

# Sample storage work areas

- · Long-term storage of non-critical samples
- Intermediate storage of sensitive samples

- Sample databases
- · Storage of cells
- Long-term storage

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# Sample storage down to -80 °C

If the number of samples in use increases and processes are automated, laboratories need to store large quantities of samples for longer time periods. We recommend storage at -80 °C for long-term protection of samples.

Key characteristics of storage plates and tubes are compact formats for space saving storage, secure closure, easy handling and versatile materials for flexible applications. BRAND offers a large number of different storage options that reliably protect samples down to -80 °C and are easily integrated into different applications. Deep-well plates allow for space-saving storage of large numbers of samples. The ANSI/SLAS format of deep-well plates allows for the utilization with automated processes and for creating large sample libraries. Tight-sealing microtubes with screw caps or lid closure and tube racks allow for space saving storage of many samples and the taking of individual samples at the same time.



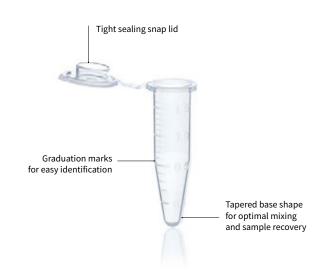
# 9.1 Microtubes with snap lids



- ✓ Tight sealing snap lid
- ✓ Can be opened and closed with one hand
- ✔ Available in different colors for clear sample identification

It is important to store samples securely so that they are protected against contamination during long procedures. Convenient handling is also important for ensuring processes can be completed quickly.

Microtubes with snap lids from BRAND offer tight-sealing lids with convenient lid opening mechanisms. They are also available in different colors to facilitate easy identification guaranteeing smooth work processes.



## **Applications**

- + Aliquoting
- + DNA and RNA isolation and purification
- + Use in analysers
- + Sample dilution
- + Short-term sample storage

- + Quality level BIO-CERT® PCR QUALITY (see page 5)
- + Tight-sealing lid
- + Available in sizes 1.5 ml and 5 ml
- + Highly transparent
- + Autoclavable at 121 °C (2 bar), acc. DIN EN 285



The microtubes 1.5 ml and 5 ml with snap lids can be centrifuged up to 20,000 resp. 25,000 x g. The rotor fit and tared weight distribution must be taken into consideration. Even minimal weight differences can cause an imbalance and damage both the centrifuge and the vessel.

**Caution:** The relative centrifugal force (RCF) is dependent on the radius of the rotor and the speed (RPM) of the centrifuge.

General conversion formula:

 $g = RCF = ((U/min)/1000)^2 \cdot r \cdot 1.118$ 

g-force: Gravitational accelerationRCF: Relative centrifugal force (corresponds to the g-force)

r: Rotation radius

**U/min:** Rotor revolutions per minute (speed)

 Microtubes should not be filled to the top during freezing, due to volumetric expansion. The recommended fill levels correspond to the top graduated lines. The microtubes with snap lids are not recommended for long-term storage of samples. We recommend using microtubes with a screw cap (chapter III) or cryogenic tubes (chapter I). These allow for safe long-term storage, preventing the lid from breaking.

Refrigerated or frozen samples generally used in testing should be exposed to the smallest temperature fluctuations possible. Try to maintain the temperature using

a mini cooler or avoid frequent thawing during aliquoting.

# **Accessories**

#### Microtube rack, PP

Stackable racks with alphanumerical positions. Operating temperature -20 °C to +90 °C. Autoclavable at 121 °C (2 bar), acc. DIN EN 285. Density 1.2 g/cm³. Will not float in waterbath. Pack of 5.



For Ø up to mm	Positions	white Cat. No.	blue Cat. No.	red Cat. No.	
11	8 x 16	4341050	4341051	4341052	
13	6 x 14	4341000	4341001	4341002	

# Microtube rack, PP

Numbered positions for 20 microtubes, 1.5 ml. Autoclavable at 121 °C (2 bar), acc. DIN EN 285. Pack of 1.





# Mini cooler, PC

Durable polycarbonate filled with non-toxic gel. Mini coolers hold twelve 0.5 ml to 2.0 ml tubes. Pack of 1.



Bench temp. maintained	Time held	Color	Cat. No.
0 °C	60 min.	red	114930
-20 °C	60 min.	yellow	114935
-70 °C	45 min.	white	114940

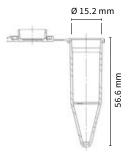


# **Technical information & Ordering data**

# Microtubes with snap lid

- Easy handling with perfectly sealing and easy-to-open lids to protect against contamination
- · Frosted marking area
- Autoclavable at 121 °C (2 bar), acc. DIN EN 285





# 5 ml microtubes with snap lid Color transparent Outer-Ø [mm] 16.6 RCF max. (at 20 °C, t 20 min) Pack of 25,000 250 pieces Cat. No. 780555



# 9.2 Microtubes with lid closure



- ✓ Highly transparent
- ✓ Lid closure for secure storage
- ✓ Suitable for centrifugation up to 30,000 x g

Microtubes with lid closure allow for sample storage down to -80  $^{\circ}$ C with easy, consistent handling. Practical lids are convenient for opening and closing quickly and easily with one hand. Their high-purity polypropylene and high transparency make them ideal storage vessels especially for valuable samples.



## **Applications**

- + Sample storage
- + Aliquoting and sample preparation
- + Extracting nucleic acids and proteins
- + Screening tests
- + For use in analysers

- + Quality level BIO-CERT® PCR QUALITY (see page 5)
- + Tight-sealing caps with lid closure
- + Withstand centrifugation up to 30,000 x g
- + Autoclavable at 121 °C (2 bar), acc. DIN EN 285

Microtubes are exposed to high loads in general, and in particular under thermal stress, such as during thermal denaturation. The biggest danger is that the lid may break open as pressure increases. Microtubes with lid closures provide optimal protection due to the significantly higher force required to open them. This graphic shows lid opening forces in Newtons (N).





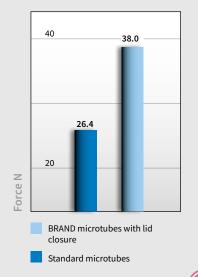
The lid closure protects against accidental opening of the lid.

The wide lid rim facilitates one-handed operation.

#### **Correct thawing**

Significant temperature fluctuations put a strain not only on the materials used in vessels, but on the samples as well. Because of this, avoid frequent thawing and freezing, and thaw samples stored at -80 °C slowly and carefully. Clean the exterior of the sample vessel thoroughly after thawing to remove any contamination.

#### Lid opening force



## Thawing tips:

- Thaw slowly (overnight in a 4 degree refrigerator)
- Thaw in a water bath with constant circulation
- Do not actively apply heat

# **Accessories**

# Microtube rack, PP

Stackable racks with alphanumerical positions. Operating temperature -20 °C to +90 °C. Autoclavable at 121 °C (2 bar), acc. DIN EN 285. Density 1.2 g/cm³. Will not float in waterbath. Pack of 5.



For Ø up to mm	Positions	white Cat. No.	blue Cat. No.	red Cat. No.	
11	8 x 16	4341050	4341051	4341052	
13	6 x 14	4341000	4341001	4341002	

# Microtube rack, PP

Numbered positions for 20 microtubes, 1.5 ml. Autoclavable at 121 °C (2 bar), acc. DIN EN 285. Pack of 1.





# Mini cooler, PC

Durable polycarbonate filled with non-toxic gel. Mini coolers hold twelve 0.5 ml to 2.0 ml tubes. Pack of 1.



Bench temp. maintained	Time held	Color	Cat. No.
0 °C	60 min.	red	114930
-20 °C	60 min.	yellow	114935
-70 °C	45 min.	white	114940



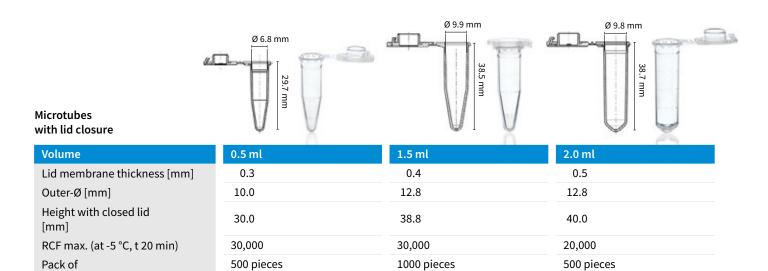
Cat. No.

# **Technical information & Ordering data**

780536

# Microtubes with lid closure

- Lid closure to ensure good lid security
- High transparency
- · Frosted marking area



780540

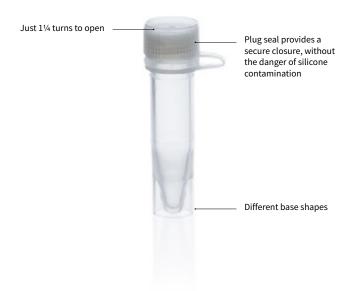
780546

# Microtubes with screw cap and plug seal



- ✓ Screw cap with plug seal ensures secure closure
- ✓ Silicone-free
- ✓ Microtubes with round bottom withstand RCF to 17,000 x g (at 20 °C, 20 min)

Expensive reagents and formulations are best protected in microtubes with screw caps. A screw cap offers reliable protection, preventing accidental opening. The plug seal in the cap ensures a secure closure, to provide a tight seal for excellent protection against freeze drying and without the danger of silicone contamination. This means they are an especially good choice for sensitive samples.



## **Applications**

- + Aliquoting reagents
- + Storage of sensitive samples
- + Storage of biological materials, such as serums or blood samples
- + Preparing formulations

- + Tubes made of highly transparent polypropylene
- + Non-graduated
- + Silicone-free
- + Colored cap inserts available for sample identification



- Ideal for storing sensitive samples and for heating and centrifuging samples. The plug seal minimizes the risk of samples freeze drying, reliably protecting even your most valuable samples.
- Tubes with screw cap should not be filled to the top during freezing due to volumetric expansion.
- Microtubes with a plug seal are a good choice to prevent silicone seal contamination of sensitive samples during storage.



Self-standing tubes with a foot-rim can easily be opened in the rack with one hand



# **Accessories**

# Cryogenic tube rack

For self-standing cryogenic tubes and tubes with screw cap. Pack of 4.





# Mini cooler, PC

Durable polycarbonate filled with non-toxic gel. Mini coolers hold twelve 0.5 ml to 2.0 ml tubes. Pack of 1.

tubes. Pack of 1.			
Bench temp. maintained	Time held	Color	Cat. No.
0 °C	60 min.	red	114930
-20 °C	60 min.	yellow	114935
-70 °C	45 min.	white	114940

# Microtube rack, PP

Stackable racks with alphanumerical positions. Operating temperature -20 °C to +90 °C. Autoclavable at 121 °C (2 bar), acc. DIN EN 285. Density 1.2 g/cm³. Will not float in waterbath. Pack of 5.



For Ø up to mm	Positions	white Cat. No.	blue Cat. No.	red Cat. No.
11	8 x 16	43410 50	43410 51	43410 52
13	6 x 14	43410 00	43410 01	43410 02

# Microtube rack, PP

Numbered positions for 20 microtubes, 1.5 ml. Autoclavable at 121 °C (2 bar), acc. DIN EN 285. Pack of 1.

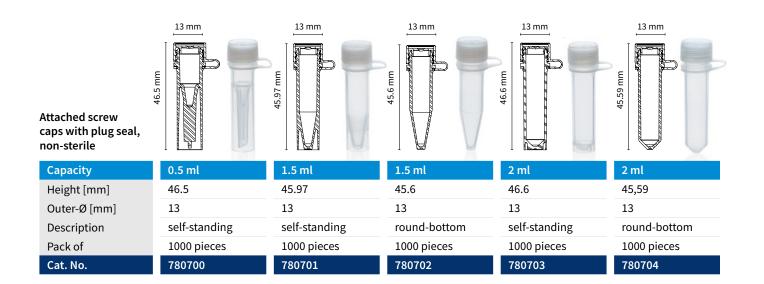


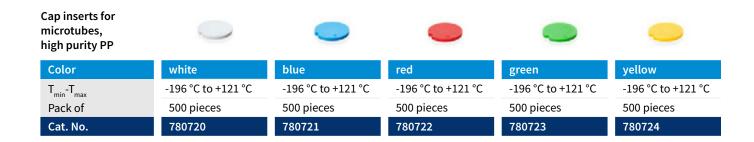


# **Technical information & Ordering data**

# Microtubes with attached screw cap with plug seal, non-sterile

- High-purity polypropylene tube and PE screw cap
- · Perfect cap seal to protect against evaporation and freeze drying
- Operating range -90 °C to +100 °C
- Not autoclavable







# Microtubes with screw cap and silicone seal



- ✓ Excellent seal reliability
- ✓ Fast opening and closing with 1¼ turn of cap
- ✓ High purity polypropylene

Microtubes with screw caps with silicone seals are available with different base shapes to offer greater flexibility. They seal tightly and reliably and are an excellent choice for securely storing expensive reagents. Microtubes with screw caps with silicone seals are also a secure choice for interim storage of prepared formulations to be used in later testing.



## **Application**

- + Aliquoting reagents
- + Storage of expensive samples
- + Storage of medical materials, such as serums or blood samples
- + Preparing formulations

- + All tubes are made of highly transparent polypropylene
- + Screw cap with silicone seal for secure closure
- + Variable base shape for convenience
- + Easy identification through color coding

- · Ideal for storing medical materials such as serums and blood samples, as well as for sample heating and centrifuging.
- The microtubes can be centrifuged up to 17,000 x g.

Caution: The relative centrifugal force (RCF) is dependent on the radius of the rotor and the speed (RPM) of the centrifuge.

General conversion formula:

 $g = RCF = ((U/min)/1000)^2 \cdot r \cdot 1.118$ 

g-force: Gravitational acceleration RCF: Relative centrifugal force (corresponds to the g-force)

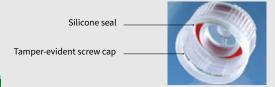
Rotation radius r:

U/min: Rotor revolutions per minute (speed)

Microtubes are sealed extremely well with silicone seals, without contact between the sample and the sealing ring. The containers are suitable for the storage of samples in the gaseous (vapor) phase of liquid nitrogen.



· The tamper-evident screw cap guarantees the user an uncontaminated sample. A visible ring acts as an antitamper seal, which breaks when the cap is first opened. The microtubes have a silicone seal, and are suitable for the storage of samples in the gaseous (vapor) phase of liquid nitrogen.



Self-standing tubes with a foot rim can easily be opened in the rack with one hand



# **Accessories**

# Cryogenic tube rack

For self-standing cryogenic tubes and tubes with screw cap. Pack of 4.





# Microtube rack, PP

Stackable racks with alphanumerical positions. Operating temperature -20 °C to +90 °C. Autoclavable at 121 °C (2 bar), acc. DIN EN 285. Density 1.2 g/ cm<sup>3</sup>. Will not float in waterbath. Pack of 5.



for Ø up to mm	Positions	white Cat. No.	blue Cat. No.	red Cat. No.
11	8 x 16	4341050	4341051	4341052
13	6 x 14	4341000	4341001	4341002

## Mini cooler, PC

0°C

-20 °C

-70 °C

Durable polycarbonate filled with non-toxic gel. Mini coolers hold twelve 0.5 ml to 2.0 ml tubes. Pack of 1.



white

45 min.

# Microtube rack, PP

Numbered positions for 20 microtubes, 1.5 ml. Autoclavable at 121 °C (2 bar), acc. DIN EN 285. Pack of 1.





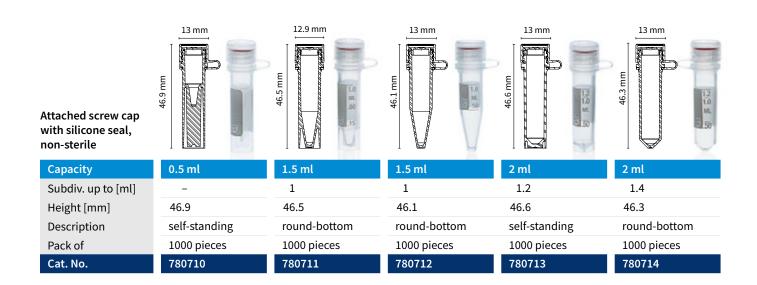
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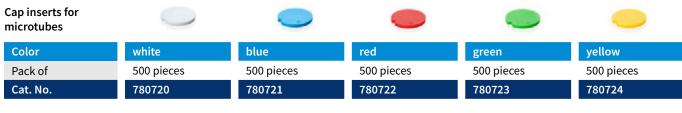


# **Technical information & Ordering data**

# Microtubes with attached screw cap with silicone seal, non-sterile

- · Easy handling due to attached lid
- For storage in gaseous phase of liquid nitrogen
- Operating range -196 °C to +121 °C
- Autoclavable at 121 °C (2 bar), acc. DIN EN 285





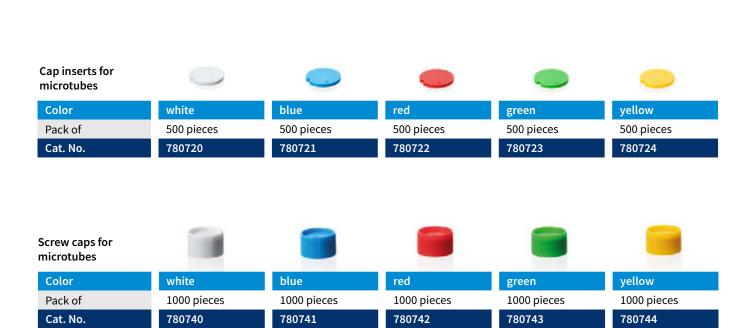


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# Microtubes with bulk screw cap with silicone seal, sterile

- · High purity polypropylene, DNA-, DNase-, and RNase-free, endotoxine-free, non-mutagenic, non-toxic
- Perfect cap seal to protect against evaporation
- Operating range -196 °C to +121 °C

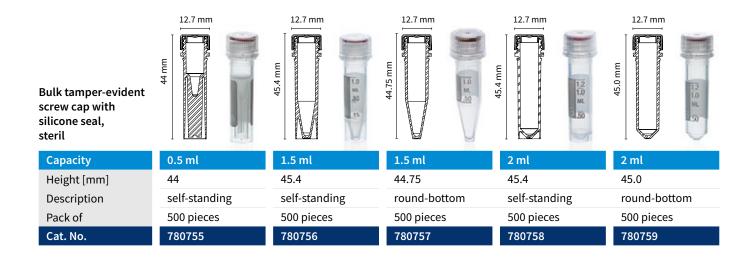






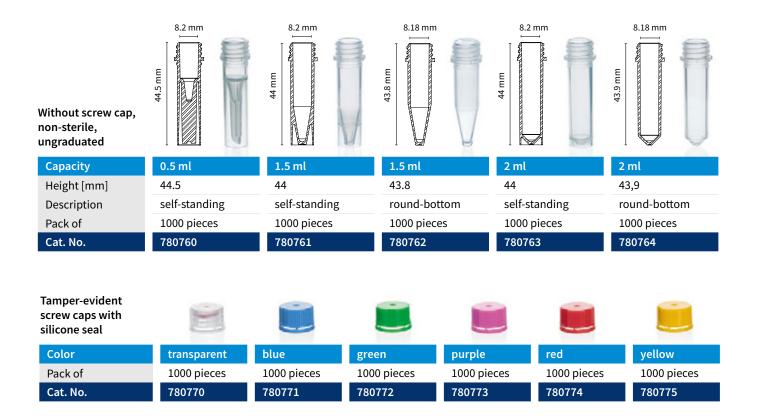
# Microtubes with bulk tamper-evident screw cap with silicone seal, sterile

- The tamper-evident screw cap guarantees uncontaminated samples
- · For storage in gaseous phase of liquid nitrogen
- Operating range -196 °C to +121 °C



#### Microtubes without screw cap, non-sterile, ungraduated

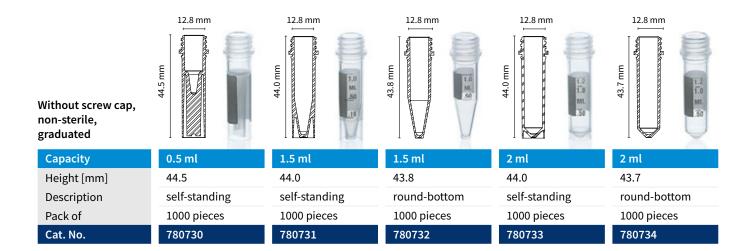
- For storage in gaseous phase of liquid nitrogen
- Operating range -196 °C to +121 °C
- Autoclavable at 121 °C (2 bar), acc. DIN EN 285



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# Microtubes without screw cap, non-sterile, graduated

- High purity polypropylene
- Operating range -196 °C to +121 °C
- Autoclavable at 121 °C (2 bar), acc. DIN EN 285



Screw caps for microtubes					
Color	white	blue	red	green	yellow
Pack of	1000 pieces				
Cat. No.	780740	780741	780742	780743	780744



# **Cryogenic tubes**



- ✓ Safe long-term storage down to -196 °C
- ✓ Tight sealed containers
- ✔ High purity polypropylene, RNase-, DNA- and endotoxin-free

Cryopreservation is an essential process for halting almost all chemical reactions during long-term storage and for preventing sample degradation. The most commonly used approach is to store samples in the gas phase of the liquid nitrogen tank, or in freezers. BRAND offers highly stable cryogenic tubes as an ideal choice for safe, long-term storage of biological materials. The right plastic and a precise thread design help perfectly seal these containers, reducing the danger of sample contamination.



## **Applications**

- + Sample storage
- + Aliquoting and sample preparation
- + Extracting nucleic acids and proteins
- + Screening tests

- + High-purity polypropylene with excellent chemical resistance
- + Tight-sealing and easy opening
- + Available in sizes 0.5 ml, 1.5 ml and 2.0 ml
- + Autoclavable at 121 °C (2 bar), acc. DIN EN 285

# What does storage under cryogenic conditions mean?

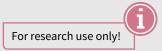
Cryogenic conditions indicate temperatures below approx. -130 °C (approx. < 140 K). This means the temperature is below the temperature at which water turns into a gas. Ice no longer recrystallises, and therefore there is no further growth of ice crystals (BURDEN 1999). This ensures that chemical processes in the samples are minimised, and that morphological changes (ie, ice crystal growth) are

prevented. When samples are stored in the gas phase in liquid nitrogen, the evaporating nitrogen in the sample storage container also creates an inert gas atmosphere that likewise generally prevents samples from changing due to oxygen from the ambient air (oxidation processes).

Examples of products stored under cryogenic conditions are:

- · Sperm, egg cells
- · Stem cells, bone marrow
- Blood components, such as erythrocytes
- · Heart valves
- · Skin, bones, teeth
- Samples for DNA analysis in genetic engineering.

Source: Dr. Heinz Rüdel, Martin Weingärtner, Fraunhofer Institute for Molecular Biology and Applied Oncology; Title: Lagerung von Umweltproben unter Cryobedingung; December 2008, V 2.0.0



# Comparison of thread types



# Advantages of external thread with sealing lid and silicone seal

- Simplifies single-handed operation in comparison to cryogenic tubes with internal thread.
- · Reduces the danger of contamination.



#### Advantages of internal thread

- Space-saving compared to cryogenic tubes with external thread.
- Colored cap inserts snap in farther. Tubes can be removed from the box using the rod.
- Uniform exterior diameter improves fit with centrifuge rotors.



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