

CryoCooler™ User Guide

Quick Start

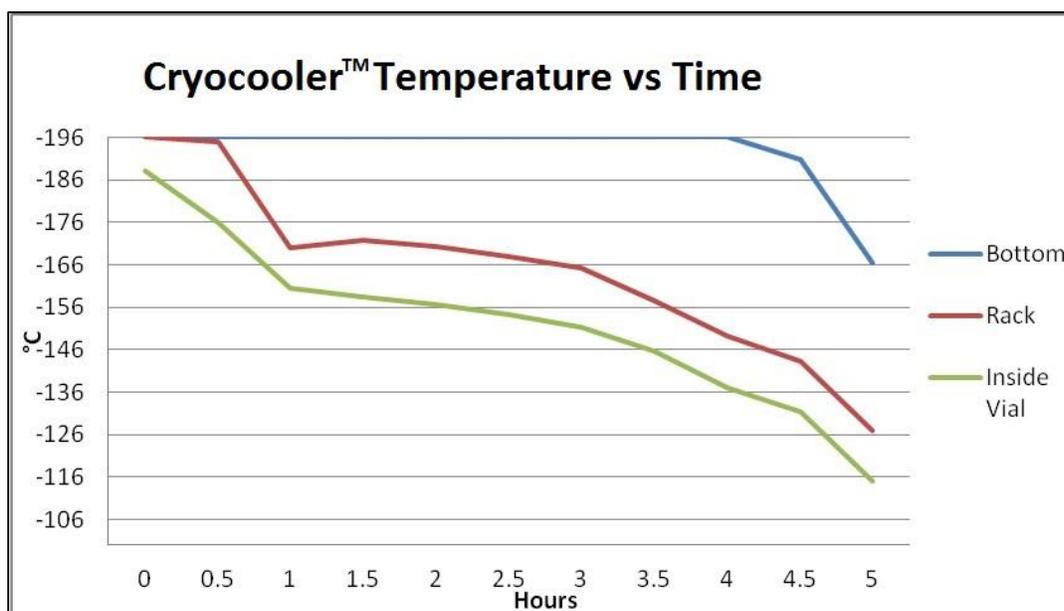
The following are a list of key points for using the CryoCooler™ safely and effectively.

- The CryoCooler™ uses liquid nitrogen (LN₂) to reach and sustain a cryogenic temperature within the cooler (< -130°C). **CAUTION:** Liquid nitrogen has a temperature of -196° C, which can cause severe burns. Therefore it is necessary to wear safety goggles, gloves, and a laboratory coat while working with LN₂.
- The CryoCooler™ features a pan that is 5.5" x 7" x 5.5". A newly designed rack with handles was also added to assist with the handling and holding of samples.
- Disinfect and clean the CryoCooler™ prior to and after use, by spraying the surfaces with 70% isopropyl alcohol and then wiping to dry. **DO NOT** clean the surface with a solvent such as acetone, because it will degrade the cooler's insulation.
- Fill the reservoir with 1 liter of LN₂, wait 5 minutes then fill with LN₂ until a **thin layer** of LN₂ is visible above the surface of the metal grating.
- **DO NOT** fill the metal reservoir to the top. This can cause an overflow of LN₂ which can become a safety concern may cause damage to the CryoCooler™.
- **DO NOT** pour any liquids in the reservoir other than liquid nitrogen.
- Leaving the lid open for an extended period of time after charging will cause loss of liquid nitrogen vapor and reduce cryogenic working time.

Introduction

Traditionally cryogenic sample preparation can be a difficult process because of the challenge of maintaining an optimal cryogenic temperature below -130°C under standard conditions. Biological molecules such as RNA are susceptible to degradation at room temperature and are best harvested at cryogenic temperatures. Thus, it is important to maintain a temperature well below -130°C when working with such labile molecules.

The CryoCooler™ was designed as a portable, cryogenic station aimed at increasing working time during sample preparation and collection. Once the chamber is fully charged with liquid nitrogen it will maintain temperatures well below -130 °C for up to 4 hours (see graph below). Consequently, the CryoCooler™ can be used for sample collection outside of the laboratory and for processing samples in the laboratory. The CryoCooler™ is suited for sample transport, preparation, sample collection in operating rooms, and short-term storage. **It is not designed for overnight shipping of cryogenic samples.** When used in conjunction with the CryoGrinder™, a miniaturized mortar and pestle it is effective for disrupting samples of less than 100 mg within a cryogenic environment.



Safety and Precautions

- Liquid nitrogen (LN₂) is necessary to charge the CryoCooler™ to the appropriate cryogenic temperature, thus several pre-cautions must be taken to prevent injury.

CAUTION: Liquid nitrogen has a temperature of -196 °C and will cause severe burns.

- Any materials and items that come into contact with the LN₂ or its vapors will also become very cold and can cause burns. Therefore, safety goggles, gloves, and a laboratory coat must be worn while working with LN₂. Direct contact of LN₂ with the outside of the container may cause paint to chip if exposed for a period of time. Review the safety rules and procedures established by your lab/ organization for handling liquid nitrogen in addition to the ones provided by this manual.
- Never overfill the CryoCooler™ the maximum capacity of the reservoir is **3 Liters**. The liquid nitrogen should never rise above the tray with metal grating (see diagram).
- NEVER** clean the CryoCooler™ with acetone. It will degrade the cooler's insulation. **DO NOT** submerge or rinse the cooler with water or any other substance.
- Cleaning the CryoCooler™ can be done by first removing the perforated platform and Liquid Nitrogen Pillow and then disinfecting the chamber by wiping surface with 70% isopropanol.

Instructions for Use

1. Disinfect with 70% isopropanol prior to use.

- Sanitize its surfaces by wiping them with 70% isopropanol. **DO NOT** submerge the cooler or pour any other liquid beside liquid nitrogen into the reservoir.

2. Wear safety goggles, gloves, and laboratory coat.

- Working with LN₂ can cause burns to skin and clothing.

3. Verify the metal tray with grating is secure.

- Open the CryoCooler™ lid and ensure the metal tray is in place by tightening the thumb nuts before.

4. Charge the pillow with 1 liter of liquid nitrogen.

- Pour 1 liter of liquid nitrogen into the reservoir, close the lid, and wait 5 minutes. Take caution when initially charging the cooler. The LN₂ will violently boil until the CryoCooler™ has cooled. **DO NOT** submerge the cooler in liquid nitrogen or place in a cryogenic freezer to pre-chill it.

5. Complete the charge to the CryoCooler™ after the initial chilling.

- Slowly add additional liquid nitrogen to the reservoir until a thin layer of LN₂ is visible above the tray with metal grating. After the boiling has stopped and the LN₂ levels have dropped, additional LN₂ may be added. **It is important to never exceed a thin layer of liquid nitrogen above the metal grating.** Overfilling the CryoCooler™ may damage the paint on the outside of the cooler and internal insulation. Once charged, the CryoCooler™ is ready to use.

6. Handle samples with care while chilling.

- When handling samples in the CryoCooler™, it is advised that the sample be placed on the metal rack in a small dish, such as a weigh boat, to avoid cross-contamination issues. Pre-chilling the weigh boat will speed sample freezing. Aluminum weigh boats typically transfer heat rapidly. Close the lid and allow the samples to chill for 5 minutes.

7. Set a timer for temporary storage or sample processing.

- Temporary Storage: The samples can be stored in the cooler for **up to 4 hours** with the lid closed.
- Sample Processing: Leaving the lid ajar for extend periods of time while processing samples will cause the cooler to warm quicker than normal, and thus an optimal cryogenic temperature of below -130°C may be maintained for **up to 3 hours** with the lid open.

8. Monitor the CryoCooler™ temperature (optional).

- A digital thermometer can be used to monitor the cooler's internal temperature. The CryoCooler™ can be recharged if the temperature rises above -130°C by following steps 3-5 above.

Care and Maintenance

- The CryoCooler™ can be re-used on a regular basis if it is cared for properly. However, certain substances such as acetone can degrade the insulation.
- Wipe the CryoCooler™ surface clean with 70% isopropanol.
- **DO NOT** fill the metal reservoir to the top. This can cause an overflow of LN₂ which can become a safety concern and may cause damage to the CryoCooler™
- **DO NOT** allow LN₂ to come into contact with the outer box.
- Routinely check the CryoCooler™ reservoir when not in use for the white cellulose absorbent powder residue. If large amounts of white powder are found in the reservoir or on the surface of the perforated metal grate, replace the pillow.

Related Products

CryoGrinder™ Kit (Mortar and Pestle Kit)

Product No. CG 08-01

CryoGrinder Set (Mortar and Pestle Set)

Product No. CG 08-02

Liquid Nitrogen Absorbent Pillow (Replacement Pillow)

Product No. CG 08-08

CryoStorage™ Box (81 Vial Capacity)

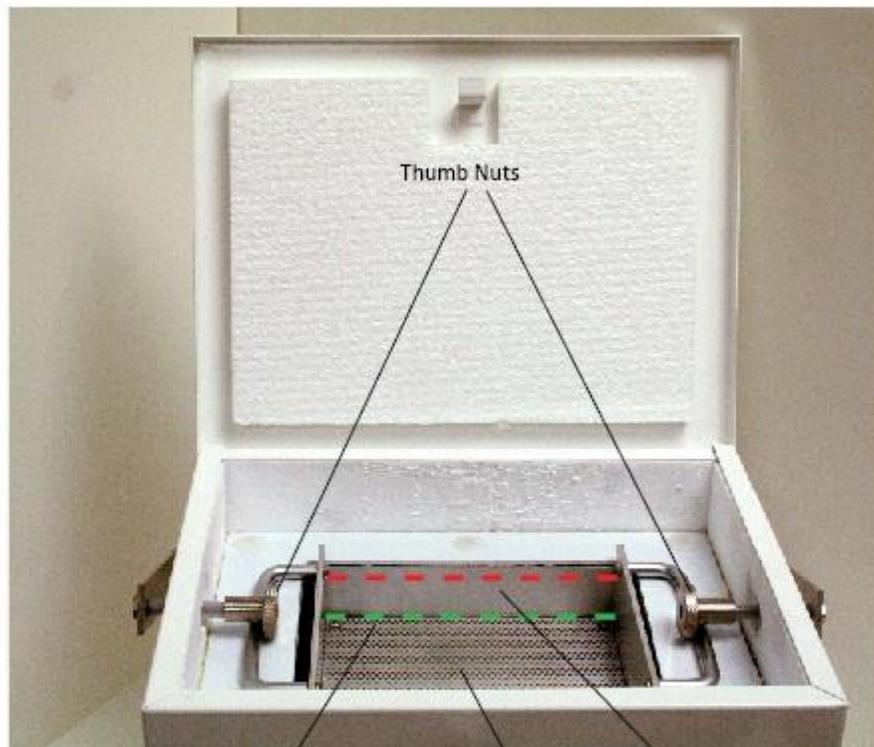
Product No. CRY 012-01

CryoVials™ Sterile (1.8 ml)

Product No. CRY 300-02

CRYOCOOLER™ OVERFILL WARNING

Please be aware that overfilling of the CryoCooler™ may cause damage to the unit, the paint and be a safety concern. Take note of the maximum fill line. Liquid nitrogen should never rise above the metal grating on the tray. Ensure that the thumb nuts are tight securing the metal tray down before filling. If accidental overfill occurs, do not touch the sides or bottom of the cooler. Allow excess liquid nitrogen to evaporate and the CryoCooler™ to warm before moving.



MAXIMUM FILL LINE
Never exceed a thin layer of liquid nitrogen above the metal grating.

OVERFILL WARNING