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# Instruction for Use
# TPP Tissue Culture Flasks with Peel-off Foil

The tissue culture flasks with peel-off foil are specifically engineered for manual cell culture applications that require large-scale, top-down access to the growth area. These flasks facilitate seamless sterile handling and storage while providing an expansive opening for easy cell harvesting or manipulation.

Only the growth surface has been opto-mechanically activated to ensure optimal cell adhesion and improved cell growth. This activation promotes the efficient cultivation of adherent cells and thereby supports the performance of accurate and reproducible experiments. The design features an angled neck that serves a dual purpose: it minimizes the risk of media contamination by preventing contact with the inside of the screw cap and offers excellent maneuverability for serological pipettes and cell scrapers.

To ensure the integrity of the seal, these flasks are available exclusively with filter screw caps. Caution: Do not use VENT screw caps. Even a slight pressure build-up of 0.03 bar or higher may cause the peel-off foil to loosen or be forced open.

The tissue culture flask with peel-off foil is for single use only. Re-use disclaims all warranties.

**Safety instructions**

- Handling and Safety
  Handling of biological materials shall be performed in full compliance with all applicable national and international regulations. Activities must conform to the laboratory's assigned biological safety level, the relevant Safety Data Sheets (SDS), and the manufacturer's Instructions for Use (IFU).
  Appropriate personal protective equipment (PPE) should be always worn during handling.
- Risk of Contamination
  All operations shall be conducted in accordance with aseptic techniques and established Good Laboratory Practices (GLP). Packaging shall be opened immediately prior to use. Only products that are visually intact and free from defects shall be utilized. Products exhibiting visible damage, contamination, or any other irregularities shall be disposed of in accordance with applicable regulations.
- Storage
  TPP products shall be stored under the following conditions:
  - Temperature: 10 °C to 30 °C (50 °F to 86 °F).
  - Light exposure: Products shall be protected from direct ultraviolet (UV) radiation.
  - Relative humidity: ≤ 60 %, with a recommended control range of 50 – 60 %.

  Storage conditions shall be monitored and recorded to ensure compliance with these requirements. Any deviations shall be documented, evaluated, and managed in accordance with the applicable quality.

**Instruction**

- Check the expiration date (EXP) on the label and packaging. Only use products with a valid EXP date.
- Before use, verify that the packaging is intact, as the consumable is only considered sterile if the packaging is undamaged.

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- Open the Tissue culture flask with peel-off foil and fill it with the medium and inoculum according to your laboratory routine. Please refer to the optimal fill volume, see: Technical Data, Recommended volume mL.
- Avoid touching the treated bottom with sharp objects.
- Close the filter screw cap with ventilation holes.

*Remove the peel-off foil:*

- With the peel-off foil removed, cells can be harvested from the top via the large opening.
- Place your thumb and middle finger on the inscription fields on either side of the T-flask neck. Use your index finger to press the flask onto the surface by placing the fingertip underneath the foil flap, thereby stabilizing the flask.
- Grab the foil flap with the other hand and gently pull the foil back (Fig. 1).
- **Important:** It is not possible to reclose the foil.



**Figure 1.** Opening the peel-off foil

**Optimization of Adherent Cell Growth**

To achieve optimal proliferation of adherent cells on the surface, observe the following guidelines:

- Cells must be fully and gently resuspended to obtain a true single-cell suspension. Residual aggregates lead to heterogeneous settling and nonuniform attachment.
- Prevention of foam formation: Foam should be minimized during resuspension and seeding, as protein denaturation and trapped air bubbles can impair cell viability and gas exchange.
- Immediately after seeding, the culture vessel should be gently rocked in an orthogonal (cross-shaped) pattern to ensure homogeneous distribution of cells across the growth surface and to prevent central or peripheral accumulation (“bullseye effect”).
- The seeding density must be selected according to cell line specific recommendations. Excessively high densities accelerate contact inhibition, increase metabolic stress, and promote overcrowding artifacts.
- Incubator shelves must be precisely leveled to ensure uniform medium depth across the growth area. Tilted surfaces promote media pooling and cause heterogeneous attachment.

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- Follow the vessel's specified fill volume. Too little medium increases meniscus effects, leading to cell accumulation at the edges. Adjust medium volume and culture duration according to the specific requirements of the cell line.
  Use 0.2–0.5 mL of medium per cm² of growth surface, corresponding to a medium height of approximately 2–5 mm [1]. Medium height, and therefore total volume, is a key factor for oxygen supply and influences the Oxygen Transfer Rate (OTR) (Gstraunthaler et al., 1999).
- Vibrations in or around the incubator must be avoided, particularly during the initial attachment period, to maintain reproducible attachment patterns.
- Cultures shall be maintained under controlled environmental conditions (temperature, humidity, and $CO_2$ concentration). Maintenance of high relative humidity is critical to prevent evaporative loss, which induces a detrimental increase in medium osmolarity.

**Sub-Zero Storage**

- The TPP Tissue culture flask is not suitable for sub-zero storage. Polystyrene (PS) exhibits significantly increased brittleness at temperatures below 0 °C (32 °F). Storage of PS products below this temperature shall not be performed, as the material is prone to spontaneous cracking and shattering, which may result in product failure and potential safety hazards.

**General Handling and Limitations**

- Graduations are for reference only and serve as approximate guidelines for fill volume. For precise measurements, use calibrated pipettes or volumetric instruments.
- Avoid exposing the white labeling area to 90 % alcohol in combination with mechanical stress (e.g., rubbing or wiping), as this may cause the ink to dissolve or smear.
- These devices are stackable. Air vents on the top of the chambers ensure optimal heat distribution between stacked units.
- Continuous gas exchange occurs through the integrated 0.22 µm hydrophobic membrane. If the membrane becomes wet, gas exchange is temporarily reduced.
- Air vents in the bottom rim ensure optimum heat distribution in the incubator when several flasks are stacked on top of each other.

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**Technical Data**

| Component | Material |
|---|---|
| Cap | Polyethylene (PE) |
| Membrane | Polytetrafluoroethylene (PTFE), Pore size 0.22 µm |
| Flask | Polystyrene (PS) |

| Measurement | 90028 | 90078 | 90153 | 90303 | 90653 |
|---|---|---|---|---|---|
| Peel-off foil | ✓ | ✓ | ✓ | ✓ | ✓ |
| Barrier | --- | --- | --- | --- | ✓ |
| Length mm | 92 | 155 | 210 | 275 | 210 |
| Width mm | 51 | 87 | 122 | 170 | 122 |
| Heights mm | 31 | 45 | 50 | 55 | 50 |
| Growth area $cm^2$ | 25 | 75 | 150 | 300 | 115 |
| Recom. volume mL | 3 – 8 | 8 – 15 | 15 – 30 | 30 - 40 | 15 – 30 |
| Opening mm | 38 x 45 | 87 x 92 | 100 x 128 | 140 x 185 | 100 x 128 |
| Max volume mL | 20 | 75 | 100 | 280 | 100 |

**Additional Information**

Instructions for use, chemical resistance lists, and quality certificates for individual products can be downloaded from the TPP website at www.tpp.ch.

**Literature**

[1] Amanda Capes-Davis, R. Ian Freshney (2010) Freshney's Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications (8th Ed.) - Wiley (p.180).

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**Disclaimer**

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