Plastics are all around us and serve critical functions within virtually every aspect of modern society, from healthcare to telecommunications to transportation to construction. Whether it's the toothbrush you pick up first thing in the morning, the car you drive to work, or the device on which you are reading at this very moment, plastics shape your ability to care for yourself, communicate with others, and function in daily life. And demand for plastics is expanding; over the past 25 years, plastic production has increased by almost 300%.

In recent years, however, growing concern regarding the environmental impact of plastics has spurred demand for alternative plastic formulation using renewable sources such as methane, corn, and bacteria. Some of these new plastics are now being introduced in mainstream applications. In 2009 Coca-Cola, a major purchaser of plastics, introduced bottles crafted from plastic comprised of up to 30% plant material and in 2010, "Brazilian petrochemical giant Braskem started using ethanol from cane sugar to make a more sustainable polyethylene, one of the most commonly used plastics."[1] While the development of alternative plastics offers exciting possibilities for the future of plastics production, petroleum-based plastic manufacturing currently remains a necessary and invaluable source of plastic products. Now, Color Process Automation Technology, developed through a strategic partnership between HunterLab and Plastore, is making it possible to increase the environmental-friendliness of traditional plastics by heightening efficiency of the manufacturing process itself, which researchers identify a major opportunity for carbon footprint reduction.[2]

Color Process Automation Technology

Color Process Automation Technology (cPAT) is a fully integrated system that combines online spectrophotometric instrumentation with closed-loop color control tailored to your manufacturing needs. At the center of the cPAT system is the SpectraTrend HT, a versatile, lab-grade 0/30 spectrophotometer with integrated height measurement to allow for precise color measurement of both smooth and textured surfaces. With a compact footprint and robust construction, the SpectraTrend HT is easily deployed within production lines in even the harshest factory environments. Continuous, non-contact color measurementstaken by the SpectraTrend HT the provide real-time color condition feedback within the process stream that triggers automatic feeder adjustments based on your specifications, modulating for bulk density variation, feed screw wear, and other process variables. When color falls outside of your chosen tolerance, operators are instantly notified and automated defect containment is activated to allow for downstream sorting of defective product, preventing further processing or release of substandard product. The result is the highest level of control quality control possible in plastics manufacturing, resulting in not only enhanced performance and cost-savings, but reduced environmental impact.

Environment Benefits of cPAT

The cPAT system provides opportunities for improved plastics manufacturing practices that have significant environmental benefits:

Enhanced Accuracy and Predictability: cPAT significantly increases the accuracy of color evaluation by replacing subjective visual color assessment and imprecise time-interval based color monitoring with continuous, automated color measurement that ensures every product is evaluated the same way every time based on pre-determined parameters. Color measurements do not depend on the skill of the operator, the quality of sample preparation, or the luck of catching a single defective product during time-interval testing. As a result, efficiency is optimized, minimizing production of scrap material, decreasing the need for re-processing, and, ultimately, shrinking the carbon footprint of the plastic manufacturing process.

Increased Use of Recycled Material: Color control of recycled material can be particularly challenging using traditional time-interval based color measurement, which can compromise the color consistency of a capstock. As a result, many plastics manufacturers are reluctant to include recycled plastics or minimize the amount they use. cPAT allows for expanded topcoat control and automatic variation of the feeder along with the material "to keep capstock color in spec as the percentage of recycled content on the backside is increased." As a result, more recycled material can be integrated without compromising product color, resulting in both pigmentation savings and a decreased reliance on new raw materials.

Heightened Color Changeover Precision: The color changeover process can be a major site of waste creation, particularly as just-in-time manufacturing practices have dramatically increased changeover frequency within the plastics industry. Today, it is not uncommon to see 6-7 changeovers within a single 8-hour shift, resulting in massive amounts of scrap and wasted resources if reliant on time-interval based QC checks. The continuous color monitoring offered by cPAT allows operators to identify the precise moment at which the old color falls out of spec and the new color comes in, ensuring that all in-spec pieces are used. As a result, waste is greatly reduced and minimal resources are expended on scrap product.

Full article with photos available here:

https://www.hunterlab.com/blog/color-plastics/examining-how-color-process-automation-technology-makes-plastics-manufacturing-greener/