

Edgetek™ Conductive Compounds

A hard disk drive manufacturer improves quality and reliability by reducing electrostatic discharge and ionic contamination in its production line with PolyOne's Edgetek™ conductive compounds

Situation

Ongoing demands for more reliable hard disk drives (HDDs) are forcing manufacturers to look for ways to reduce contamination in production. HDD manufacturing already requires the use of Class 100 cleanrooms, so the goal is to improve the cleanliness of materials within the production environment. Another major quality challenge is the elimination of electrostatic discharge (ESD), a momentary and unexpected release of electrons that can damage sensitive electronics and result in product defects and high scrap rates.

A leading U.S. manufacturer of HDDs needed to find a suitable material for a new drive wheel critical to the operation of the conveyor trolley that transports the hard drives in its cleanroom production facility. As a moving part, the original drive wheel tended to generate surface static electricity due to friction, also known as triboelectric charging. This static charge resulted in ESD events, which then required effective dissipation methods. Material for the new drive wheel needed to provide ESD protection as well as minimize ionic contamination and outgassing to comply with the cleanroom environment.

The PolyOne Difference

The manufacturer engaged a custom molder and moldmaker to develop and produce the new drive wheel. Working with PolyOne, the molder selected an Edgetek™ compound based on PEEK (polyetheretherketone) resin. PEEK's inherent polymer purity provides the low outgassing and reduced contamination the manufacturer sought, and its high heat resistance (over 600F) enables the drive wheel to withstand temperatures generated during operation. To meet ESD requirements set by the HDD manufacturer, the PolyOne team collaborated with the molder to formulate a conductive Edgetek™ grade filled with 20 percent carbon fiber by volume. This loading delivers a surface resistance of less than 1E9 ohm/sq and a triboelectric charge of less than 10 volts, well within parameters.

The team visited the molder's facility to observe mold trials, provide design support, and finalize the custom formula. After testing initial samples of the Edgetek™ compound, PolyOne further tailored the material to optimize additional properties required by the application, such as lubricity, wear resistance, and dimensional stability.



Delivering a Value-Added Solution

The PolyOne Edgetek™ conductive compound is helping the manufacturer ensure high-quality HDDs.

- **Lower scrap rates:** Carbon-fiber filled Edgetek™ quickly dissipates electrostatic build-up on the drive wheel, eliminating potential ESD events that could damage HDDs moving along the conveyor.
- **Reduce warranty issues:** The low ionic contamination and outgassing properties of the PolyOne compound help ensure a high-quality, reliable product.
- **Decrease production costs:** Toughness and heat resistance of the material enables the drive wheel to perform consistently and without failure at fast production speed for high throughput. Carbon fiber reinforcement maintains the wheel's dimensional stability for smooth conveyor operation and less downtime.
- **Material-based savings:** Unlike antistatic coatings, the conductive properties of the Edgetek™ compound do not wear off and are present throughout the part. Drive wheels molded from this material do not have to be coated, replaced, or inspected to ensure continuous ESD protection. As a result, the manufacturer eliminates the cost of coating, inspection, replacement, and downtime.

“We were very impressed with the hands-on involvement of the PolyOne team, who came to our facility to work side by side with us,” stated the molder. “They provided excellent technical expertise and support in the development of this new part. We know we can count on PolyOne to work with us over the long term.”

Product choices often vary by region due to differences in regulatory and agency requirements, availability and other key factors. Please contact your nearest sales office for assistance in choosing the right solution for your locale.

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