to achieve top results and optimum cost versus performance. To find the best solution for a specific application, the following technical performance requirements need to be taken into account:

-  Excellent molecular weight preservation during processing (compound, melt conversion) and use (outdoor service life, long-term thermal stability, light stability)
-  Low initial color (compound)
-  Low color development (conversion)
-  Resistance to blooming (discoloration)
-  Low gas fading (storage & service life)
-  Compatibility / solubility (in film)
-  Others, relating to specific applications or end uses, e.g., indirect food contact

These technical considerations need to be balanced against cost. If the application requires indirect food contact approval, information can be obtained from global inventories on the regulations in the respective countries.

SONGWON offers a broad range of antioxidant stabilization packages for use in melt conversion of polyethylene:

-  SONGNOX® 417B
-  SONGNOX® 217B
-  SONGNOX® 611B
-  SONGNOX® 921B
-  SONGNOX® 1162

The table below summarizes the main features of each package:





		Monomer	Reactor (In situ)	Post reactor extrusion	Compounding	Masterbatch	Recycling
Base stabilization							
SONGNOX® 417B	Good color stability with acceptable processing stability			•			
Improved processing stability							
SONGNOX® 217B	Improved processing stability and good color stability			•			
SONGNOX® 921B	Superior processing stability at high temperature			•	•	•	•
SONGNOX® 611B	Excellent balance of processing stability, low color and high LTTS			•	•	•	
	Not suitable for gas fading sensitive applications						
Special effects							
SONGNOX® 1162	High solubility with excellent processing stability, low color and improved gas fading			•			

Recommended steps for selecting the most suitable stabilization package

If higher performance is needed or a new application has been added, SONGWON recommends a review of the current stabilization process. If this does not meet requirements, a new solution can be tried. Support from experts will help to shorten development time, maximize efficiency and save time.

Conclusions

To conserve the key properties of polyethylene during melt conversion:

-  Various solutions are available so careful selection is needed
-  Attention needs to be paid to conversion, storage and usage conditions
-  A balance between cost and performance should be found
-  Involving experts can reduce development cost and save time

For more details and advice on our stabilization packages for melt conversion of polyethylene, please contact techservice@songwon.com.