

home of tissue culture

# TubeSpin® Bioreactor

## Suspension Cell System

SWISS QUALITY

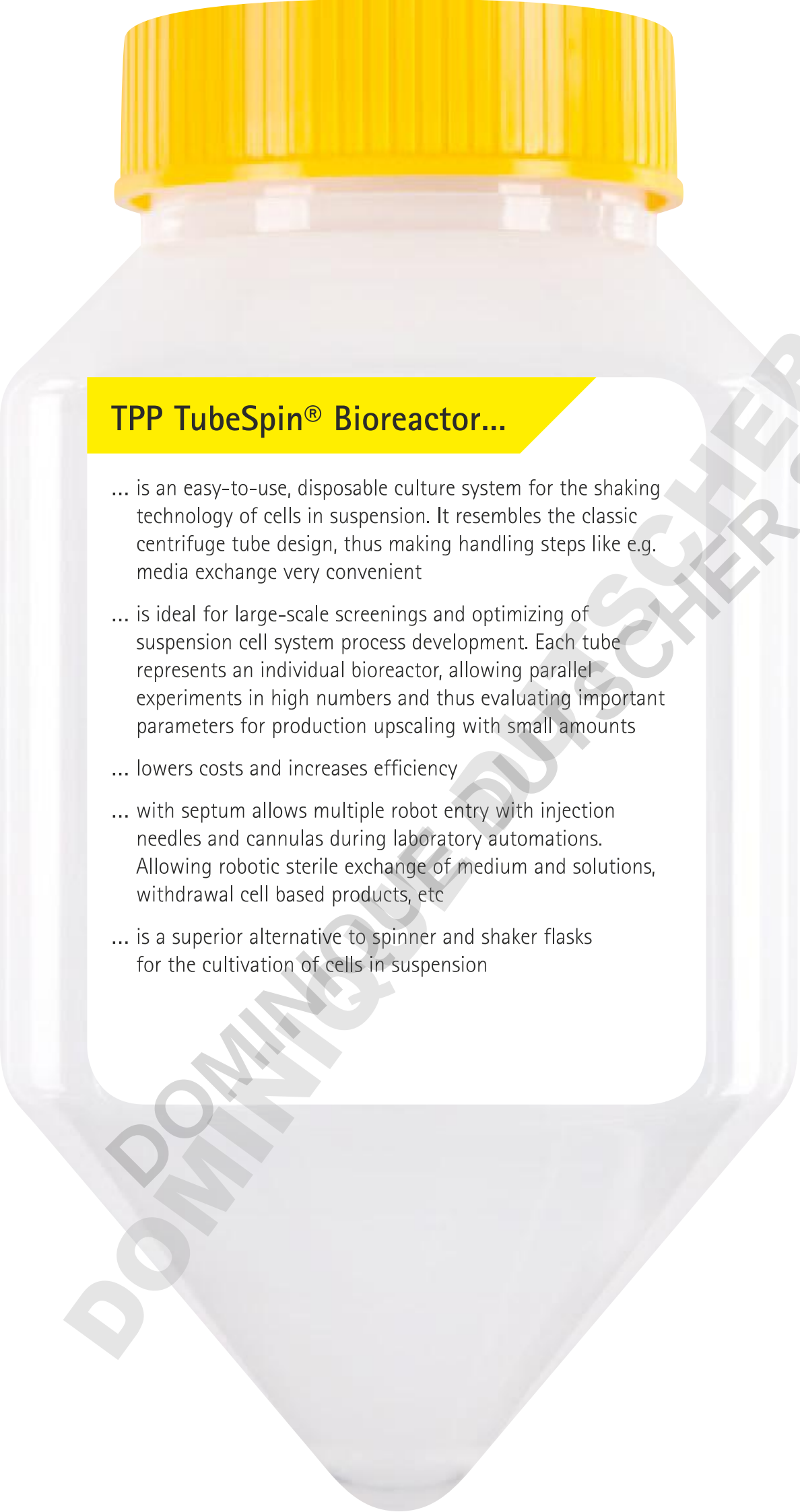
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## TubeSpin® Bioreactor

In 2004, a novel container for suspension cultures called TubeSpin® Bioreactor was established. This first disposable bioreactor was made of polypropylene, featured a ventilated screw cap and a volume of 50 ml. It was intended for medium to high-throughput of mammalian cell cultivation. It was developed in collaboration with the Swiss Federal Institute of Technology in Lausanne (EPFL), the company ExcellGene SA in Monthey and TPP Techno Plastic Products AG in Trasadingen (all in Switzerland).

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## TPP TubeSpin® Bioreactor...

... is an easy-to-use, disposable culture system for the shaking technology of cells in suspension. It resembles the classic centrifuge tube design, thus making handling steps like e.g. media exchange very convenient

... is ideal for large-scale screenings and optimizing of suspension cell system process development. Each tube represents an individual bioreactor, allowing parallel experiments in high numbers and thus evaluating important parameters for production upscaling with small amounts

... lowers costs and increases efficiency

... with septum allows multiple robot entry with injection needles and cannulas during laboratory automations. Allowing robotic sterile exchange of medium and solutions, withdrawal cell based products, etc

... is a superior alternative to spinner and shaker flasks for the cultivation of cells in suspension

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# Technical specifications

## Materials



Tube made of PP



Screw Cap made of PE



Septum made of Silicone



Membrane made of PTFE

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# Technical specifications

## Measurements



| | 86050 | 87015 | 87017 | 87050 | 87450 | 87600 |
|---|---|---|---|---|---|---|
| Volume grad. | 50 | 15 | 15 | 50 | 450 | 600 |
| Length mm | 120 | 120 | 120 | 115 | 145 | 183 |
| Diameter mm | 30 | 17.1 | 17.1 | 30 | 96 | 100 |
| (gx) max | 15'500 | 15'500 | 15'500 | 15'500 | 3'500 | 3'500 |
| Form | conical | conical | round | conical | conical | conical |
| Optimal filling volume ml | 1 - 35 | 1 - 10 | 1 - 10 | 1 - 35 | > 300 | > 400 |
| Shaker: Recom. amplitude mm | 50 | 50 | 50 | 50 | 50 | 50 |
| Shaker: Recom. speed rpm | 180 | 250 | 250 | 180 | 150 | 150 |
| Barcode / Septum | yes / yes | - / - | - / - | - / - | - / - | - / - |
| Openings in screw cap | Yes, 5 x | Yes, 5 x | Yes, 5 x | Yes, 5 x | Yes, 10 x | Yes, 10 x |
| Screw cap „solid" | - | - | - | - | 87355 | 87355 |
| Screw cap „filter" | - | - | - | - | 87356 | 87356 |

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## Key Features and Benefits

- **Passive mixing with no stirring mechanism inside**
  There is a low risk of contamination, less shear stress to cells and negligible foaming when shaken appropriately. The technique provides highest oxygen supply to cells observed in a non-instrumented container as well as conditions of extremely low shear stress
- **Fits standard centrifuge apparatus**
  The standard centrifuge design allows scientists to use standard available apparatus to grow and spin cell suspension in the same vessel, thus reducing the chances of contamination

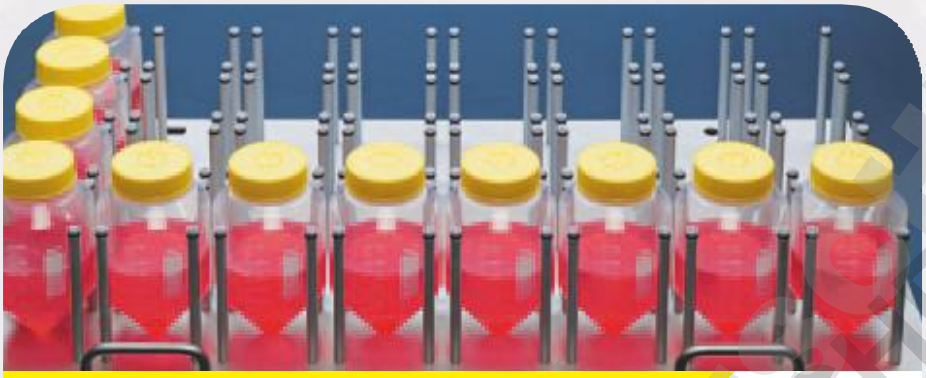
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## Key Features and Benefits

- **Saves time/completely disposable**
  Compared to stainless steel equipment, the time required for changeovers between cell lines and batches is reduced. No need for elaborate cleaning or validation procedures. Tubes are sacrificed after the run
- **Low cost**
  The initial investment necessary for equipping a lab or pilot plant is low, as capital costs are exchanged by consumable costs, resulting in a more balanced cost distribution over time. Improved cost effectiveness is particularly important in the context of competition and growing governmental and market price controls

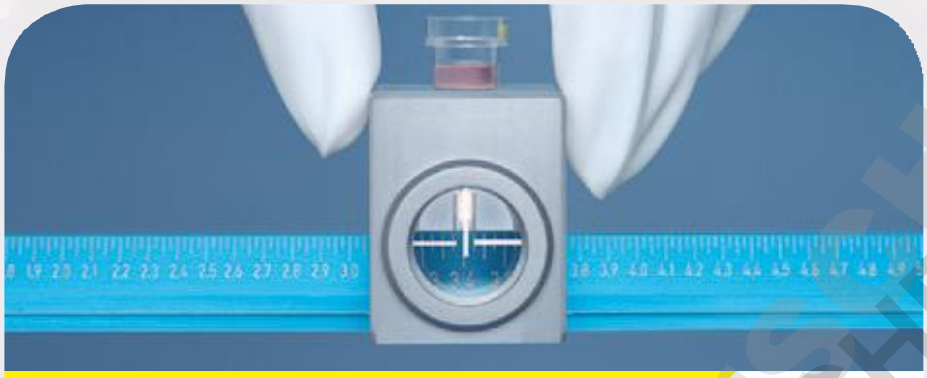
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## Key Features and Benefits

- **Smaller footprint**
  The smaller footprint print than a shaker flask allows more vessels to be placed on a shaker platform. This in turn allows a high number of experiments to be performed parallel
- **Shake it on shaker plates**
  The shaker plate from TPP guarantees largest possible volume per shaker plate

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## Key Features and Benefits

- **Easy read with easy-read**
  The measuring device with the PCV tube provides a fast, easy to use, reproducible and accurate method for determination of cell number density. This system is particularly convenient as it requires neither special training nor sophisticated expensive machines

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## Applications

- Initial cell line screening and development
- Clone selection
- Bioprocess media optimization

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## Applications

- Therapeutic protein development for biochemical and pre-clinical studies
- TubeSpin® Bioreactor can also be used for the cultivation of insect cels, yeast and microbial cells
- Various other applications

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# Dr. Shaker's Recommendations

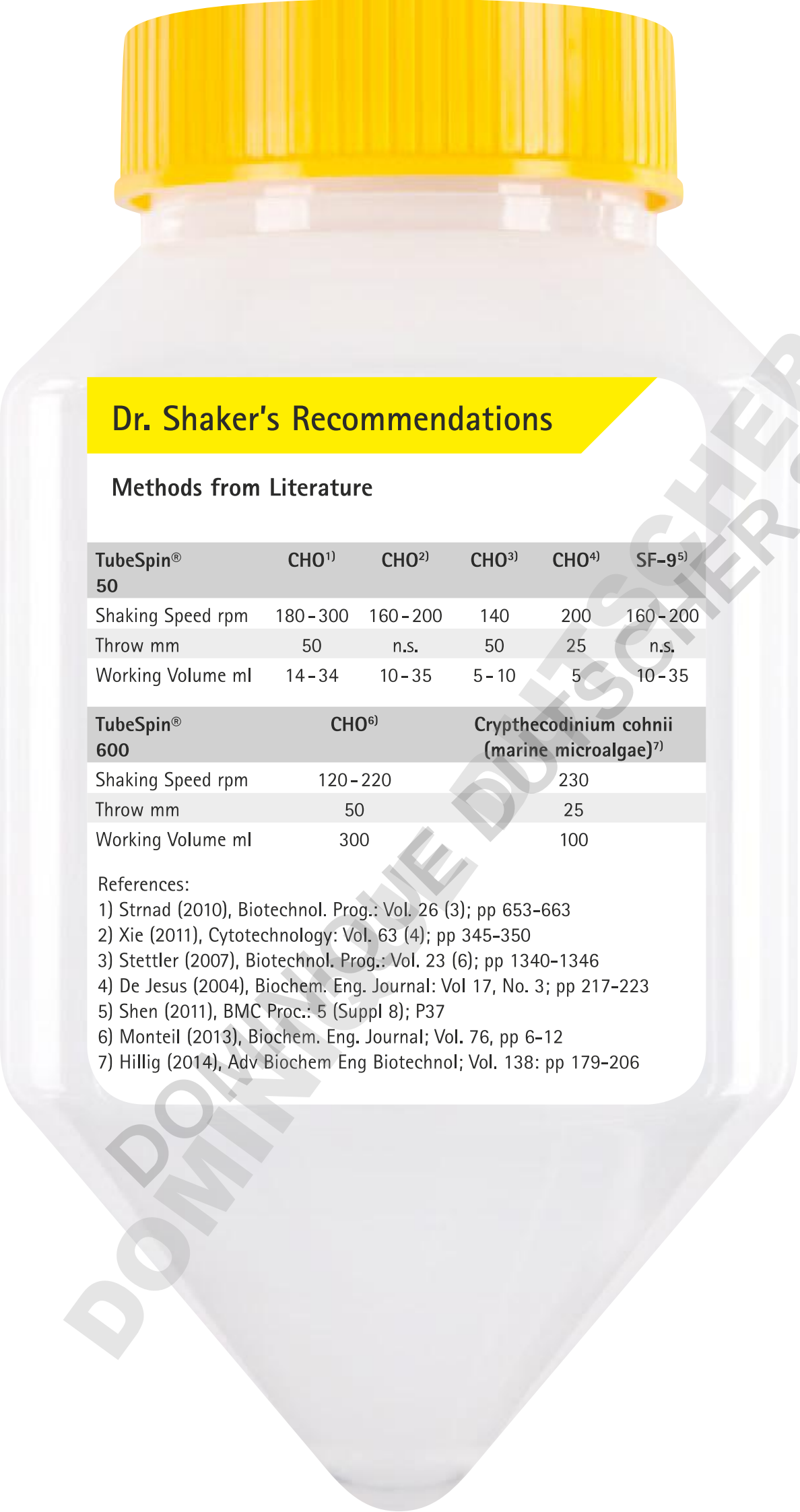


## TubeSpin® Bioreactors

| TubeSpin® 50 | Mammalian Cell culture CHO | HEK-293 | Insect Cells SF-9 | Plant Cell culture N. tabacum BY-2 |
|---|---|---|---|---|
| Shaking Speed rpm | 180 - 250 | 180 - 250 | 180 - 250 | 180 - 250 |
| Throw mm | 50 | 50 | 50 | 50 |
| Working Volume ml | 15 - 30 | 15 - 30 | 5 - 10 | 5 - 10 |

| TubeSpin® 450/600 | Mammalian Cell culture CHO | HEK-293 | Insect Cells SF-9 | Plant Cell culture N. tabacum BY-2 |
|---|---|---|---|---|
| Shaking Speed rpm | 180 - 250 | 180 - 250 | 180 - 250 | 180 - 250 |
| Throw mm | 50 | 50 | 50 | 50 |
| Working Volume ml | 300 | 300 | 200 | 150 |

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# Dr. Shaker's Recommendations

## Methods from Literature

| TubeSpin® 50 | CHO[1)] | CHO[2)] | CHO[3)] | CHO[4)] | SF-9[5)] |
|---|---|---|---|---|---|
| Shaking Speed rpm | 180 - 300 | 160 - 200 | 140 | 200 | 160 - 200 |
| Throw mm | 50 | n.s. | 50 | 25 | n.s. |
| Working Volume ml | 14 - 34 | 10 - 35 | 5 - 10 | 5 | 10 - 35 |

| TubeSpin® 600 | CHO[6)] | Crypthecodinium cohnii (marine microalgae)[7)] |
|---|---|---|
| Shaking Speed rpm | 120 - 220 | 230 |
| Throw mm | 50 | 25 |
| Working Volume ml | 300 | 100 |


References:
1) Strnad (2010), Biotechnol. Prog.: Vol. 26 (3); pp 653-663
2) Xie (2011), Cytotechnology: Vol. 63 (4); pp 345-350
3) Stettler (2007), Biotechnol. Prog.: Vol. 23 (6); pp 1340-1346
4) De Jesus (2004), Biochem. Eng. Journal: Vol 17, No. 3; pp 217-223
5) Shen (2011), BMC Proc.: 5 (Suppl 8); P37
6) Monteil (2013), Biochem. Eng. Journal; Vol. 76, pp 6-12
7) Hillig (2014), Adv Biochem Eng Biotechnol; Vol. 138: pp 179-206


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## Ordering Information

| Type | Product-No. | Version |
|---|---|---|
| | 87015 | 15 ml, conical |
| | 87017 | 15 ml, round |
| | 86050 | 50 ml, conical, with septum, with barcode |
| | 87050 | 50 ml, conical |
| | 87450 | 450 ml, conical |
| | 87600 | 600 ml, conical |
| | 87355 | Screw cap "solid" |
| | 87356 | Screw cap "filter" |
| | 99013 | Rack for 87450/87600 |
| | 99017 | Rack for 87015/87017/87050 |
| | 87611 | Kühner plate 32 for TubeSpin® Bioreactor 600 |
| | 87612 | Kühner plate 20 for TubeSpin® Bioreactor 600 |
| | 87613 | Kühner plate 16 for TubeSpin® Bioreactor 600 |
| | 87631 | Infors Multitron plate 32 for TubeSpin® Bioreactor 600 |
| | 87633 | Infors Minitron plate 16 for TubeSpin® Bioreactor 600 |

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| Volume ml | Dimensions Ø x l mm | Material | Centrifugal Acceleration max gx |
|---|---|---|---|
| 15 | 17.1 x 120 | PP | 15'500 |
| 15 | 17.1 x 120 | PP | 15'500 |
| 50 | 30.0 x 115 | PP | 15'500 |
| 50 | 30.0 x 115 | PP | 15'500 |
| 450 | 96 x 145 | PP | 3'500 |
| 600 | 100 x 183 | PP | 3'500 |
| 450 / 600 | 70 x 21 | PE | - |
| 450 / 600 | 70 x 21 | PE | - |
| 3 x 450 / 600 | 366 x 146 x 70 | PP | - |
| 18 x 15 / 10 x 50 | 209 x 98 x 62 | PP | - |
| 8 x 4 | 800 x 420 x 139 | Alu | - |
| 5 x 4 | 500 x 420 x 139 | Alu | - |
| 4 x 4 | 420 x 420 x 139 | Alu | - |
| 8 x 4 | 850 x 470 x 139 | Alu | - |
| 4 x 4 | 480 x 420 x 139 | Alu | - |

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