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Gain Deck Space with Thomson 7L & Multiported flasks for Off-Deck Reagent Addition in Automated Workflows

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Abstract

Off-deck reservoirs, such as the Thomson Multiported Optimum Growth® 7L Flask, enables the addition of up to 5L of liquids, reagents, or cultures into microplates, tube arrays, or deep well plates without requiring additional on-deck labware. This can be used to gain anywhere from 3-5+ deck positions. This application note highlights automated approaches using the Thomson Multiported Optimum Growth® 7L Flask and Transfer Cap to optimize large-scale upstream workflows.

Scaling mammalian cell culture workflows often involves seeding multiple smaller vessels simultaneously, a process that can be labor-intensive, error-prone, and susceptible to contamination. Traditional flask formats and manual pipetting limit efficiency and reproducibility, particularly with high-demand CHO or HEK cell lines. Laboratory automation addresses these challenges by streamlining processes while utilizing multiple reservoirs or troughs on a robotic deck for adding cells or reagents. Limited robotic deck space poses a consistent challenge in automated workflows. Integrating peripheral equipment maximizes automated tasks without cluttering the liquid handler deck.

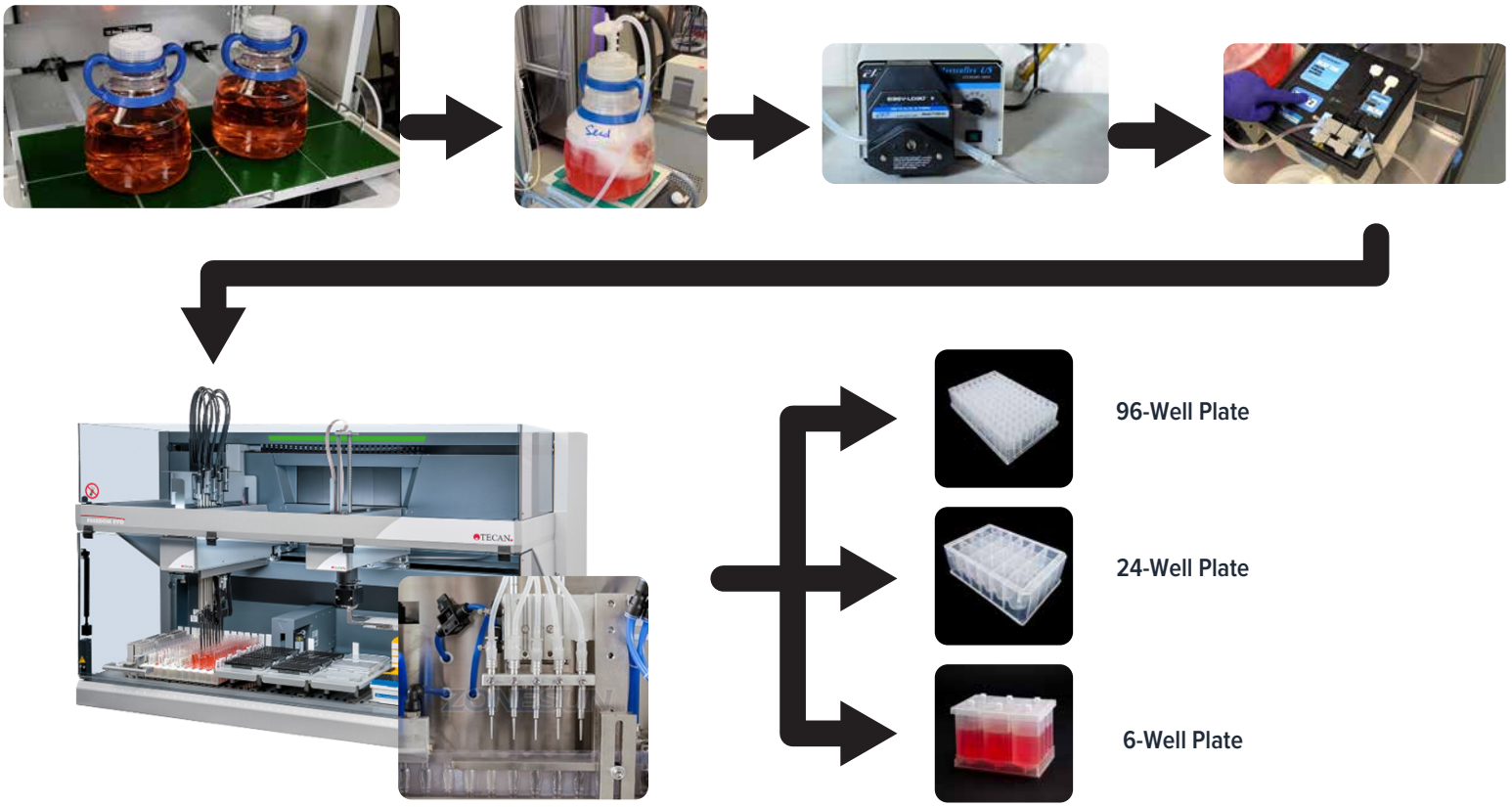
Introduction

This innovative solution eliminates the need for on-deck reservoirs, freeing up valuable deck space for additional labware and improving workflow efficiency. Laboratory automation and robotics are increasingly prevalent in the biopharmaceutical industry, offering solutions to repetitive tasks, reducing ergonomic injuries, and enhancing precision and flexibility in scientific experimentation. For example, Sanofi leverages robotic automation to seed cell cultures and clarify hundreds of antibodies using the Thomson Multiported Optimum Growth® 7L Flask and Transfer Cap.

Multiported Optimum Growth® 7L Flask and Transfer Cap

The Thomson Multiported Optimum Growth® 7L Flask and Transfer Cap provide a comprehensive solution for large-scale cell culture expression, ensuring compatibility, efficiency, and sterility. As robotic deck space becomes increasingly limited, scientists seek innovative ways to introduce liquids into automated systems. Off-deck vessels, like the 7L Flask, serve as reservoirs to replenish sterile culture lines or labware, supporting fully automated processes. The following methods, developed by colleagues at Sanofi in Cambridge, demonstrate this approach.

Workflow Visualization



Materials

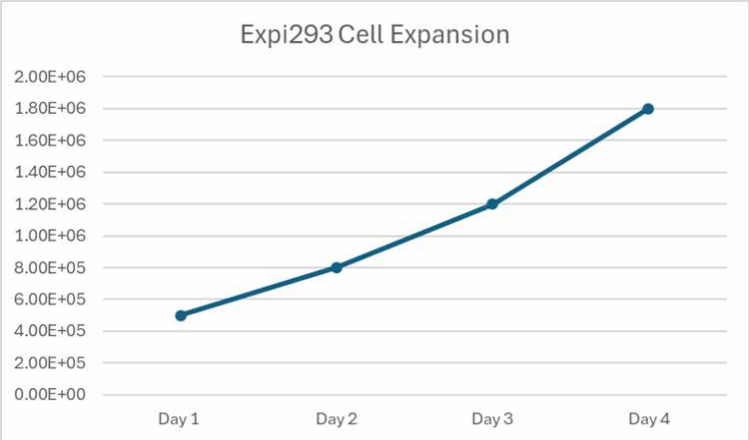
- Thomson Multiported Optimum Growth® 7L Flask *(P/N 931117-55-18)*
- Thomson Transfer Cap for 7L Flask *(P/N 931470-8)*
- Tecan Freedom EVO Liquid Handler
- INFORS Multitron Stacked Incubator
- Masterflex 900-1727 Peristaltic Pump
- Thermo Scientific™ Digital Mini Rotator
- Terumo BCT Inc. SCD IIB Sterile Tubing Welder
- Greiner Auto-Flask T75 GNF

Methods

1. Staubli robotic arm transfers the Greiner Auto-Flask T75 GNF to the Tecan Freedom EVO nest location from an automated incubator.
2. Expi293 cell culture is seeded at 0.5×10^6 cells/mL and expanded up to 4 days, or until a cell density of 1.8×10^6 cells/mL is reached, in an INFORS Multitron Stacked Incubator with a 4L working volume at 150 RPM (1-inch orbit).
3. The Thomson Multiported Optimum Growth® 7L Flask, equipped with ¼-inch weldable tubing, oscillates on a Thermo Scientific™ Digital Mini Rotator to maintain Expi293 cells in homogeneous suspension.
4. The Thomson Multiported Optimum Growth® 7L Flask is connected to sterile tubing using the Terumo BCT Inc. SCD IIB Sterile Tubing Welder.
5. The weldable tubing is sterilely connected to the Masterflex 900-1727 Peristaltic Pump.
6. 35 mL of culture is dispensed into barcoded Greiner Auto-Flask T75 GNF (or other compatible smaller vessels) on the system deck.

Discussion

The Thomson Multiported Optimum Growth® 7L Flask was seeded with Expi293 cells at a density of 5×10^5 cells/mL in an initial volume of 4L. The culture was grown for 4 days until reaching a density of 1.8×10^6 cells/mL. On day 4, the flask was transferred from the INFORS Multitron Stacked Incubator to a Thermo Scientific™ Digital Mini Rotator. The multiport harvest tube was sterile-welded to the Tecan Freedom EVO system, and 35 mL of culture was aliquoted into each Auto-Flask via automated dispensing: this workflow supports liquid transfer to well plates, vials, and additional labware reservoirs. This approach ensures consistent cell distribution and minimizes contamination risks.



Conclusion

The Thomson Multiported Optimum Growth® 7L Flask and Transfer Cap system represents a significant advancement in automated laboratory workflows. By enabling off-deck reagent and culture addition, it addresses the challenge of limited robotic deck space. On-deck shakers and reservoirs can introduce spillage risks and inconsistent cell viability due to suboptimal mixing. The Thomson system mitigates these issues, reducing labware consumption while maintaining high reproducibility and data quality. Its ease of integration with existing automation systems and minimal startup costs make it an excellent solution for laboratories advancing fully automated proteomic workflows.

Thomson Products

125mL
931110-DP

250mL
931111-DP

500mL
931112-DP

1.6L
931113-PORT-TRT

Transfer Cap
931470-8

2.8L
931114-PORT-TRT

5L
931116-PORT-TRT-F

7L
931117-55-18

7L
931117-55-14

7L
931117