



Materials Never Lie

HAS MY SUPPLIER MADE MATERIAL MODIFICATIONS?

A common practice to increase the mechanical stability of polymers is the addition of an inorganic filler material, such as glass fiber, amorphous silica, or clay. Having the correct amount of filler is crucial for a material's performance.

In a recent case, a drone manufacturer approached us to determine the material properties of a batch of plastic struts, which began to break above a certain load when previous batches of struts had not. Acuren performed a root-cause analysis that was supported by our state-of-the-art testing equipment. FTIR spectroscopy showed that both materials were made of the same base polymer polycarbonate. To determine the filler content of the polycarbonate materials, Acuren performed weight loss through ignition, a technique also known as thermogravimetric analysis (TGA). TGA utilized the combustion properties of plastic and inorganic filler. Most plastics are combustible and most fillers are not. By combusting a predetermined amount of plastic and weighing the remaining non-combustible component, the filler content of the plastic can be determined.

In this case, TGA analysis determined that the older batch of struts contained ~50% more filler material than the newer failing batches. Our client was able to solve the issue of broken struts by increasing the filler content in the plastic during formulation.

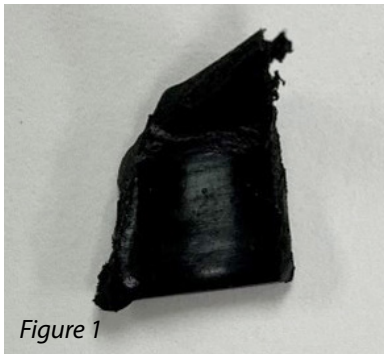


Figure 1

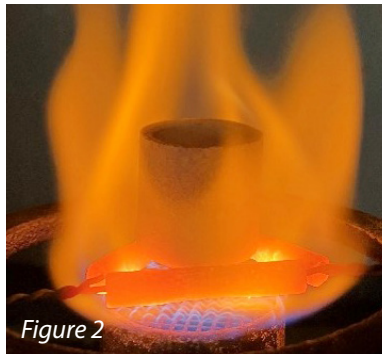


Figure 2



Figure 3

Figure 1: A sample of a plastic material. Figure 2: The plastic material is combusted in a ceramic crucible. Figure 3: The inorganic filler material that remains after combustion.

MINIMIZE OPERATIONAL RISKS AND OPTIMIZE ASSETS

- With expertise in a wide spectrum of engineering disciplines, Acuren employs a cohesive team of engineers, scientists, technologists, and technicians
- Advanced analysis techniques save clients time and money in avoided repairs, reduced business interruption, and improved reliability
- Organic testing lab provides a variety of testing to our clients, involving plastics, rubbers, coatings, and fluids for quality control, failure analysis, and litigation support
- Provide solutions to improve operation and extend life of fixed equipment
- Deepest pool of expertise and solutions in the market
- In-house experts across all disciplines available through our North American network, eliminating the need to outsource
- Rather than simply reporting results, we lead the industry by going a step further – we assist customers in interpreting results and designing solutions



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