The just-in-time philosophy has revolutionized manufacturing, allowing companies to increase flexibility, efficiency, and profitability. Image Source: Pexels user Buenosia Carol

Whether you work with consumer goods or industrial products, you know that your success depends on offering your customers the products they need when they need them. However, staying competitive isn't just about the end product, but also about the process of production itself. For many, optimizing the process means taking a just-in-time (JIT) approach to manufacturing.

First introduced in Japan in the 1960s, JIT seeks to minimize waste and optimize profitability by ordering and receiving inventory on an as-needed basis rather than holding buffer stocks. In practice, it also means producing only what is needed when it is needed, eliminating unnecessary material and labor costs. Indeed, researchers have found that companies that adopted JIT saw "a 70% reduction in inventory, a 50% reduction in labor costs, and an 80% reduction in space requirements" in the five years following implementation.[1]

However, JIT is not without risk. As pointed out in *The Economist*:

If you produce only what you need when you need it, then there is no room for error. For JIT to work, many fundamental elements must be in place—steady production, flexible resources, extremely high quality, no machine breakdowns, reliable suppliers, quick machine set-ups, and lots of discipline to maintain the other elements.

In order to implement the JIT approach to manufacturing, it is thus essential to invest in technologies that enhance the production process. Amongst the most critical of such technologies is spectrophotometric instrumentation.

Spectrophotometers allow for optimal implementation of JIT manufacturing both within individual factories and across global manufacturing sites. Image Source: Pexels user Kaboompics // Karolina

Using Spectrophotometers to Enhance Quality and Efficiency

Successful implementation of JIT depends on optimizing quality of manufacturing. Without buffer stocks, wasted material as the result of production error can result in production shortfalls as you wait for the arrival of new supply and have minimal product surplus to fulfill orders in the meantime. As such, quality control takes on heightened importance.

For many products, spectrophotometric color measurement is one of the most valuable quality control mechanisms available today. Using advanced spectral technology to capture color data, you are able to rapidly set color tolerances and monitor products to confirm it conforms to color standards. As such, operators can quickly detect out-of-spec product and prevent its release into the marketplace. At the same time, material faults or process errors can be identified and corrected as early as possible to minimize waste. Additionally, the objective nature of spectrophotometric color data means that the same color standards can be shared across manufacturing sites, ensuring consistency regardless of location and allowing for global coordination of production.

While portable and benchtop spectrophotometers can be highly valuable to this process, on-line spectrophotometers take color quality control to the next level by providing continuous monitoring at critical points in the production line. This includes monitoring of color changeovers and other process changes, reducing scrap and improving yields. On-line spectrophotometers may also be combined with **color Process Automation Technologies** (cPAT), which allow for closed-loop color control solutions, "enabling automatic adjustments of pumps, feeders, valves, and motors based on the colorimetric data received from the color measurement instrument."[2] As Ken Phillips, market development manager at HunterLab, explains, "The benefits of cPAT include improved manufacturing efficiencies, reduced operator error and costs, and reduced quality costs—scrap and

customer costs associated with defective product.” As such, these systems give manufacturers the opportunity to optimize successful deployment of the JIT approach.

Modern spectrophotometers give you the data you need to analyze your manufacturing processes and take steps to enhance efficiency. Image Source: Pexels user Pixabay

Improving the Manufacturing Process

While JIT may appear to be an in-the-moment approach, taking full advantage of the philosophy depends on continuous evaluation of the manufacturing process to heighten efficiency. Although spectrophotometers have historically been used to monitor color quality in the immediate term, modern spectrophotometric instrumentation now provides the data needed to gain an in-depth picture of manufacturing efficacy and identify points of vulnerability. Phillips says:

The ability to collect data at multiple points throughout a workflow, and share data within an organization or supply chain where it can be acted on, is critical to helping companies to improve their processes, reduce operating costs, improve efficiencies, and improve stakeholder and shareholder value.

As a result, spectrophotometric color measurement can not only enhance short-term flexibility, responsiveness of production, and optimization of supply, it can be an integral part of improving overall manufacturing processes. This allows you to further refine your adherence to JIT principles and realize the full benefits of this innovative philosophy.

HunterLab Quality

HunterLab has been a pioneer in spectrophotometric color measurement for over 60 years. Today, our comprehensive line-up of portable, benchtop, and on-line instrumentation plays a critical role in color quality control across industries. By gaining the highest level of insight into color behavior, manufacturers are able to improve efficiency of every stage, from product development to full-scale

production. Contact us to learn more about our renowned spectrophotometers, customizable software packages, and world-class customer support services, and let us help you select the right tools for your needs.

1. “Just-in-Time”, July 6, 2009, http://www.economist.com/node/13976392
2. “The Future of Color Measurement”, October 2,

   2014, https://www.qualitymag.com/articles/92181-the-future-of-color-measurement