

An Introduction to the Optimum Growth® System

The Optimum Growth® System consists of high efficiency shake flasks, specialty shake flasks, transfer caps and the Rapid Clear® Cap for cell culture clarification prior to protein purification. The modular design of the Optimum Growth® System allows components to be used interchangeably and assures that small scale bioprocessing projects can remain GMP-compliant.



SHAKE FLASKS

Higher working volumes and improved aeration increase efficiency for expansion of mammalian cells, insect cells, *E. coli* and other microbial cells



SPECIALTY SHAKE FLASKS

Feed / transfer and sampling ports enable our specialty flasks to serve as an aseptic system and mini-bioreactor, while also increasing working volume, aeration and mixing rates



TRANSFER CAPS

For seeding larger bags and fermenters, as well as filling flasks with media from a bulk source, providing time and cost savings to keep your lab operations running smoothly



RAPID CLEAR® CAP

Quickly and efficiently clarify cell culture media directly from the Thomson 5L Optimum Growth® shaker flask without the need for centrifugation



Optimum Growth[®] Flasks

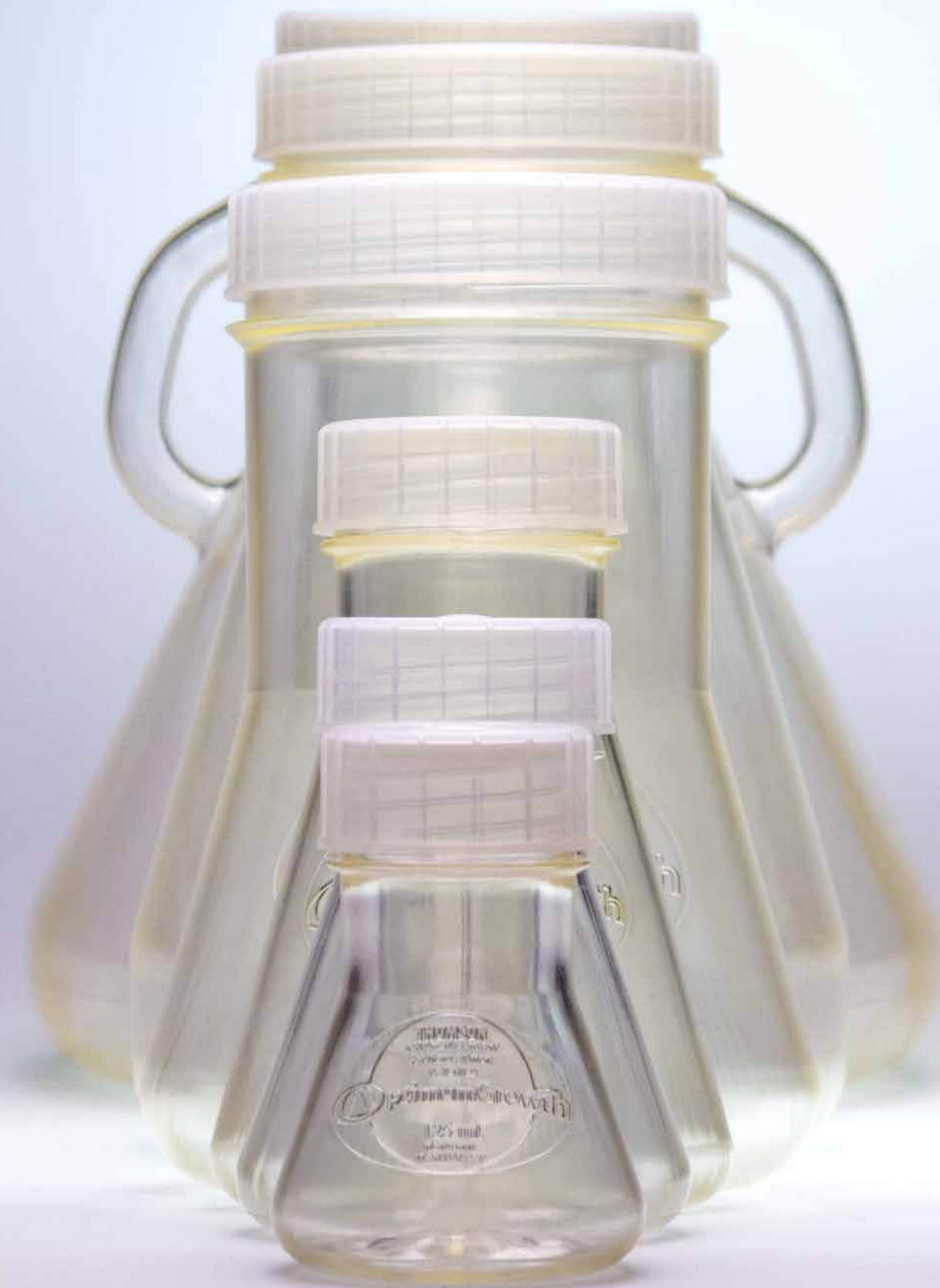
Thomson Optimum Growth[®] Flasks are designed for mammalian and insect cell culture, available in 125mL, 250mL, 500mL, 1.6L, 2.8L and our popular 5L volumes.

They are superior to traditional shake flasks due in part to the fact that they support a 40-50% fill volume, versus traditional flasks fill volume of 33%.

By holding up to 2x more media Optimum Growth[®] Flasks greatly increase shaker cabinet efficiency.

Key Features

- Baffles designed for high aeration and low shear to maintain cell viability
- Same footprint as comparable Fernbach flask but with a 40-50% fill volume
- Less foaming than disposable Fernbach potentially eliminates additives
- 0.2µm Vented Cap simultaneously maintains high gas exchange and sterility
- Transfer Cap option connects directly to cell bags or bioreactors with multiple connection options
- Scalable flask line allows more flask sizes to be shaken on the same shaker, improving efficiency and flexibility versus other products
- Individually packaged and sterilized for immediate use



Optimum Growth[®] Special Flasks

Components For Closed Systems

Thomson Optimum Growth[®] Special Flasks were designed for the unique needs of small- to medium-scale bioprocessing applications.

Sampling Flasks

Optimum Growth[®] Sample Flasks with one-way sampling valves that help reduce viable cell count sampling times

Key Feature

- Eliminate the need to remove flask caps & allow aseptic sampling on the benchtop

Multiport Flasks

Optimum Growth[®] Multiport Flasks serve as closed systems with feed/transfer and sampling ports

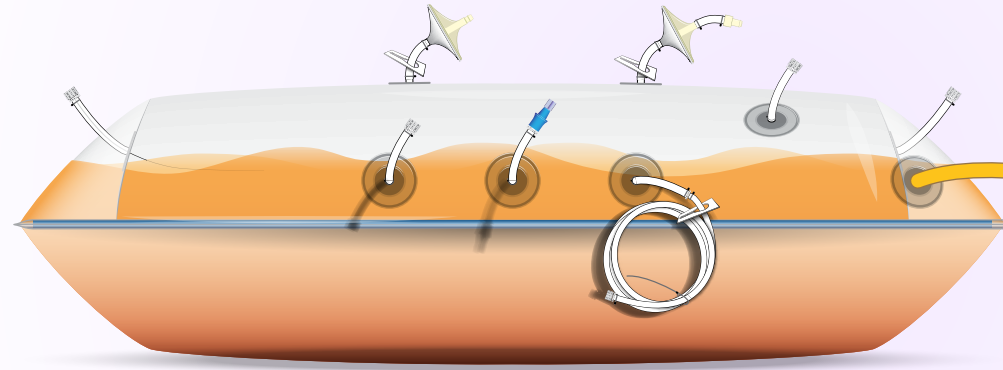
Key Features

- Feature feed/transfer ports for seeding larger bioreactors or for batch feeding medium sized cultures
- Both aseptic sampling valves & feed/transfer ports make the 1.6L, 2.8L and 5L flasks a closed system that does not need to be opened



An Introduction to Transfer Caps & How They Work

Thomson Transfer Caps are used with our Optimum Growth® 1.6L, 2.8L & 5L flasks for aseptic transfer of cells or media into any vessel. Transfer Caps eliminate the need to move cells to an intermediate vessel for scale-up or to seed cultures. Transfer caps enable reagent addition, seeding of larger bioreactors or cell bags, and media transfer.



Inversion Transfer Caps

Utilize Gravity Feed for Simple Aseptic Transfer of Media or Cells

Key Features

- Gravity feed keeps cells stress free
- Dip tube attached to 0.2µm syringe filter provides aseptic air displacement
- Configurations include with & without attached tubing to accommodate a variety of vessel connections
- C-Flex® 16 & 24 tubing sizes available for tube fusing



Dip tube for sterile air displacement

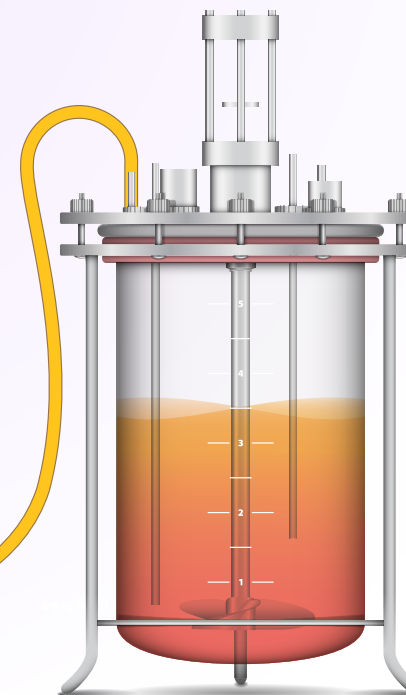
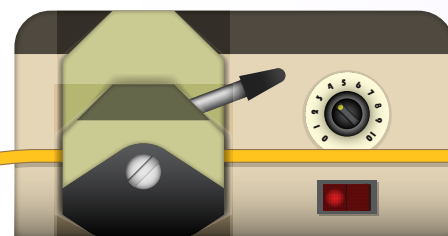
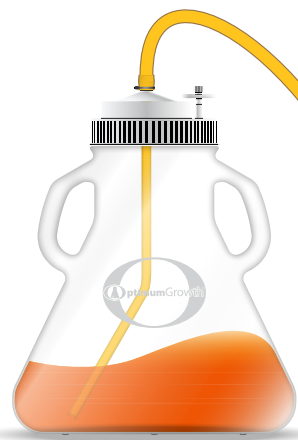
Stand & ring sold separately

Bidirectional Transfer Caps

Utilize a Peristaltic Pump for Easy Aseptic Bidirectional Transfer of Media or Cells

Key Features

- Equipped with 2' of 1/4" OD C-Flex® 16 tubing for pumping, ending with either a plug or male Luer lock
- Downstem allows for bidirectional transfer
- 0.2µm PTFE syringe filter provides aseptic air displacement while pumping



C-Flex® 16 ID: 1/8" (3.1mm), OD: 1/4" (6.35mm)
C-Flex® 24 ID: 3/16" (4.76mm), OD: 7/16" (11.1mm)

Rapid Clear® Cap

Revolutionary Technology in Downstream Processing

The Thomson Optimum Growth® System of products expanded into downstream processing with a revolutionary new technology that allows high speed clarification of cellular material. Thomson developed the Rapid Clear® Cap to address the needs of scientists to quickly and efficiently clarify cell culture media directly from the Thomson 5L Optimum Growth® shaker flask without the need for centrifugation.

**Clarify 3L of Cell Culture
In < 30 Minutes with No
Centrifugation Required**

Key Features

- Depth filtration with a 0.2µm final pore size eliminates multiple filtration steps and in most cases centrifugation
- Significant time savings versus traditional spin down technique
- Cell culture clarification of low or high density cultures of CHO stable, CHO transient, HEK293, hybridoma, and other mammalian cell lines
- Eliminates transfer steps: The Rapid Clear® Cap screws directly onto the Optimum Growth® Flask
- Secondary cap attaches to a new Optimum Growth® Flask or to a storage container with a Luer lock
- Solid Caps are also available for long-term storage of clarified media in the 2.8L or 5L receiving flask

Key Benefits

- Save time, clarify 3L of cell culture in less than 30 minutes – with no centrifugation required!
- Reduce consumables used by up to 90%
- Walk away convenience and safety – minimize endotoxin exposure

