# How It Works: Prefabricated Cleanroom PODs Speed Up Installation and Enable Repurposing

G-CON Manufacturing

**Problem:** Pharmaceutical manufacturing infrastructures are often constructed consecutively — first the shell building, then utilities, followed by cleanroom structures, and then equipment installation. The sequential nature of the construction process only allows one activity at a time, which prolongs the overall time of construction, and accordingly time to first product runs. Furthermore, every construction step requires a large amount of specialized man-hours and laydown areas, to name just two cost factors. The described construction mode does not meet the current industry needs for rapid deployment, total cost reduction, and flexibility. Moreover, such structures cannot be repurposed and commonly are only able to be used for one product lifecycle (5-10 years).

**Solution:** A better alternative is building a manufacturing site in parallel. This means that the shell building, utility bundles, cleanroom infrastructures and process equipment are all built simultaneously, allowing the project to be completed much faster. Prefabricated cleanroom modules are manufactured off -site, run through a factory acceptance test, and then are shipped to the site and placed within a shell building. This process takes approximately 4 months. In the meantime, the shell building is erected, which can take 2 months. Then, the longest manufacturing time item, process equipment, is placed into the prefabricated cleanroom system at the site. Depending on the equipment selected, lead time for these items can be 6 months or even longer. During this time, the shell building, utilities and cleanroom systems are built and assembled, and await only the processing equipment. Overall, the parallel construction timeline can be 50% faster than a traditional, sequential construction program.

The main enabler for the parallel construction sequence is the prefabricated, autonomous cleanroom system, also known as a POD. Cleanroom PODs are available in multiple sizes. They include airlocks, cleanroom space, and a separate mechanical area, which is accessible from the grey space. The mechanical space includes air handling, fire suppression, and a control system. It can also be outfitted for other needs, like

specialty gases. The standard POD structures, with dimensions of 9’, 12’, 18’, or 24’ wide and 42’ long, can be docked against an interconnecting corridor system, which allows easy access to the POD airlock areas. Since the PODs have their own air handling systems and compact ductwork in the plenum space, PODs can be sanitized via vaporized hydrogen peroxide (VHP). This ease of cleaning allows the PODs to be taken out of service if needed and then re-commissioned on demand.

Since the cleanroom PODs are independent from each other, scaling operations (up or down) can be easily accomplished without disrupting the production process. With each POD having its own air handling units, each POD can be run with either a positive or negative pressure cascade. If there ever is an excursion within a POD, that POD can be either segregated and cleaned or sanitized in place with VHP, without interrupting the other processes occurring in separate PODs.

The robustness and mobility of the epoxy coated aluminum structures allow PODs to be repurposed when the need arises. The cleanroom space can be easily refurbished, if necessary, or the entire POD infrastructure can be shipped to a different location. The container-like structures can be moved via air bearings into or out of a shell building and then driven and/or shipped to a different location to be redeployed for another use.

For more information about this product, visit www.gconbio.com [1].

*This How It Works product was featured in the May/June [2] 2015 issue [3] of* Controlled Environments.



**Links:**
[1] http://www.gconbio.com?
[2] http://digital.cemag.us/controlledenvironments/may_june_2015#pg24?
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