

OPTIMA

OPTIMA pharma whitepaper

CSPE is the key

Your home for turnkey

CSPE for perfect drug processing

Time is of the essence. Especially when installing a new turnkey vial filling and closing line with an isolator in the immediate vicinity of a current pharmaceutical production area. CSPE ensured precise production start with minimized effect on the customer's ongoing manufacturing operations. The installed system also features comprehensive product saving functions.

IMPORTANT FOR YOU

- New turnkey filling system with isolator for vials for an international pharmaceutical company
- Comprehensive product saving functions for filling and closing are integrated
- Overhead cameras provide retrospective security, for example after interventions via the isolator gloves
- With the CSPE process, the system design is extensively optimized virtually in advance
- Adaptations of the system to the building could be flexibly implemented in several project phases with CSPE
- Thanks to CSPE, the on-site work phase at the customer was reduced by around two months

The preliminary cycle development has already been carried out in the CSPE center at Optima Pharma.

→
The CSPE process saved an estimated two months of time for this project, according to internal estimates.

It is very beneficial for pharmaceutical companies to minimize the time from installation to Site Acceptance Test (SAT). To accomplish this objective for a global pharmaceutical customer, Optima used the Comprehensive Scientific Process Engineering (CSPE) method - system integration at the highest level.

"CSPE starts early in the design and engineering phase. Ultimately, the approach addresses potential risks early on in the CSPE centers at Optima Pharma – solving any potential difficulties before delivery", says Armin Weber, Director Project Engineering at Optima Pharma.

Complete line fully integrated

High quality, sensitive and expensive pharmaceuticals are produced using scarce raw materials. Numerous system functions maximize the output of usable drugs from a given quantity of liquids per batch - optimizing the product yield.

This new line consists of a washing machine for vial cleaning, a sterilization tunnel, a filling and closing machine under an isolator, and a tray loader. The system design took place parallel to the building modifications, incorporating changes to account for limitations of the existing building. The installation area reverted to a shell state, but the ceiling height, supporting pillars and various ventilation ducts remained. Optima adapted the isolator technology to fit the building's existing ventilation, relocating elements of the isolator ventilation technology to the technical area above.

Work in progress: remaining flexible

Even in this phase, the advantages of the CSPE process were apparent. The project team coordinated the entire filling and closing line, as well as the isolator structure, meaning the new interfaces could be tested virtually and quickly.

The CSPE services during the design phase also included airflow simulations, creating an ideal, low-turbulence laminar flow over the entire isolator area. The filling nozzle geometry, in combina-



tion with the containers, was also simulated and optimized. The first parameter settings for clean and high-performance filling functions were developed. Later, the entire automation and safety circuits were tested live in the CSPE center.

Maximizing product yield

High product yield – an essential project objective – requires a high-precision filling system. In addition, specific functions are crucial. For example, when the system is started-up, a certain amount of time is required before the filling system can achieve consistent filling weights. To use the product to its maximum

during priming, containers are first filled on a load cell until the target weight is reached. When complete fill accuracy is achieved, the filling system automatically switches to standard operation.

Even at full capacity, the filling weight of each individual container is checked. If deviations occur, the system immediately stops the regular operation process to refill missing product. Towards the end of a batch, this function can also be used to fill the "last drop" of the product without risk. Only the last container, without enough product, will be rejected. With these features, filling accuracy per batch is 50 to 100 times higher than conventional filling systems.

Other functions support the high product yield: If the first attempt to place and insert a stopper fails, the system stops regular operation and repeats the process - called re-stoppering. The stopper "pop-up effect" that might occur with larger fill volumes – an overpressure in the container after closing that might loosen a stopper – is no problem for the Optima system. To prevent this issue, the stopper placement is manipulated during the press-on process, allowing air to escape from the container. The cap-roundness-control checks the crimp caps with a camera for roundness in the sorting bowl. The Optima system only allows well-tested, round caps to be used, preventing unnecessary rejects.



↑
In the first step, the vials are cleaned in a washing machine.



↑
After the sterilization tunnel, there is a transition to the isolator-protected filling area.



↑
Up to 5,000 vials are processed per hour. Product saving functions make optimal use of the available quantity of drugs.



↑ Various simulations are part of the CPSE process, including the laminar flow and the filling behavior.

Recorded processes provide security

The integrated overview cameras from Optima's Intelligent Production Assistance Services (IPAS) portfolio "save" individual drugs or entire batches by continuously recording system processes. This is beneficial, for example, during manual intervention through the glove ports in case of a system failure. Any non-conformities can be clarified by consulting internal records and decisions can be made and accurately documented.

The line achieves an output of up to 5,000 vials per hour (70 ml vial format). For quick format changes, Optima has installed a transport rake that handles the entire range from 70 ml to 500 ml without format parts.



The system technology will greatly increase our efficiency in the area of application that is already certain.

Customer testimonial (international pharmaceutical company)

The mechanical format change over, which can be completed with a servo motor, takes about 30 minutes before the line is ready for use again.

In May 2021, the line was designed and extensively tested with an isolator in the CSPE center. Among other things, the tightness of the isolator and the function of all interfaces were tested here. As part of the integrated Factory Acceptance Test (iFAT), Optima carried out numerous qualification tests that would otherwise only take place at the customer site. Based

on these tests, the pharmaceutical company later succeeded in significantly accelerating its own tests by leveraging values from the iFAT.

Two months saved

The same applies to the pre-cycle development for the isolator. Optima now offers this as an additional CSPE service. Using biological and chemical indicators, the first values were developed in Optima's in-house laboratory and temperature distribution studies were carried out. Together, this resulted in a very good basis for the final cycle development at the customer. Matthias Naser (Chief Operation Officer), who played a key role in the project, estimates that CSPE services saved around two months of time. These are two valuable months in which the employees of the pharmaceutical company were able to pursue their actual tasks.

The project took place during the peak of the COVID-19 crisis with strict travel restrictions. As a result, the customer's project participants were ultimately only on site at the iFAT in Schwäbisch Hall and with a reduced team. With online training courses, future operators began training with the system even before the iFAT. At the iFAT, only a small number of Optima employees were present

in the assembly hall of the CSPE center, the rest of the Optima team participated remotely. This allowed all customer employees, who came to see the system to be onsite.

Precision up to the installation site

Bringing in the various parts of the system once again required full attention and a detailed move-in concept. The new system could be transported to its place of installation in parts, in stages and with millimeter clearances to an open outer wall and a platform specially built for this project. The SAT followed immediately in October 2021, because the isolator and filling and sealing machine were already a well-established team.

The customer is very satisfied with the course of the project and the system technology: "An almost smooth course of events under difficult conditions is something that cannot be taken for granted. And the system technology will greatly increase our efficiency in the application area – this is already clear today." 🌐



← According to the customer, the new system for dosing and sealing expensive, sensitive medicines will greatly increase efficiency in the area of application.

Fully installed and and operational – the conclusion of the customer is clear. ↓

→ Customization dominated when designing and installing the machines in the existing building.



Key benefits of OPTIMA pharma's turnkey expertise

Key Facts



Fastest time-to-market
of customer-tailored
processing lines



Integrated solution
of filling line, isolator
and freeze-dryer from
one partner



Fast production start
with comprehensive
simulations and VHP-
cycle development



Entire life cycle
with turnkey approach
– from conception to
production



Highest safety
due to fully tested line
at Optima CSPE-Center

Time-to-market? Take the shortcut with OPTIMA » [Click here!](#)