



# BIOCISION COOLING SYSTEMS – GENERAL FAQ'S

## QUESTIONS ABOUT COOLCELL -1°C/MIN CELL FREEZING CONTAINER

### **Why choose a CoolCell over an alcohol-filled cell freezing container?**

CoolCell provides a reproducible and consistent -1°C/minute cell freezing rate when placed in a -80°C freezer. The absence of alcohol means no variability in freezing profiles run-to-run. It also means no on-going expense, no keeping track of freeze cycles in order to replace the alcohol every five runs, no hazardous waste, no pre-cooling, no frozen-stuck lids, and no frosty fingers when removing it from the freezer.

### **What temperature do I use CoolCell with?**

The CoolCell can be used in a -70°C to -80°C environment. This includes mechanical freezers at -70°C to -80°C and dry ice lockers (typically stable at -75°C). The CoolCell will freeze at -1°C per minute under these conditions. CoolCell should not be used with liquid nitrogen vapor phase freezers because the contents will freeze much faster than -1°C per minute when placed in a -150°C environment.

### **How fast will CoolCell warm up when removed from the freezer?**

Just like an alcohol-filled container, the CoolCell cools down and warms up at 1C per minute. When recovered from a -80°C freezer, the samples will reach -50°C in about 30 minutes. Opening either container and exposing the cryovials to room temperature will warm them much faster (about 30°C /min) so be careful to have a bed of dry ice in a pan to immediately empty the samples onto when transferring from -80°C to LN2 storage.

### **Can I freeze multiple CoolCells at the same time?**

Yes. The CoolCell releases about one-third the amount of heat given off by an alcohol-filled container per sample. So, with the CoolCell, you can freeze 54 samples with the same heat load into the freezer as would be generated by 18 samples in an alcohol-filled container. This makes CoolCell ideal for batch production of multiple sample sets.

### **How do I get fast recycle time with CoolCell?**

While a closed CoolCell will protect samples below -50°C for 30 minutes, an open, empty CoolCell can be recycled to room temperature in just minutes for the next freeze cycle. After emptying samples onto dry ice for transfer to LN2, remove the center solid thermal ballast ring from the CoolCell. The CoolCell insulator jacket and ballast will warm up in minutes because of their low thermal mass, while an alcohol-filled container will take hours to warm back up. Make sure the CoolCell is dry, replace the central ring, and the CoolCell is ready for the next freezing cycle.

### **Can CoolCell be used for production of large numbers of samples?**

Yes, CoolCell is ideal for production of large numbers of samples. CoolCell's fast recycle time allows for two freezing runs per shift and CoolCell can handle three times as many samples in the freezer per cycle (see above regarding freezing multiple CoolCells at once). This means that the production through-put using CoolCell can exceed an alcohol-container-based process by six-fold.

### **Is there a limit to the number of times the CoolCell can be used?**

The CoolCell is designed for an unlimited number of duty cycles with no change in performance. The CoolCell is precision machined from high density polyethylene foam and both the housing and alloy core are built to last.

### **Currently I use chilled samples. Do I need to pre-cool the CoolCell?**

Pre-cooling the CoolCell is not necessary. Unlike room-temperature alcohol filled containers that will re-warm chilled samples up to 12°C even when placed immediately in the freezer, a room-temperature CoolCell will insulate iced samples below 5°C peak temperature prior to onset of freezing.

### **Can I pre-cool CoolCell?**

You can pre-cool CoolCell if you want, but unlike alcohol filled containers, an explosion-proof refrigerator is not necessary since no alcohol is present. Also, in side by side tests between an alcohol-filled container and CoolCell, with both containers pre-cooled to 4°C, the ice-temperature samples inserted into the CoolCell initiated freezing six minutes faster than those in the alcohol-filled container; another benefit of the absence of alcohol.

### **Why is reducing freezing time lag important?**

The time it takes between placing samples into the freezer and the onset of fusion is called – freezing lag. Minimizing exposure time to Dimethyl sulfoxide (DMSO) cryoprotectant solution before freezing is increasingly thought to be important for cell health. CoolCell's low thermal mass reduces freezing lag time to less than one-half of the lag caused by alcohol-filled freezing containers and reduces exposure time to DMSO. For more information, see [CoolCell PBMC Processing](#).

## **QUESTIONS ABOUT COOLBOX INSULATED COOLER FOR COOLRACK**

### **Can CoolBox be used for snap freezing?**

Absolutely. CoolBox makes an ideal bench-top snap-freezing system when used with dry ice. Simply place block, pellet, or crushed dry ice in the CoolBox about 2 - 3cm deep and place a CoolRack directly on top in contact with the dry ice. The CoolBox will hold about 200cc of dry ice when the CoolRack is level with the top of the box. When the top of the CoolRack drops about 2cm below the rim it is time to refill. Freezing will last about 3 hours with the CoolBox lid off and up to 6 hours covered.

### **Can CoolBox be used with liquid nitrogen?**

Yes. Place a 15-well CoolRack in the CoolBox to allow space to fill/refill liquid nitrogen. LN2 level should be maintained halfway up the side of the CoolRack (approx 2cm) to maintain cryogenic temperature. Do not place the lid on the CoolBox when using LN2. Be sure not to touch cryogenic temperature metal with bare skin and follow all laboratory safety protocols for the use of liquid nitrogen.

## **QUESTIONS ABOUT COOLRACK THERMO-CONDUCTIVE MODULES**

### **Are CoolRacks resistant to UV?**

CoolRacks are impervious to ultraviolet and other wavelengths of radiation.

### **How long will CoolRacks remain at temperature when removed from their source?**

CoolRacks adapt rapidly to changing temperature conditions because of their excellent thermal conductivity. When a room temperature CoolRack is placed on ice the temperature of the CoolRack equilibrates to the ice temperature within minutes. Similarly, when removed from the ice, the CoolRack will equilibrate to the new temperature source with which it is placed into contact. If desired, this passive warming or cooling rate can be slowed by placing the rack on an insulated surface and avoiding direct contact with heat conductive materials. For additional information, please contact us at [info@alphatech.ie](mailto:info@alphatech.ie) or [info@biocision.com](mailto:info@biocision.com).

### **How can I extend the time CoolRack stays at temperature.**

Many CoolRack and CoolSink modules can be placed in a CoolBox insulated container for extended ice-free cooling (up to 10 hours) or for keeping samples frozen (up to 7 hours). Replaceable cartridges allow continuous bench cooling and freezing. When using CoolRacks in ice, the use of a ThermalTray platform under the CoolRack module(s) provides a stable solid base that allows <4°C cooling for up to 14 hours with one pan of ice.

### **Can CoolRacks be used for snap freezing?**

Yes, all CoolRacks can be used in dry ice or LN2 for snap-freezing. For optimum freezing rates in 1.5ml conical microcentrifuge tubes, the CoolRack PF series offers a freeze rate equivalent to directly inserting tubes into a dry ice/alcohol slurry. And no alcohol is needed! All tubes will remain upright, organized and indexed. More importantly, standard deviation will be dramatically reduced as all tubes will exhibit identical snap-freezing profiles.

### **Can CoolRacks be used with Liquid Nitrogen?**

CoolRacks are excellent for use with LN2 and will keep samples at cryogenic temperature without liquid contact or tube immersion. Just fill an insulated pan with about 2cm of LN2 and place a CoolRack in. For extended LN2 work, use a deep insulated pan and place a ThermalTray LP under the CoolRack(s) to provide a stable raised platform for easy visibility and access. Fill LN2 up to the table of the ThermalTray LP (about 5cm) and you can add and remove CoolRacks without getting your thermal gloves immersed in LN2. Remember to follow all safety precautions with LN2 - any surface at cryogenic temperatures can freeze skin on contact.

## **CLEANING AND MAINTAINING COOLPRODUCTS**

### **How do I clean CoolCell and CoolBox?**

CoolCell and CoolBox are a cross-linked closed-cell dense polyethylene foam. This makes them ideal for cleaning with aqueous detergents, alcohol, bleach, and acid/base viricide (such as Virkon S) solutions. Rinse with clear water after using cleaning solutions. The material has excellent resistance to fluid absorption and abrasion. Ensure sample bays and tubes are dry before a freezing cycle to prevent sticking. Do not autoclave.

### **How do I clean CoolRacks?**

CoolRacks are hard anodized and very corrosion resistant. The CoolRack may be cleaned with solvents, aqueous detergents, alcohols, bleach, and acid/base viricide (such as Virkon S) solutions. Rinse with clear water after using cleaning solutions. Avoid soaking the CoolRack for extended periods (more than one hour) in low or high pH solutions. The CoolRack is autoclavable and can be heat sterilized up to 250°C.

### **Is there any routine maintenance necessary?**

No. CoolBox and CoolCell are virtually maintenance free. Just ensure the units are completely dry prior to placing in the freezer. All wells of the CoolCell must be dry before inserting vials, to ensure easy vial removal once frozen.

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