

OPTIMUM GROWTH FLASKS



Accessories for Optimum Growth Flasks



Transfer Cap System

Optimum Growth™ Flasks (patented) in conjunction with the Transfer Cap System eliminates the need to move cells to an intermediate transfer for scale up or seed cultures. The ability to pump into the Optimum Growth™ Flask (patented) makes filling with media from a bulk source a simple aseptic method. The Transfer Cap in conjunction with the Thomson Optimum Growth™ Flask (patented) product line can be used for reagent addition, seeding of larger bioreactors or cell bags, pumping of media into flasks from large drums or bags of media, and other liquid media transfers into and out of bioreactors

Multiported Optimum Growth™ Transfer & Feed Flask

The multiported flask is completely aseptic, making it the perfect start for the initial seed cultures that seed bioreactors in multiple stages of clinical drug production. Other uses for Multiported Optimum Growth™ flasks include keeping cell lines alive and other manufacturing functions.

The Multiported Optimum Growth™ Flask was born out of necessity from biopharmaceutical companies requiring a completely aseptic process. These multiported flasks have replaced the need for bags to start seed cultures for the inoculation of bioreactors.



Rapid Clear® Cap

The filters work by simply switching the vented Optimum Growth™ Cap to the **Rapid Clear® Cap**. The only equipment required is a peristaltic pump. In initial testing the units can filter up to 2.5L-3L of high density culture, 6×10^6 - 20×10^6 @ >70% viability, in approximately 18 minutes. This technique will transform the time consuming and laborious task of harvesting cells to a rapid walk away procedure.



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Key Features

- Baffles designed for high aeration & low shear
- Same footprint as comparable Fernbach flask
- Less foaming than disposable Fernbach
- Transfer cap option connects directly to cell bags or bioreactors with quick connect, luer lock or tube fusing
- 0.2µm Vented Cap
- Individually packaged and sterilized

Scalability

Thomson Optimum Growth™ Flasks are designed so that protein production will scale consistently across all sizes, unlike any other shake flasks on the market. Additionally, these flask features allow for consistent shake speeds from the 125mL flasks up to the 5L flasks.

Space Saving More Volume

Optimum Growth™ Flasks give excellent growth with space saving capability.



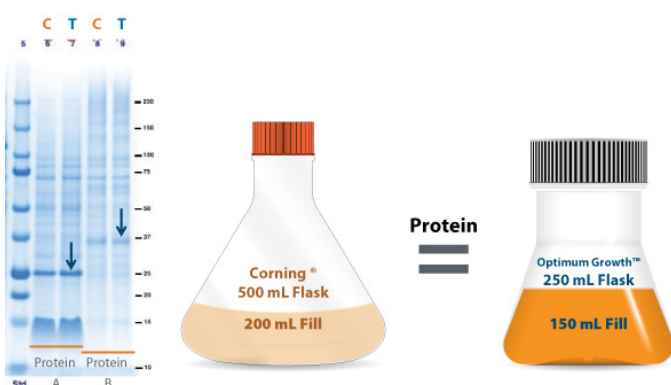
- fig. 1. 18 x 1.6L Optimum Growth™ Flasks Total Volume 16.2L/Shaker
- fig. 2. 6 x Corning® 3L Total Volume 6L/Shaker
- fig. 3. 8 Position Carrier for 125mL & 250mL flasks
- fig. 4. 12 x Optimum Growth™ 2.8L Flasks Total Volume 16.8L/Shaker

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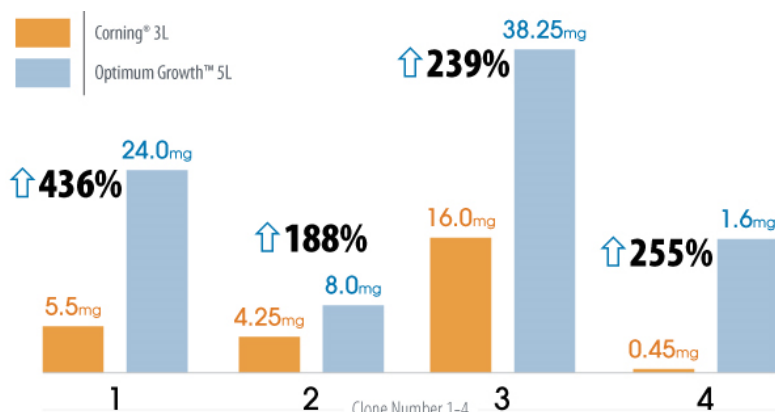
Corning® vs Optimum Growth™ Flasks: Comparison of Two Expressed Membrane Proteins



- **Corning®** – 500mL flask, 200mL culture
- **Thomson** – 250mL flask, 150mL culture
- 4mL samples purified over Ni-NTA
- **Protein A** – Membrane protein of moderate expression, 34kDa
- **Protein B** – Membrane protein of low expression, 45kDa
- 12µL of elution resolved on a coomassie gel

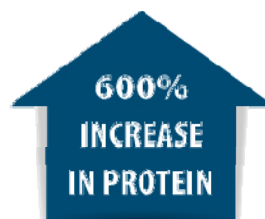
Conclusion:

Thomson flasks work at least as good as Corning® standard. Improved working volume/flask volume ratio when using Thomson.



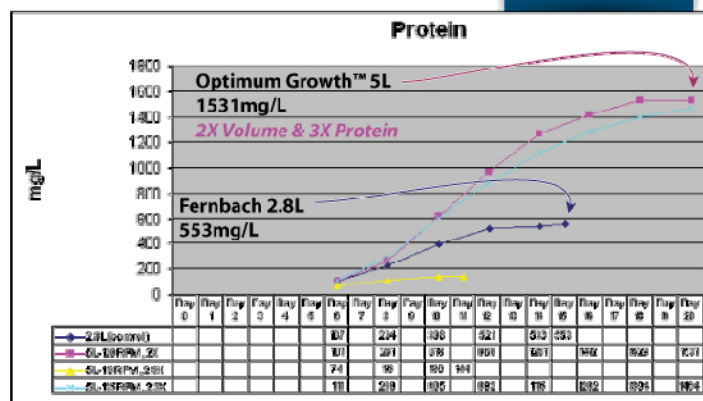
214% Yield Increase From Insect Cells

Protein Production/Flask
Data supplied by New York Structural Genomics Research Consortium



Same Footprint-Double Volume

Optimum Growth™ 5L (3L Media)
vs Nalgene® Nunc 2.8L (1.5L Media)

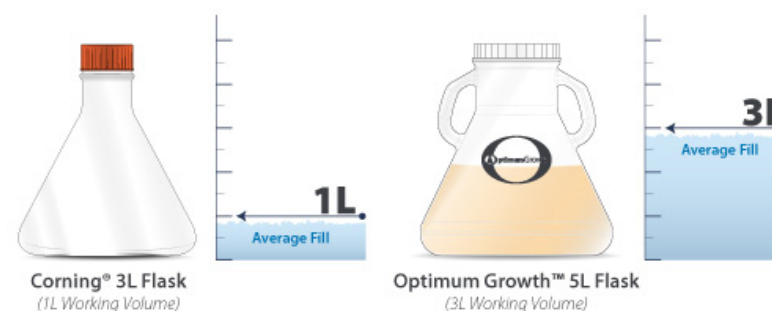


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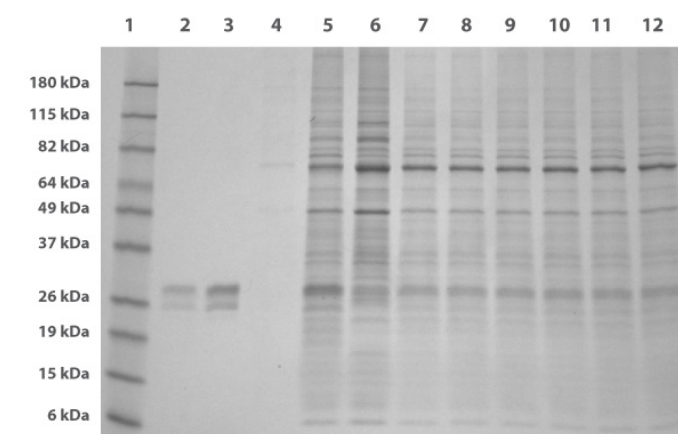
High & Low Expressing Proteins in HEK293 Cells



Low Expressing Gel

This gel shows equal bands from 5 replicates of a low expressing protein, producing roughly 10 to 20 mg/L.

1. Benchmark Pre-Stained Protein Ladder
2. Purified protein, 100 ng control
3. Purified protein, 200ng control
4. Un-transfected cells, -ve control
5. +ve control
6. +ve control
7. Protein of interest, 5L Combined Flasks #1-5
8. Protein of interest, 5L Flask #1
9. Protein of interest, 5L Flask #2
10. Protein of interest, 5L Flask #3
11. Protein of interest, 5L Flask #4
12. Protein of interest, 5L Flask #5

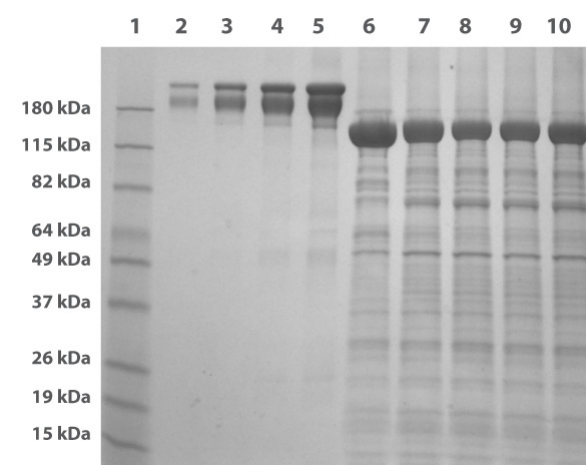


4-20% SDS-PAGE Quick Blue Stain Commassie Gel
Expected MW of dimer 24.5 kDa Estimated expression level

High Expressing Gel

Thomson 5L flasks are consistently able to maximize production of your best expressers. This gel shows equal bands from 3 replicates of a high expressing protein, producing approximately 300 mg/L.

1. Benchmark Pre-Stained Protein Ladder
2. Purified mAb 100 ng control
3. Purified mAb 250 ng control
4. Purified mAb 500 ng control
5. Purified mAb 1000 ng control
6. +ve control
7. Protein of interest, 5L Flask #1
8. Protein of interest, 5L Flask #2
9. Protein of interest, 5L Flask #3
10. Protein of interest, 5L Combined Flasks #1-3



4-20% SDS-PAGE Quick Blue Stain Commassie Gel
Expected MW of dimer 159.4 kDa Estimated expression level ~300 mg/L

Conclusion

Thomson Optimum Growth™ Flasks not only ensure consistent expression from HEK293 strains, they can also increase shaker capacity. With the same footprint as a typical Corning® 3L flask and a culture volume of up to 3L, the Optimum Growth™ 5L Flask may increase production 200%, if not more, in the same space (this is construct dependent).

Most constructs express at higher levels in the Optimum Growth™ 5L flasks. This makes one Optimum Growth™ 5L equivalent to, if not greater than, two 3L flasks.

