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Instruction for Use
TPP Cryo Tube

TPP cryo tubes are manufactured from high-quality polypropylene (PP) and are designed for the storage of biological materials and samples at temperatures down to −196 °C. The tubes feature an external thread screw cap with an integrated sealing lip, which minimizes the risk of contamination and cross-contamination. A specially designed star-shaped base allows the tubes to be securely locked into the cryogenic rack # 99016, enabling safe single-handed handling

Color-coded inserts in a range of colors provide convenient marking and identification The cryo-tubes include graduation marks for volume measurement, as well as large labeling areas to clearly identify samples and experimental parameters. All tubes are free of detectable RNase and DNase and are sterilized by irradiation, ensuring suitability for sensitive biological applications.

The TPP cryo tube 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.

Notes on Storage in Nitrogen (LN_2)

- It is strongly recommended that the tubes be stored exclusively in the gas phase.
- Storage in the liquid phase should be avoided, as improperly sealed closures can allow LN_2 to penetrate the tubes.
- During the thawing process, rapid LN_2 evaporation can generate elevated internal pressure, which may cause the tubes to rupture, potentially releasing biologically hazardous materials.
- Follow institutional safety procedures when handling cryogenic materials.

Instruction

- Check the expiration date (EXP) on the label and packaging. Use only products that are within their valid shelf life.
- Before use, verify that the packaging is intact. The consumable is only guaranteed sterile if the packaging is undamaged.
- Open the packaging and remove the product within a sterile environment.
- For stable and secure one-handed operation, place the cryo tubes in the compatible TPP cryo tube rack #99016.
- Label the designated area and/or use the colored cap inserts to identify samples.
- Unscrewing the cap of the cryo tube and filling the tube according to established laboratory procedures.
- To accommodate volumetric expansion during freezing, a recommended fill volume of 80 % and a maximum fill volume of 90 % shall be observed. Aqueous samples expand upon freezing, generating internal pressure within the tube. The recommended fill volume provides an adequate safety margin. Exceeding the maximum fill volume may result in excessive internal pressure, potentially causing tube deformation, leakage, or rupture.
- Close the screw cap securely. Ensure the threads are dry, as moisture may impair the seal. Avoid over-tightening to prevent damage to the sealing lip.
- For controlled freezing of cells, use only validated freezing containers or automated freezing systems before transferring cryo tubes to the gas phase of a liquid nitrogen storage system. Use of unsuitable freezing containers may cause uneven freezing, potentially resulting in reduced cell viability and/or damage to the tubes.
- An example of a cell freezing protocol can be found at www.tpp.ch.

Centrifugation Safety and Performance

To ensure operational safety and optimal performance, strictly adhere to the centrifuge manufacturer's instructions and use appropriate rotors and adapters.

- Ensure the centrifuge load is correctly balanced. Tubes must be positioned symmetrically relative to the rotational center and axis to maintain a horizontal orientation. Improper loading may result in uneven separation, vibration, or tube damage.
- Several factors influence the structural integrity of the tubes during operation:
    - Tube shape and material composition.
    - Proper fit within the designated adapter.
    - Centrifugation parameters: Temperature, duration, and Relative Centrifugal Force (RCF).
    - Sample properties (density and viscosity).
    - Rotor type (fixed-angle vs. swing-out).
- RCF (g-force) ratings are determined at room temperature using water-filled tubes in a horizontal rotor for 5 minutes. Using fixed-angle rotors or with unsupported tubes may significantly reduce mechanical performance.
- Perform a test run with the specific sample and settings before routine use to verify suitability for the intended application.

Sub-Zero and Cryogenic Storage

- Store cryo tubes exclusively in the gas phase of liquid nitrogen (LN_2). Storage in the liquid phase is not recommended, as LN_2 may penetrate the tubes through small openings, for example due to improperly closed caps. During thawing, rapid evaporation of trapped LN_2 can generate excessive internal pressure, potentially causing the tubes to rupture or explode and release biologically hazardous substances.
- Polypropylene (PP) exhibits reduced mechanical strength at temperatures below 0 °C (32 °F). Frozen tubes shall not be subjected to mechanical stress, such as dropping, impact, or bending, as this may result in cracking or tube failure.

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.

Accessories

- Cryo Box L, # 99014 / Cryo Box S, # 99015
- Cryo Rack # 99016: The combination of the tube's star-shaped base and the rack allow safe one-handed operation.
- Colored cap inserts available in blue, yellow, green, pink, red, and white to facilitate sample identification.

Technical Data

Cryo Tubes

Component	Material
Screw cap	Polypropylene (PP)
Tube	Polypropylene (PP)

Measurements	89012	89020	89040	89050
Thread	External thread			
Volume graduation mL	0.9	1.5	3.5	4.0
Recommended fill volume mL	0.9	1.6	3.2	4.0
Max. fill volume mL	1.05	1.85	3.55	4.5
Outside tube Ø mm	12	12	12	12
Inside Tube Ø mm	10	10	10	10
Outside cap Ø mm	13.5	13.5	13.5	13.5
Length tube and cap mm	37	48	75	90
Working temperature °C	-196°C to +121°C			

Colored Inserts

Component	Material
Color insert	Polypropylene (PP)

Measurements	99020	89801	89802	89803	89804	89805	89806
Dimension Ø mm	11						
Color	each	white	blue	yellow	green	pink	red
Quantity per bag	600	600	600	600	600	600	600
Working temperature °C	-196°C to +121°C						

Cryo Boxes and Rack

Component	Material
Boxes and Rack	Polypropylene (PP)

Measurement	99014	99015	99016
Type	Box	Box	Rack
Array	9 x 9	9 x 9	4 x 10
Capacity pcs	81	81	40
Length mm	133	133	209
Width mm	133	133	109
Height incl. lid mm	95	45	24
Lid height mm	65	26	----
Fits tubes mL	>5	>2	All TPP
Working temperature °C	-196°C to +121°C		

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.

Disclaimer

TPP products are intended for Research Use Only (RUO) and are not approved for clinical, diagnostic, or in vitro fertilization (IVF) applications. The full Terms & Conditions, including limitations of warranty and liability, intended use, and reseller obligations, are available at: https://www.tpp.ch/page/qualitaets_sicherung/index.php

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