

CoolRack® CoolSink® ThermalTray™

Thermo-conductive passive temperature regulating modules for use on common laboratory cooling, freezing, warming sources such as ice, dry ice, liquid nitrogen (LN₂), waterbath or other compatible cooling or heat sources.

Instructions for Use

Thermo-conductive CoolRack® and CoolSink® tube and plate modules and ThermalTray™ platforms are designed to regulate temperature through direct contact with a cooling, freezing, or heating source. When placed on a cooling or heating source (-196°C through >100°C) they will rapidly adapt to the source temperature. This method of cooling or heating replaces direct insertion of tubes and/or plates into or onto the temperature source, allowing for more uniform temperature amongst the individual samples, reproducible cooling, freezing or warming, increased organization and minimized risk of contamination.

⚠ CAUTION: *Direct skin contact with metal surfaces at cryogenic temperatures or when heated can cause serious burns. Never touch frozen or heated metal surfaces with bare skin. Always use insulated protective gloves when handling modules in dry ice, liquid nitrogen or any heat source. Follow all standard laboratory safety procedures when using LN₂.*

Benchtop Cooling with Ice

Fill ice bucket with ice and place thermo-conductive module directly on top of the ice. The module will cool below 4°C within two minutes and will stay below 4°C as long as it remains in contact with solid ice or water that contains solid ice pieces. It is not necessary to pre-cool module prior to placing on ice. Replenish ice as desired for longer cooling duration.

If using a ThermalTray™ platform for extended cooling duration, fill a large rectangular ice pan half way with ice. Press the ThermalTray™ platform into the ice pack until fully seated. The ice level should reach the underside of the ThermalTray™ platform. Place CoolRack® or CoolSink® module(s) onto the ThermalTray™

platform and allow to reach <4°C temperature (about 5 minutes). The modules will remain below 4°C for as long as solid ice remains in the melt water (typically 8-10 hours or longer, depending on ambient conditions). Replenish ice as desired for longer cooling durations. Avoid exposure to hot lights or strong air currents for optimal temperature stability.

Benchtop Cooling without Ice

For an alternate method of benchtop cooling without ice, some CoolRack® and CoolSink® thermo-conductive modules are compatible with BioCision CoolBox™ ice-free systems. Pairing a CoolRack® or CoolSink® module with a CoolBox™ system will provide hours of ice-free cooling (0.5 to 4°C) or freezing (-20 to 0°C). For more information, visit www.biocision.com.

Snap-Freezing in Dry Ice

Place enough dry ice into an insulated foam pan to create a 1.5 inch (approx. 4 cm) bed of dry ice under the entire surface of the CoolRack® or CoolSink® module. Place the CoolRack®/CoolSink® on the dry ice. Allow approximately 7-8 minutes for the module to equilibrate to cryogenic temperature (-78°C).

Insert tubes or plates into the module to snap freeze. Replenish dry ice as desired for longer cooling duration. Note that while cooling, modules may briefly emit a ringing tone due to CO₂ emissions beneath the module.

CoolRack® and CoolSink® modules will provide a solid work surface on dry ice. It is not necessary to use a ThermalTray™ platform when working with dry ice. It is not necessary to pre-cool the CoolRack® or CoolSink®. It is not necessary to add ethanol to the dry ice.

Snap-Freezing / Cryo Specimen Benchtop Handling in Liquid Nitrogen (LN₂)

A ThermalTray™ may be used, but is not required when using BioCision thermo-conductive modules with liquid nitrogen.

If using a ThermalTray™ platform, place ThermalTray™ into an insulated foam pan. A pan size of L 16.0 x W 12.5 x H 4.5 inches is ideal. Add LN₂ to the pan until the level reaches just below the table height of the ThermalTray™. Place CoolRack® or CoolSink® module(s) onto the ThermalTray™ and allow approximately 15 minutes to reach cryogenic temperature (-150°C). The modules will remain

at cryogenic temperature for as long as liquid nitrogen contacts the fins of the ThermalTray™. Replenish LN₂ as desired for longer cooling durations.

If NOT using a ThermalTray™ platform, place CoolRack® or CoolSink® module in an insulated foam pan. Add LN₂ to the pan until it covers half the height of the module. Allow approximately 15 minutes for the module to equilibrate to cryogenic temperature (-150°C). Replenish LN₂ as required.

Heating / Thawing in a Water Bath

Place a ThermalTray™ platform into a water bath. A minimum clear area of 12 x 6 in. with a minimum depth of 5 in. deep is ideal. Place CoolRack® or CoolSink® module(s) onto the ThermalTray™. Maintain a water level that is at or slightly above the level of the ThermalTray™ surface. Allow approximately 10 minutes for the modules to equilibrate to bath temperature. It may be necessary to offset bath temperature by 1°C to maintain desired module temperature.

Other Heating Sources

CoolRack® and CoolSink® modules may be used on other heating sources such as hot plates and dry baths. Please note that aluminum alloy may react with some ceramic surfaces. Check compatibility of surface prior to placing CoolRack® or CoolSink® module on it.

General Information:

- *Thermo-conductivity:* CoolRack® and CoolSink® modules and ThermalTray™ platforms are thermo-conductive and designed for direct contact with a temperature source. They are compatible with ice, dry ice, liquid nitrogen, refrigerators, -20°C freezers, -80°C freezers, water baths, heat blocks, ovens, incubators or any other laboratory temperature source. Upon removal from these temperature sources, the modules will gradually equilibrate to room temperature. For more information on passive warming and cooling profiles, visit www.biocision.com/resources/faqs.

- *Use of liquid crystal display (LCD) temperature strip:* The LCD 1-8°C temperature strip may be affixed to any thermo-conductive module by simply removing the paper backing to

expose the adhesive strip and applying to a flat dry surface on the module. The display will indicate the temperature of the module when placed on or in a 1°C to 8°C temperature source. A module bearing an LCD temperature strip may be used in other cooler or warmer temperature sources. The LCD strip is not autoclavable and should not be affixed to modules that will be autoclaved.

Care and Cleaning

All thermo-conductive modules are anodized and corrosion resistant. They may be cleaned with solvents, aqueous detergents, alcohols and acid/base viricide (such as Virkon S) solutions. Rinse with clear water after exposure to cleaning solutions. They may be stored at room temperature or in a cooling or heating medium. Avoid soaking for extended periods (more than one hour) in low or high pH solutions. The modules are autoclavable and can be heat sterilized up to 250°C.

For more information, visit www.biocision.com

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