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Cycletime Tips - Automotive

Volume 36: Additive Compatibility

In order to produce a more cost-effective product, many injection molders have been looking for alternatives to toll compounding of thermoplastic products. Some have taken on compounding of proprietary products in-house, while others have begun introducing various additives at the machine feed throat. Whichever direction your facility chooses to consider, please be aware that many conflicts exist when we combine additives. This tip is devoted to the discussion of just a few of those scenarios.

We've learned that parts produced from semi-crystalline materials are very sensitive to severe changes in intended color. Oftentimes, completely different process strategies are required to counteract the dimensional change that is witnessed due to a "nucleating effect" with particular colorants. In reality what occurs is the resin re-crystallizes at a higher temperature with certain pigment systems and produces an unforeseen shrinkage change at a given process. Some colorant suppliers will work with you to produce a more stable system in most resins.

Certain applications utilizing polypropylene require additive packages for what is known as Long-term Heat Aging (LTHA). As the name indicates, prolonged exposure to heat (or hot water) will have a minimal effect on the resin when this product is used. If you also select a colorant system that has been UV stabilized for protection against the sun's rays, it will react with this LTHA additive and render it useless.

Nylon components that use light colors and require long-term color stability have proven to be a challenge. Generally nylon producers add an antioxidant (AO) to combat this natural yellowing phenomenon. The most widely used AO is copper based and can react with certain additives used in colorant systems - particularly zinc sulfide. Color houses use this product for a good reason (property retention), but the fact is color control will be an issue when this is used. While there are many causes for component discoloration in nylon, we need to make certain that the colorant system is compatible with commonly used resin additives.

Sometimes the reaction is so discrete, we may not realize an additive conflict exists by looking at the molded part immediately after molding. Other times, a splay, processing, or product failure problem might plague you (when compared with running natural resin only). Please let us know if we can be of further assistance in your effort to avoid such issues.

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