SARTORIUS

Customer Case Study

Zero to Final Fill: How HUGEL Implemented Its First Single-Use Lines

Customer Profile

Company Name:
HUGEL

Company Location:
South Korea

Company Type:
Large Biopharma

Industry:
Healthcare

Specialty:
Medical Aesthetics

Company Profile:
www.hugel-inc.com/en

Customer Challenge

HUGEL was looking to implement a new single-use (SU) final formulation and filling line within its manufacturing process. The project was driven by the need to improve contamination control and align operations with the latest EU GMP Annex 1 requirements for aseptic processing.

While HUGEL had prior experience in filling operations, the team had no prior experience with SU technologies or with designing a contamination control strategy (CCS) suitable for modern regulatory expectations. In particular, they required expert support in adapting their process from an existing RABS-based setup toward an Annex 1-compliant isolator and transfer system.

HUGEL

The scope of the project included:

- Guiding the selection and integration of SU assemblies—including filling bags, PUPSIT systems, and the Octoplus® Final Filling Assembly—into the filling line and isolator.
- Supporting the design and implementation of efficient material transfer processes between Grade C and Grade A areas.
- Advising on the selection and installation of rapid transfer ports (RTPs) to manage the aseptic transfer of components and products.
- Providing regulatory and technical guidance to ensure that the process setup would support Annex 1 compliance and inspection readiness.
- HUGEL engaged Sartorius to provide comprehensive technical support and hands-on project guidance from early design through successful implementation.

Background Information

The bioprocessing landscape in South Korea is evolving rapidly. Many manufacturers in the region are seeking to upgrade legacy multi-use systems and adopt SU technologies to meet modern regulatory expectations and improve process efficiency.

Regulatory drivers play a key role in this transformation. The latest EU GMP Annex 1 guidance reinforces the importance of CCS and is pushing manufacturers toward isolation technologies in the filling area. Specifically, section 4.3 of Annex 1 states:

"Restricted access barrier systems (RABS) and isolators are beneficial in assuring the required conditions and minimizing the microbial contamination associated with direct human interventions in the critical zone. Their use should be considered in the CCS. Any alternative approaches to the use of RABS or isolators should be justified."

This regulatory pressure is accelerating the shift toward isolator-based filling lines and closed transfer solutions, especially for companies seeking to future-proof their operations and inspection readiness.

Aseptic filling requires the highest quality standards. Processes must ensure precise filling accuracy, high product recovery, and the flexibility to accommodate diverse product and packaging formats while minimizing the risk of contamination. Achieving this requires close collaboration between technology providers, original equipment manufacturers (OEMs), and end users.

HUGEL sought to implement its first SU final formulation and filling line. To ensure a successful outcome, the company engaged Sartorius to provide expert guidance and hands-on support from early design through project implementation.

Project Key Indicators

Keywords:
Formulation and Filling, Octoplus® Final Filling System, Single-use filling line

Process Steps:
Drug Formulation, Fill, and Finish

Success Criteria:
Regulatory compliance, reduced labor requirement, more efficient production

Provided Solutions:
Octoplus® Final Filling Assembly, PUPSIT, Flexsafe® 2D, Flexsafe® Promixer Bags

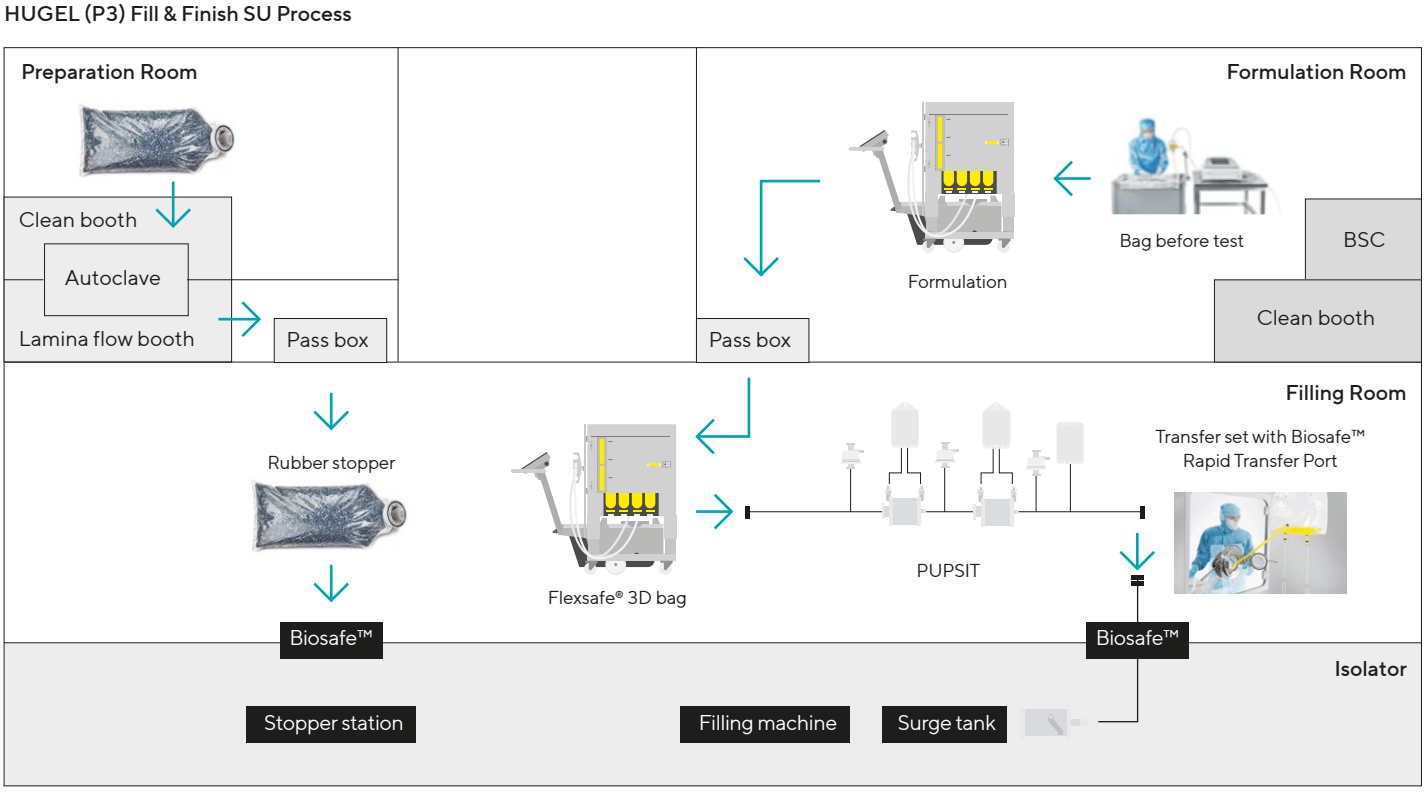
"By combining technical expertise with regulatory insight, our imperative was to help HUGEL establish a sustainable, efficient process that's ready for the future."

Piers Kim (Sango),
Manager Application Services (FMT)

Provided Solution

Consulting Support for the Final Formulation and Filling Process
With deep expertise built over years in the field, we guided HUGEL to establish a final formulation and filling process, including setting up a new facility and helping to optimize the flow of people and materials (Figure 1).

Figure 1: *Proposed Facility Design Including Flow of Material and People*

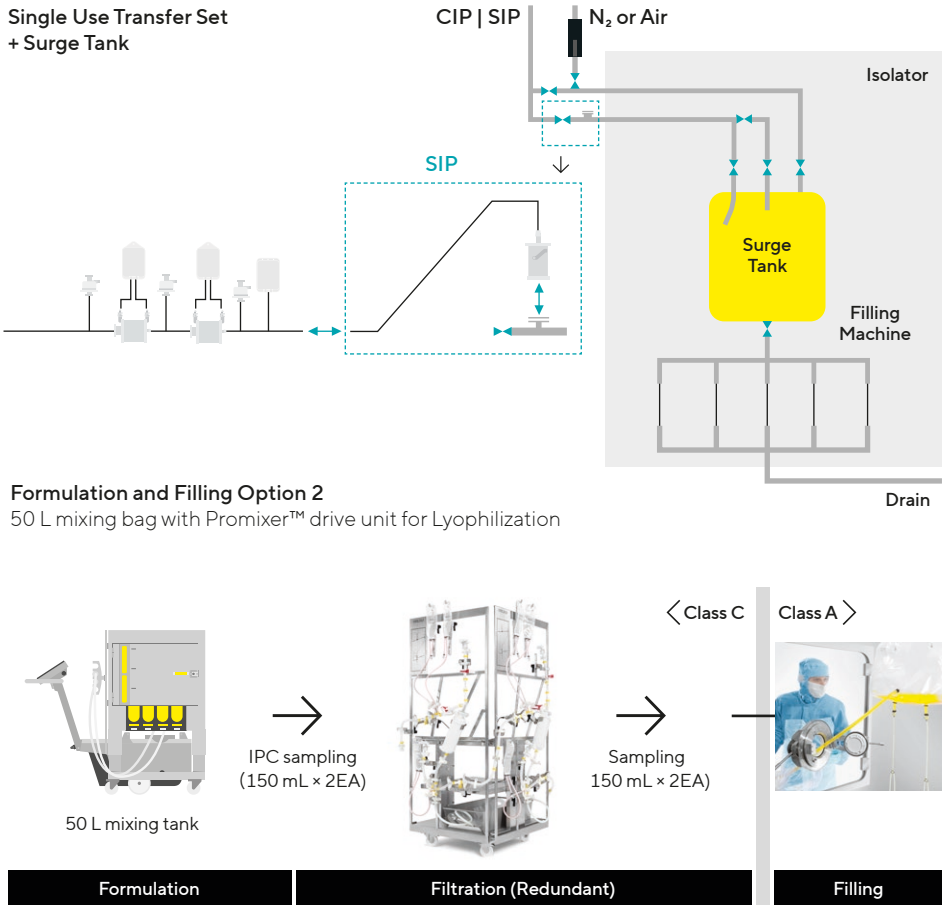


Evaluating the Advantages of SU vs. Stainless Steel Systems
Our expertise led us to guide HUGEL toward exploring alternatives to stainless steel systems, because SU solutions would:

- Secure their aseptic processing operations, arriving as pre-assembled, pre-sterilized ready-to-use systems
- Minimize the main sources of contamination: human interventions, CIP, and SIP
- Increase productivity, as the installation and setup time from 4 hours with stainless steel to 15 minutes with an SU filling bag
- Minimize production costs by eliminating the need for CIP | SIP and associated validations
- Reduce product losses during cleaning, maximizing product recovery
- Provide the flexibility to easily fill different types of primary containers on the same filling line

Figure 2 shows the initial design compared to the final, fully SU design$_2$

Figure 2: *Initial Design Concept With SU Transfer Set and Surge Tank vs. Final Fill SU Design*



Review of Unique Final Formulation and Filling Requirements

Sartorius worked closely with HUGEL to define the specifications required for the filling machine and isolator. This included collaborating with the filling line manufacturer to review equipment behavior and address integration questions. Particular attention was given to the placement and handling of SU assemblies, including the Octoplus® Final Filling Assembly within the isolator environment (Figure 3).

Figure 3: *Picture of the Actual Final Filling Set Up at HUGEL*

Attendance at Filling Machine Factory Acceptance Test (FAT)
Sartorius supported HUGEL during the FAT, where a prototype of the Octoplus® Final Filling Assembly was installed and its length adjusted to fit the facility layout. The Sartorius field application specialist provided hands-on guidance on how to install and operate the assembly within the isolator.

Contamination Control Strategy (CCS) Support
Sartorius provided targeted guidance on applying Annex 1 principles to key elements of the process. The team advised on:

- The optimal location and handling of PUPSIT to ensure filter integrity testing.
- Material transfer workflows to reduce contamination risks during transitions between Grade C and Grade A areas.
- Best practices for handling SU assemblies inside the isolator in alignment with regulatory expectations.

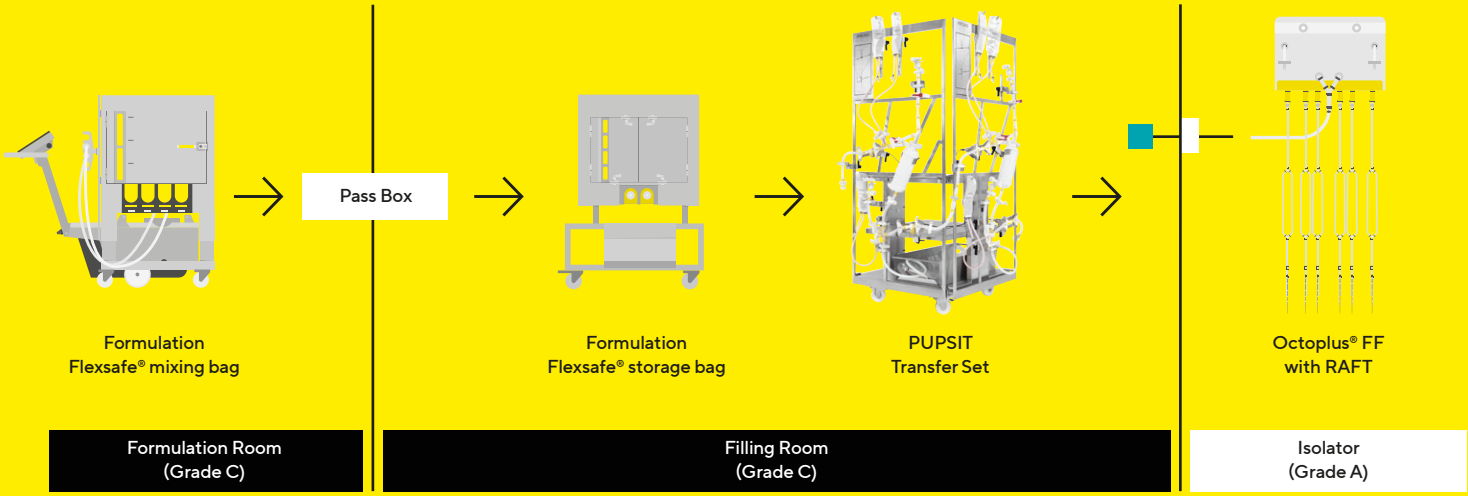
To help HUGEL's team better understand common regulatory risks, Sartorius' field application specialist also cited examples from FDA warning letters, providing practical insights into aseptic technique challenges in RABS-based Class B areas and supporting the development of a more robust process.

Results

With Sartorius' support and the implementation of SU systems, HUGEL successfully reduced labor requirements and met the regulatory expectations of the revised EU GMP Annex 1. Sartorius guided the customer's transition from a RABS-based setup to an isolator-based filling process, helping to strengthen HUGEL's contamination control strategy. The team also advised on scenarios for installing the Octoplus® Final Filling Assembly inside the isolator—ensuring optimal handling and regulatory compliance (Figure 4).

Further targeted consulting was provided on the location of PUPSIT and on the appropriate wetting solutions and methods, in alignment with Annex 1 guidance. Through this collaboration, HUGEL achieved a robust, optimized SU final formulation and filling process, with stabilized production capacity supported by team training.

Figure 4: *Figure 4: Final Project Outcome Including SU Products, Placement, and Transfer*



At a Glance

By implementing a SU final formulation and filling process with Sartorius' support, HUGEL successfully reduced labor requirements, improved process flexibility, and aligned its operations with the latest EU GMP Annex 1 guidance. The transition from a RABS-based setup to an isolator-based filling process strengthened contamination control and inspection readiness. Targeted consulting on PUPSIT implementation, transfer and handling of the Octoplus® Final Filling Assembly, and operator training enabled HUGEL to establish a robust and efficient filling workflow—supporting stable production capacity and the flexibility to handle diverse product formats.

Achievements

Transitioned from **RABS to isolator-based** SU filling line

Stabilized production capacity through targeted operator training

Improved contamination control and **Annex 1 compliance**

~4 hours to ~15 minutes

Reduced final filling setup time

+250 batches/year

Increased productivity

Before: Multi-Use System
- RABS
- Consumables: only filter, PVS

After: SU Platform
- Isolator
- Consumables: Flexsafe® 2D bag, Flexsafe® Pro Mixer bag, PUPSIT, Octoplus® Final Filling System, PVS

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