

Carbon black dispersion

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Q: Why is dispersion an issue with carbon black?

A: The dispersion quality of carbon black plays a major role in the properties displayed by the final product. In many cases, the use of carbon black is not only for color, but also for physical property enhancement. Well-dispersed carbon black can improve the weather-ability of the end product and its mechanical properties.

Q: What is the single most important factor influencing carbon black dispersion quality?

A: Maximizing the amount of shear experienced by the material is the single most important factor which influences the dispersion quality. This shear forces the agglomerates of carbon black apart and dispenses the particles of carbon black throughout the final product.

Q: Doesn't the resin play a part in dispersion quality?

A: The myology of the resin is the primary factor to be considered during the resin selection. In order to maximize the shear as discussed above, the viscosity of the resin should not be very low. Generally, the resins selected as carriers for black polyethylene color concentrates have melt indices less than 5g/10 min. When the melt index of the carrier resin is higher than that, i.e., less viscous, it is difficult to consistently achieve optimum dispersion.

Q: What about the carbon black itself?

A: Both the particle size and the structure of the carbon black influence the dispersion quality. Smaller particle size and higher structure carbon blacks are more difficult to disperse because of the amount of surface area to be wet out during compounding.

Q: Are dispersion aids used with carbon black compounds?

A: While some dispersion aids are touted for use with carbon black, dispersion aids are not commonly used. The primary disadvantage to using dispersion aids with carbon black is the apparent reduction in viscosity which can be seen during compounding. This decreases the amount of shear which the material experiences and can interfere with the dispersion of the carbon black.

Q: Are there any situations where excellent dispersion quality is undesirable?

A: In very few situations is poor dispersion preferred, but there is one situation where the dispersion quality needs to be balanced with the amount of shear to minimize damage to the carbon black structure. When conductive carbon blacks are used to produce semi-conductive compounds, care must be exercised to prevent over-shearing the compound and breaching the structure of this specialized carbon black.

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