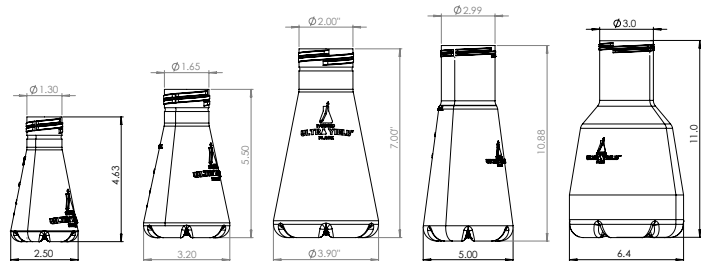


## Ultra Yield® Flask Technical Data Sheet

Product Description	Part #	Sterility
Ultra Yield® Flask 125mL	931147	10 <sup>-6</sup>
Ultra Yield® Flask 250mL	931144	10 <sup>-6</sup>
Ultra Yield® Flask 500mL	931141	10 <sup>-6</sup>
Ultra Yield® Flask 1.5L	931138	10 <sup>-6</sup>
Ultra Yield® Flask 2.5L	931136-B	10 <sup>-6</sup>

# ULTRA YIELD®



## Introduction

Thomson's Ultra Yield® system has proven over the last decade to enhance the aeration of *E. coli* and other microbial cells.

## Specifications

Top Style	threaded
Top	sold separately
Seal Compatibility	AirOtop® Enhanced Seal (899421)
Flask Material	PP (polypropylene)
Baffles	Yes
Sterility (SAL)	10 <sup>-6</sup>
Packaging	single-bagged

## FAQ's

**Why do Ultra Yield® Flasks perform better than glass flasks, and other disposable baffled flasks for *E. coli*, *Pichia* and *Schizosaccharomyces pombe*?**

Ultra Yield® Flasks are shake flasks that achieve high aeration with a 6

baffle design that has been optimized for fermentation of *E. coli*, *Pichia*, *Schizosaccharomyces pombe*, and other microbes. When combined with enriched media and proper pH balance, the Ultra Yield® Flasks can increase yield significantly. The flasks provide better aeration with high-speed shaking to give an oxygenation increase of 10-fold. Ultra Yield® Flasks allow for scalable results from the 125mL, 250mL and 500mL up to the 1.5L and 2.5L flask volumes.

### How does protein or DNA yield increase with Ultra Yield® flasks?

The Ultra Yield® Flasks is designed to grow more biomass or cells per unit volume compared with traditional shaker flasks. With an increase in density there comes an increase in protein or DNA yield. Because they are not oxygen limited microbial cells in Ultra Yield® Flasks can be grown for over 24 hours when paired with the Plasmid+® enriched media. With regard to cell growth microbial cells in Ultra Yield® Flasks do not go from log phase to stationary phase rather, as shown by data from GSK, go to a transition phase. This transition phase allows for continued growth without the anaerobic conditions encountered in traditional flasks that use up the cells' own nutrients. The Ultra Yield® Flasks require pH maintenance, so utilizing a buffer with non-temperature dependence like MOPS can make a great difference in cell growth.

### What ratio of liquid media can we have in Ultra Yield® Flasks for *E. coli* and microbes? What are the recommended shake speeds for *E. coli* and microbes?

Media ratio depends on the cell type being grown. A general rule for *E. coli* is to use a 40% fill volume. For example, in the 2.5L Ultra Yield® Flask for maximum OD, we recommend using between 500mL and 1L of media. Three to four 2.5L Ultra Yield® Flasks will replace a small-scale fermenter.

## Recommended Shake Speeds:

Recommended culture volumes & orbital shaker speeds (a throw of 1" is generally used for orbital shaking)

Flask Size	Use AirOtop® Seal / Vented Screw Cap	Media (mL)/Flask	Shaker Speed (RPM)
125mL	899421 / 899109	35-50	300-350
250mL	899423 / 899110	75-100	300-350
500mL	899424 / 899111	150-200	300-350
1.5L	899425/899566	300	300-350
2.5L	899425 / 899566	500	300-400

### Has anyone tested Ultra Yield® Flasks for acetate concentration?

GSK has kindly provided data on pH, OD, and acetate parameters during *E. coli* growth in both traditional shake flasks and Ultra Yield® Flasks. These studies show that while OD rapidly increases pH remains stable and acetate levels actually decrease over time with Ultra Yield® Flasks. However, in traditional flasks OD increases more slowly while pH drops and acetate levels increase over the same time period.

### What clamps and shakers work best for the Ultra Yield® Flasks?

Ultra Yield® Flasks are designed to shake in 1 inch orbit shakers at high speeds. Higher speeds allow for better aeration, however at higher speeds it is necessary to use flask clamps rather than sticky mats. Our 125mL, 250mL and 500mL flasks will work with standard shake flask clamps. The 2.5L Ultra Yield® flask can fit into a standard 2L shake flask clamp. New

Brunswick and Kuhner shakers have also made a special flask clamp. See our clamp cart below for specific clamp recommendations.

## Flask Clamp Compatibility

Refer to the chart below to find the appropriate flask clamp compatible with your shaker.

Flask Size	Eppendorf®	INFORS HT®	Kuhner®	Fisher Scientific®	VWR®
125mL	M1190-9001	12202	SM310100	11-676-013	57019-676
250mL	M1190-9002	12203	SM310250	11-676-014	57019-678
500mL	M1190-9003	12204	SM310500	11-676-015	57019-682
1.5L	ACE1000S	12205	SM311000	11-676-016	57019-684
2.5L	M1190-9005	12206	SM312500U	11-676-017	57019-686

### What media do we put in the Ultra Yield® Flasks?

Recommended media is an enriched media with pH balance around 7.4. TB, EnBase, Magic Media & Plasmid+® are all good examples of highly enriched medias. The pH balance is most useful with buffers that contain phosphate since these are not temperature dependent.

### Are the Ultra Yield® Flasks disposable or re-usable?

This depends on your individual laboratory policies. Ultra Yield® Flasks are priced to be a disposable shake flask even when also adding in the cost of autoclaving. Keep in mind that when reusing **standard glass flasks**, a little residual detergent in the flasks and subsequent ruining of an experiment is more expensive than just using a new flask. However, Ultra Yield® Flasks are autoclavable and reusable. If you were to reuse the flasks we suggest not more than three rounds of autoclaving before disposal as polypropylene becomes brittle over time.

## Myths & Legends of Growing Cultures?

**LB is a good media to use for my microbial cultures:** Ultra Yield® Flasks perform optimally when using an enriched media like Plasmid+®.

**Growing cultures for more than 18 hours will damage my culture:** What slows down microbial growth and causes anaerobic growth to occur is an insufficient amount of oxygen and subsequent drop in pH when using traditional shake flasks. Ultra Yield® Flasks give sufficient aeration for up to 7 days of culture at 20°C, and up to 50 hours culture at 37°C.

### What is missing with LB and minimal media?

LB or minimal media is like feeding a person bread and water. People need nutrients and vitamins. This is true with other living organisms such as microbes as well. We all need a balanced diet to grow strong.

### What systems are people using with Ultra Yield® Flasks?

Scientists use Ultra Yield® Flasks on New Brunswick, INFORS HT, Kuhner, and every other shaking platform available.

## End User Questions

**We intend to autoclave Ultra Yield® Flasks and media between uses. Can Ultra Yield® Flasks and AirOtop® Seals or Vented Screw Caps withstand autoclaving? Are flasks, seals and caps sterile and ready to use?**

Ultra Yield® Flasks and AirOtop® Enhanced Seals and Vented Screw Caps come ready to use sterile. It is acceptable to add media and sterilize the flask with the media in it, but **DO NOT** autoclave the AirOtop® Enhanced Seals or Vented Screw Caps during this process as they cannot withstand the autoclave environment. Sterilization is best done with a piece of Aluminum foil to seal the top of the flask. After autoclaving allow the Ultra Yield® Flasks to cool down before using as they do retain heat. Microbes can be destroyed by adding them to flasks taken straight from the autoclave without letting them first cool to the proper temperature.

**Reminder:** The Ultra Yield® Flasks are only recommended to be autoclaved up to three times.

### When should I use a Vented Screw Cap vs an AirOtop® Enhanced Seal?

Both Vented Screw Caps and AirOtop® Enhanced Seals offer consistent sterile gas exchange for microbial cultures. AirOtop® Enhanced Seals are resealable for up to 24 hours. Some customers prefer using the Vented Screw Caps for the larger sized flasks, 1.5L and 2.5L.

Thomson Instrument Company is not affiliated with TB, Magic Media, Enbase, New Brunswick, INFORS HT, Kuhner, GSK or their products