

Blending innovation together

Optimal and VIAVI develop smart powder processing solution

Optimal Industrial Technologies and VIAVI Solutions have developed a smart blending system that reduces processing times and energy usage while maximising blend uniformity. The combination of Optimal's Process Analytical Technology (PAT) knowledge management platform, synTQ, and VIAVI's MicroNIR PAT-W near-infrared spectrometer form an innovative setup to improve productivity and product quality.

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YouTube share link: <https://youtu.be/pKgvuFeOQWA>

Maintaining optimum powder processing times during blending activities, for example, is crucial for chemical and pharmaceutical manufacturers, as this operation can greatly influence end product quality and production costs. In fact, in the pharmaceutical sector, lack of uniform blending is a leading cause of quality variations in oral solid dosage (OSD) forms, resulting in wastage and reworks. Overprocessing, on the other hand, increases cycle times and energy usage while still affecting product quality.

Key tools to help companies address these issues are real-time, on-line monitoring and responsive, automated control. The first is essential to assess the feedstock's critical quality attributes (CQAs) as blending occurs, eliminating any need for downtime. Based on this information, the second can determine whether the operation should continue or stop and send the relevant commands to the processing equipment. This type of setup can be created with data-driven digital technologies, which enable smart manufacturing applications.

The collaboration between Optimal and its instrumentation partner, VIAVI, leverages their respective capabilities and cutting-edge technologies to fully realise a data-driven, intelligent setup for end-point detection of blending. This can help businesses improve their operations by avoiding costly and inefficient overprocessing while delivering products of consistently high quality.

The digital transformation of powder blending

Highly accurate, compact and rugged, VIAVI's MicroNIR PAT-W near-infrared spectrometer can be easily added to any processing unit, including tumble blenders of many designs. This can conduct extremely fast, highly reproducible and non-invasive analyses of the CQAs of the materials being processed. Moreover, it eliminates the risk of contamination during sampling.

The NIR spectra are acquired in real time and immediately sent to Optimal's synTQ software, which analyses the data and determines blend uniformity. Once the optimum CQAs are achieved, the process is deemed to be complete and synTQ sends a stop signal to the blender, preventing overprocessing. In addition to data interpretation, the platform visualises the information in an easily accessible (and customisable) format, providing users with a comprehensive, instant overview of the process. Trend data is available at any time in the future for further detailed analysis, facilitating the possibility of additional process optimisation.

Paul Gillham, Innovations Team Director at Optimal, explains: *"synTQ is more than a PAT data management solution. It is a powerful portal that can bring together all available PAT knowledge to provide a unique understanding of the process and actionable insights. These ultimately enable improved productivity and product quality."*

Plug and blend

The innovative system was also designed to streamline installation, configuration and start-up activities, as these tasks can be completed in less than two days. In effect, monitoring and control do not usually require calibration or a multivariate analysis (MVA) model to determine blend uniformity and process endpoint. As a result, chemical and pharmaceutical manufacturers can benefit from a quick return on investment (ROI) and maximum uptime.

Emiliano Genorini, Account Manager – MicroNIR at VIAVI Solutions, comments: *"What have we created is a plug-and-play, fully integrated PAT solution to automate and improve powder blending activities. There is also considerable value in the accessible nature of this system, which can help businesses to build their PAT competences. We look forward to continuing our collaboration with Optimal and creating more setups that help manufacturers advance in a wider range of industrial activities."*

To learn more about the smart blending setup developed by Optimal and VIAVI Solutions, attend the webinar Process Analytical Technology (PAT) to control blending MicroNIR PAT-W, taking place on Tuesday 25th January 2022 at 3 p.m. CEST. Register at: https://zoom.us/webinar/register/WN_AYEI7ZuoSX-rxSejojE_Nw

Image caption: The smart blending system developed by Optimal and VIAVI reduces processing times and energy usage while maximising blend uniformity.

About Optimal Industrial Technologies Ltd

Within the Optimal group, we have more than 30 years' experience in the automation and optimisation of control and data management systems for the food, chemical, pharmaceutical, biotech, life science and other process industries.

The demands being placed on manufacturers in relation to getting products to market sooner, minimising development and production costs together with increasing product quality and business sustainability are ever increasing. Our primary aim is to deliver measurable improvements in all these target areas.

In addition to practical automation and system integration expertise, Optimal Industrial Technologies has also developed the world-leading PAT Knowledge Management software platform – synTQ® – which is used by over 60% of the world’s leading pharmaceutical and biotech companies, and is now being adopted by other process industries. synTQ has been a proven enabler of QbD via PAT by significantly increasing productivity and quality, while reducing waste, time to manufacture and time to market for batch and continuous processes.

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