

OnCap[™] Antistatic Additives

Challenge

Polymers can accumulate static charge on their surface as they move through shear-inducing production equipment. This positive or negative static buildup can hinder production operations and degrade final part performance for its intended use. From an operational perspective, the static charge can cause parts to stick together or stick to molds, and might provide an unwelcome shock to workers. From a functional performance perspective, static charge can remain in plastics long after production, which can enable an unwanted conduit for charge movement in the final part, for example, electronic equipment, or diminish part aesthetics as dust collects on displayed items due to static electricity.

Solution

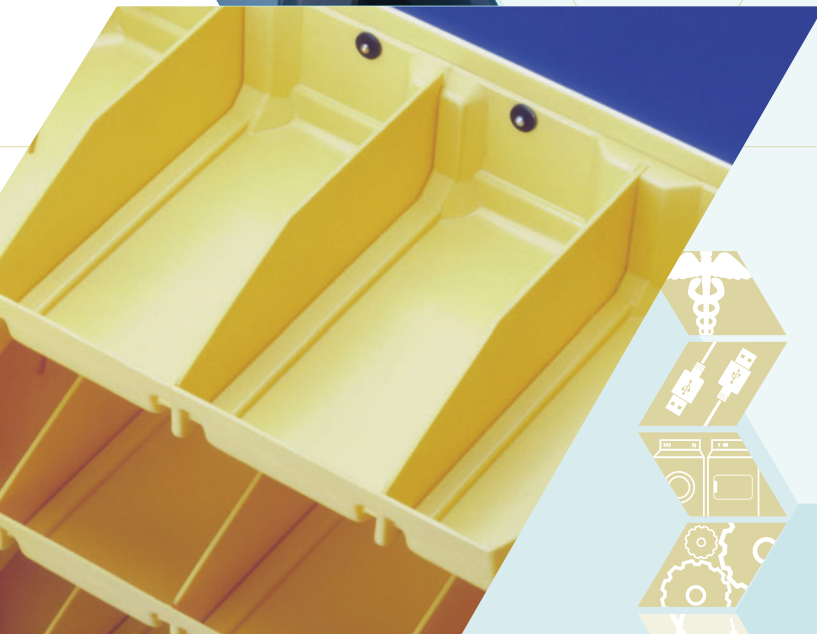
Antistatic additive concentrates can be added directly to the polymer to control static charge. The antistatic ingredient must migrate to the surface ("bloom") in order to absorb and ionize moisture from the air and form a conductive path for charges to dissipate. Typical antistatic chemistries therefore should contain a hydrophobic end to remain part of the polymer surface and a hydrophilic polar end available at that surface that absorbs the water molecules. Antistat chemistries include glycerol monostearate (GMS), ethoxylated amines and other quaternary or sulfonated organic compounds.

It is important to know processing conditions, polymer base, relative humidity of the environment, part thickness and end-use application in order to select the most appropriate antistatic solution. The bloom rate and frequency and longevity of protection vary greatly among the antistat choices.

Value

The use of antistatic additives can control the buildup of static forces in thermoplastic parts and provides several benefits to processors and OEMs:

- Allows for production of safe, static-dissipated parts for certain applications (electronic equipment, electronic packaging, military parts, healthcare parts)
- Shortens cycle times and decreases operating costs as parts are released quickly from equipment
- Maximizes throughput as parts no longer stick together during filling operations
- Improves worker safety and morale as shocks are avoided during processing
- Helps finished product repel dust, look fresher and sell better
- Reduces scrap and returns as scuffs from part-to-part contact are reduced
- Improves consumer satisfaction as parts are easy to destack and use



Implementation

OnCap™ antistatic additives are available in concentrated pellet or bead forms for use in a variety of resin systems. Use rates vary based on the situation, with typical rates ranging from 2% to 4%. Accurate dosing is achieved via a volumetric in-line feeder or gravimetric weight scale blender. Antistats can be combined with other additives or colorants into a single OnColor™ Smartbatch™ concentrate. Versions having FDA approval are available.

With these additives, two limitations need to be observed:

- Overdosing an antistat additive can cause screw slippage and a reduction in output.
- Adhesion of certain inks or labels may be affected due to the migration of the additive to the surface.

Application

Antistatic additives are applicable for use in a variety of plastics processes, including blow molding, injection molding, extrusion and film processing. Antistats find use in most markets, including packaging, electronics/electrical, healthcare, consumer and industrial goods, building and construction, appliances and transportation.

PolyOne offers a one-stop source of color concentrates, additive concentrates, color and additive systems, and associated technology and support services. Our expertise extends across a wide variety of industrial and consumer markets. We have more than 20 manufacturing locations in North America, Europe and Asia, with color labs, design centers and sales offices located around the world.

Please contact your nearest sales office for assistance in choosing the right solution for your needs.

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