

TUNAIR SHAKE FLASKS

TUNAIR SHAKE
FLASK SYSTEMS

The TUNAIR™ Shake Flask Systems are a unique and patented flask and closure system, designed for microbiology and biotechnology applications. This system provides optimum growth conditions for aerobic microorganisms, mammalian cells, and plant cells. They also provide better culture growth and productivity than standard Erlenmeyer flasks. The TUNAIR™'s high oxygen absorption rate is due to the unique baffling and turbo-vane closure design. The TUNAIR™ systems are designed to increase the availability of dissolved oxygen as well as improve cell yields. There are three (3) flask designs available depending on your application; the No-Baffle (normal throw), the Half-Baffle (vortex motion), and Full-Baffle (propeller motion). The slip on cap and filter linings protect the flask neck from airborne particles and eliminates the need for flaming. All TUNAIR™ flasks, caps, and linings can be sterilized by autoclaving.

ORDERING INFORMATION

CATALOG# DESCRIPTION

SS-7001 TUNAIR™ SAMPLE KIT-1 KIT

SS-7001 sample kit comes complete with one (1) polypropylene 300ml no-baffle flask, one (1) polypropylene 300ml Half-Baffle flask, one (1) polypropylene 300ml full-baffle flask, three (3) 300ml two piece caps, one (1) 300ml silicone cap lining, two (2) 300ml Dri-Gauze cap lining, one (1) polypropylene 2.5L full-baffle flask, one (1) 2.5L two piece cap, one (1) 2.5L silicone cap lining.

ORDERING INFORMATION

CATALOG# DESCRIPTION

SS-3014 CAP, TWO PIECE (300ML FLASK)-1EA.

SS-3015 CAP, TWO PIECE (2.5L FLASK)-1EA.

TUNAIR™ caps are available in four convenient colors; red, blue, green, and yellow!



The two piece cap assemblies are constructed of polypropylene, and are resistant to most solvents. All caps and flasks are fully autoclavable prior to reuse, and filter linings can also be autoclaved or simply replaced. To replace the filter lining in the cap assembly simply pinch the flanges of the inner-closure shell until they snap loose, then pull apart and remove used lining. Replace the lining by sandwiching it between the two parts of the cap and snap the cap back together. When reassembling the cap, ensure the flanges from the inner piece snap into the mated grooves in the outer piece. This will ensure the cap assembly stays together during use.

ORDERING INFORMATION

CATALOG# DESCRIPTION

SS-3016 SILICONE MEMBRANE CAP LININGS (300ML FLASK)-5 PACK

SS-3017 SILICONE MEMBRANE CAP LININGS (2.5L FLASK)-5 PACK

SS-3018 DRI-GAUZE CAP LININGS (300ML FLASK)-5 PACK

SS-3019 DRI-GAUZE CAP LININGS (2.5L FLASK)-5 PACK

All IBI TUNAIR™ filter linings are 0.22 micron, and are available in silicone or nitrocellulose membranes.

TUNAIR™ flasks were compared to conventional flasks using four different types of microorganisms; *Escherichia coli*, *Saccharomyces cerevisiae*, *Penicillium avellaneum*, and *Streptomyces chartreusis*. The aeration capacities of the shake flasks were determined by the sulfate oxidation method, and the values shown below are presented as oxygen absorption rate (OAR) in mM oxygen/L/Min. The growth rates of *E.coli* and *S.cerevisiae* were expressed as optical densities (OD) at 555mM. For *S.chartreusis* and *P.avellaneum* growth rates were evaluated by percent sedimentation. For *E.coli* and *S.cerevisiae*, the growth rates were determined after an 18 hour incubation period; for *S.chartreusis*, a 24 hour incubation period; and for *P.avellaneum*, a 72 hour incubation period. Growth and OAR evaluations were carried out with 3-9 replicates and statistically analyzed using Turkey's w-procedure. See results below. . .

GROWTH EVALUATION OF FOUR (4) MICROBIAL TYPES IN TUNAIR™ FLASKS VS. OTHER CURRENTLY USED SHAKE FLASKS

| | OAR Value mM O ₂ /L/Min | OD @ 555mM | | % Sedimentation | |
|------------------------|---------------------------------------|------------|--------------|-----------------|--------------|
| | | E.coli | S.cerevisiae | S.chartreusis | P.aveilaneum |
| TUNAIR™ Full-Baffle | 4.25 | 7.09 | 5.63 | 19.70 | 3.3M |
| TUNAIR™ Half-Baffle | 1.22 | 5.36 | 5.57 | 27.73 | 30.50P |
| Triple Indented Flasks | 2.47 | 5.97 | 5.31 | 19.20 | 9.50MP |
| Unbaffled Erlenmeyer | 0.52 | 5.97 | 5.19 | 17.37 | 25.10P |

*Growth morphology: M, mycelial; P, pellet; MP, mixed mycelial. The mycelial growths mostly adhered to the walls of flask, which accounted for the low overall sedimentation value.

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ORDERING INFORMATION

| CATALOG# | DESCRIPTION |
|-----------------|-----------------------------------------------------|
| SS-2011 | 300ML NO-BAFFLE SHAKE FLASK-1EA. |
| SS-4001 | 300ML NO-BAFFLE SHAKE FLASK-4 PACK |
| SS-2001C | 300ML NO-BAFFLE FLASK KIT (DRI-GAUZE LININGS)-1 KIT |
| SS-2001S | 300ML NO-BAFFLE FLASK KIT (SILICONE LININGS)-1 KIT |

SS-2001C & SS-2001S flask kits come complete with twelve (12) polypropylene 300ml No-Baffle flasks, twelve (12) two piece caps, and five (5) filter linings.

WORKING VOLUMES

300ml Flasks 100ml
2.5L Flasks. 1L



ORDERING INFORMATION

| CATALOG# | DESCRIPTION |
|-----------------|-------------------------------------------------------|
| SS-2012 | 300ML HALF-BAFFLE SHAKE FLASK-1EA. |
| SS-4002 | 300ML HALF-BAFFLE SHAKE FLASK-4 PACK |
| SS-2002C | 300ML HALF-BAFFLE FLASK KIT (DRI-GAUZE LININGS)-1 KIT |
| SS-2002S | 300ML HALF-BAFFLE FLASK KIT (SILICONE LININGS)-1 KIT |

SS-2002C & SS-2002S flask kits come complete with twelve (12) polypropylene 300ml Half-Baffle flasks, twelve (12) two piece caps, and five (5) filter linings.

DIMENSIONS

| Flask Size | Base Dia. | Neck Dia. | Height | Weight |
|------------|--------------------|-------------------|---------------------|--------------------|
| 300ml | 3.25" [8.25cm] | 1.75" [4.45cm] | 6.00" [15.24cm] | .011bs [.004Kg] |
| 2.5L | 6.50" [16.51cm] | 3.00" [7.62cm] | 10.75" [27.31cm] | .021bs [.008Kg] |

ORDERING INFORMATION

| CATALOG# | DESCRIPTION |
|-----------------|-------------------------------------------------------|
| SS-2013 | 300ML FULL-BAFFLE SHAKE FLASK-1EA. |
| SS-4003 | 300ML FULL-BAFFLE SHAKE FLASK-4 PACK |
| SS-2003C | 300ML FULL-BAFFLE FLASK KIT (DRI-GAUZE LININGS)-1 KIT |
| SS-2003S | 300ML FULL-BAFFLE FLASK KIT (SILICONE LININGS)-1 KIT |

SS-2003C & SS-2003S flask kits come complete with twelve (12) polypropylene 300ml Full-Baffle flasks, twelve (12) two piece caps, and five (5) filter linings.

CLEANING

All TUNAIR™ flasks and caps can be cleaned by soaking in water with a light detergent (e.g. Joy) solution to loosen dirt and contaminants, air dry. All TUNAIR™ flasks and caps can be autoclaved, if required.

MIXING

No-Baffle (0 Baffles) Normal Throws
Half-Baffle (2 Baffles) Vortex Motion
Full-Baffle (6 Baffles) Propeller Motion

ORDERING INFORMATION

| CATALOG# | DESCRIPTION |
|-----------------|----------------------------------------------------|
| SS-5011 | 2.5L NO-BAFFLE SHAKE FLASK-1EA. |
| SS-8001 | 2.5L NO-BAFFLE SHAKE FLASK-4 PACK |
| SS-6001C | 2.5L NO-BAFFLE FLASK KIT (DRI-GAUZE LININGS)-1 KIT |
| SS-6001S | 2.5L NO-BAFFLE FLASK KIT (SILICONE LININGS)-1 KIT |

SS-6001C & SS-6001S flask kits come complete with four (4) polypropylene 2.5L No-Baffle flasks, four (4) two piece caps, and five (5) filter linings.

MATERIAL

All TUNAIR™ flasks and caps are constructed of chemical resistant polypropylene. All flasks and caps are fully autoclavable.



ORDERING INFORMATION

| CATALOG# | DESCRIPTION |
|-----------------|------------------------------------------------------|
| SS-5012 | 2.5L HALF-BAFFLE SHAKE FLASK-1EA. |
| SS-8002 | 2.5L HALF-BAFFLE SHAKE FLASK-4 PACK |
| SS-6002C | 2.5L HALF-BAFFLE FLASK KIT (DRI-GAUZE LININGS)-1 KIT |
| SS-6002S | 2.5L HALF-BAFFLE FLASK KIT (SILICONE LININGS)-1 KIT |

SS-6002C & SS-6002S flask kits come complete with four (4) polypropylene 2.5L Half-Baffle flasks, four (4) two piece caps, and five (5) filter linings.

SHAKER SPEED

1" Throws 150-200rpm
2" Throws 300-400rpm or possibly higher

ORDERING INFORMATION

| CATALOG# | DESCRIPTION |
|-----------------|------------------------------------------------------|
| SS-5013 | 2.5L FULL-BAFFLE SHAKE FLASK-1EA. |
| SS-8003 | 2.5L FULL-BAFFLE SHAKE FLASK-4 PACK |
| SS-6003C | 2.5L FULL-BAFFLE FLASK KIT (DRI-GAUZE LININGS)-1 KIT |
| SS-6003S | 2.5L FULL-BAFFLE FLASK KIT (SILICONE LININGS)-1 KIT |

SS-6003C & SS-6003S flask kits come complete with four (4) 2.5L polypropylene Full-Baffle flasks, four (4) two piece caps, and five (5) filter linings.