

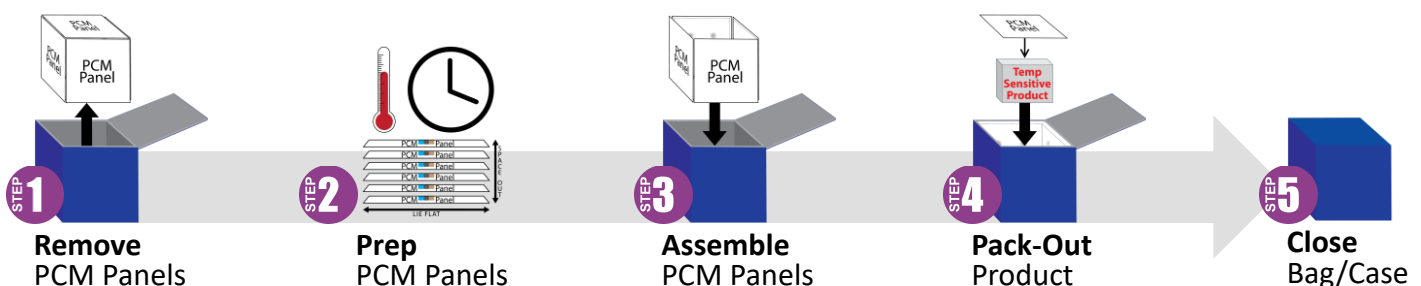
Cool Cube™

Best Practices

Call for
Technical Support
(608) 526-6901



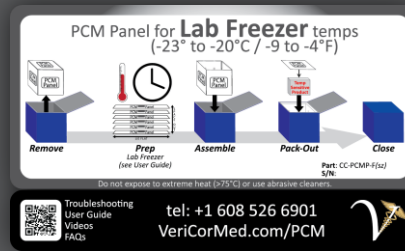
- Always prep the PCM (phase change material) panels before use according to one of the described methods provided by VeriCor.
- Ensure all components are clean and free of damage.
- Lay panels flat when turning them solid (to disperse liquid throughout the panel).
- Enable ample air flow around all panel sides.
 - Use spacers (pencils) or racks. →
- Freezing/melting times vary depending on number of panels being prepped and equipment being used.
- Assemble using all six panels for maximum hold time.
 - Using less panels does not change the holding temperature, but does decrease the hold time.
- Panels are reusable (10,000+ cycles).
 - End-of-life disposal: Panels use a plastic #2, typically recycled by businesses/communities. PCM is nontoxic and readily biodegradable.
- Use a calibrated data logger or other temperature monitoring device to observe internal temperature.
- Avoid unnecessary opening of the Cool Cube™ after loading payload. Opening of the Cool Cube™ will decrease hold time.
- An infrared temperature thermometer can assist in ensuring the panels reach a safe pack-out temperature (good for finding out the approximate temperature of each panel).
- The farther the ambient temperatures are from the melting point, the quicker PCM will change states (solidify/liquefy).



Various methods based on type of panel, equipment available & purpose.

Cool Cube™ Lab Freezer PCM Panels

for varicella, MMRV, Zoster, FFP & more



Grey Tab/Label

All Sizes



This PDF is *clickable!* Click the QR code for a video, or the row for more information on the method.

Video	Method	Use	Required Equipment	Prep Location (Time)	Advantage(s)	Drawback(s)
	A <i>(method used in User Guide)</i>	Keep product frozen (in warm conditions)	Ultra-Low Freezer	Ultra-Low Freezer (≈ 24 hrs*)	Maximum hold times	Special freezer (<-30°C) required
	B	Keep product frozen (in warm conditions)	Dry Ice & Freezer	Dry Ice (varies) Freezer (≈ 3 hrs*)	Maximum hold times Uses a standard freezer	Multi-step
	C	Keep product frozen (in warm conditions)	Standard Freezer	Freezer (≈ 24 hrs*)	Uses a standard freezer	Shorter hold times

*Panels may be stored at this stage indefinitely (for longer than indicated).



About Lab Freezer PCM (Phase Change Material)

PCM absorbs and releases thermal energy during the process of melting and freezing. When solid PCM melts, it absorbs the heat from the environment, yet its temperature stays at the melting point until totally liquid. Conversely, when liquid PCM freezes, it absorbs the cold from the environment yet stays at its temperature until totally solid. *Therefore, PCM an ideal, passive solution for a variety of applications that require temperature control.* The most common PCM is water, which has a melting point of 0 °C (32 °F). When solid, ice/water maintains a temperature of 0 °C until it turns completely liquid. So, in essence, the 0 °C melting point makes it unsafe for most frozen temperature-sensitive applications.

Cool Cube™ **Lab Freezer PCM** has a melting point of -21.5 °C/-6.7 °F. When the PCM is solid, a panel helps the Cool Cube™ stay cool (about -21 °C) in warm/hot environments. It's right around that -21.5 °C/-6.7 °F where a PCM panel's temperature plateaus for a while during the warming up and/or cooling down processes.

How to prepare Lab Freezer PCM panels for use in the Cool Cube™

Cool Cube™ Lab Freezer PCM Panels

for varicella, MMRV, Zoster, FFP & more.

All Sizes



Grey Tab/Label



PCM Panel for **Lab Freezer** temps
(-23° to -20°C / -9 to -4°F)

Remove Prep (see User Guide) Assemble Pack-Out Close

Do not expose to extreme heat (>75°C) or use abrasive cleaners.

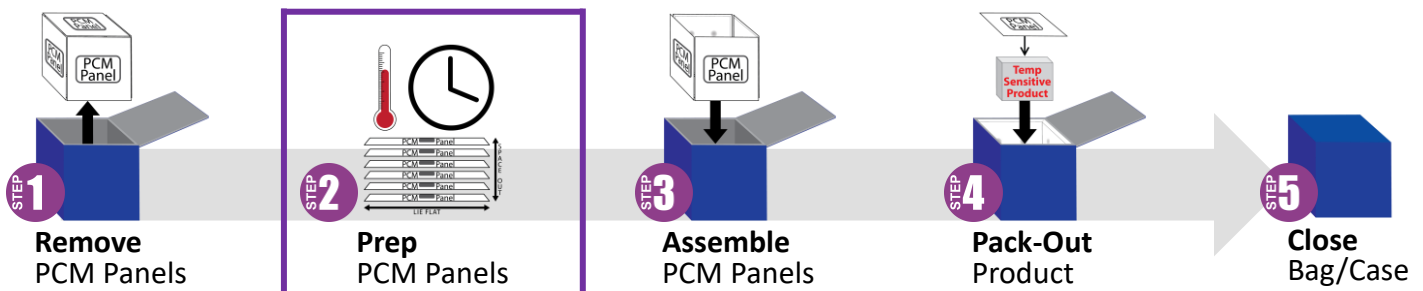
Part: CC-PCM-#(sz)
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tel: +1 608 526 6901
VeriCorMed.com/PCM

Video



Prep Method A: Ultra-Low Freezer Prep to keep product frozen



A freezer kept colder than -30°C is necessary to turn PCM completely solid.

Panel Prep

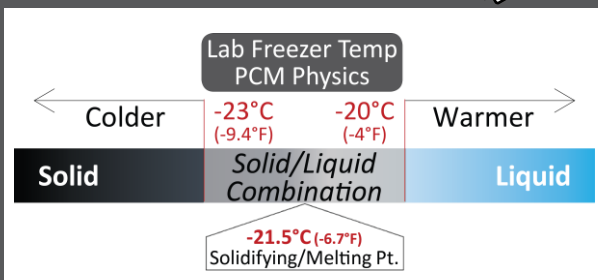
2.1 Lay panels flat in an ultra-low freezer until all the PCM (phase change material inside the panel) turns solid. At -30°C/-13°F the PCM will solidify in a day or two.*

* If the freezer temperature is ever warmer than -30°C, PCM may not get completely solid (due to the possibility of supercooling). If panels are stored within the temperature parameters of the product but the PCM is liquid, panels may be used but the hold time will decrease.

2.2 Shake panels to verify the PCM is solid. If there is liquid, restart at step 2.1 to ensure the longest hold time. Using liquid PCM or panels with a solid/liquid combination decreases the hold time.



PCM Panel Shake Test



ISTA 7D Thermal Performance Study

Lab-Qualified Hold Times When Starting with Solid PCM

Qualified Temp: -50 to -15°C		
Cool Cube™ 03	Utilizing Six (6)	62 hrs
Cool Cube™ 08	Lab Freezer Temp	60 hrs
Cool Cube™ 28	PCM Panels	94 hrs
Cool Cube™ 96	(Grey Tab/Label)	139 hrs

Times listed are based on lab-validated, 24-hour cycles of a summer profile (hot ambient temperatures) without the additional thermal mass of a payload, which if conditioned properly, will improve hold times. Actual performance times may vary.

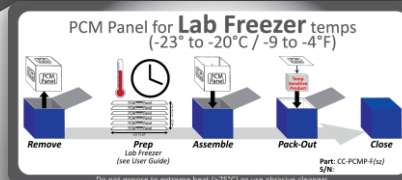
Cool Cube™ Lab Freezer PCM Panels

for varicella, MMRV, Zoster, FFP & more.

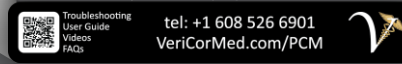
All Sizes



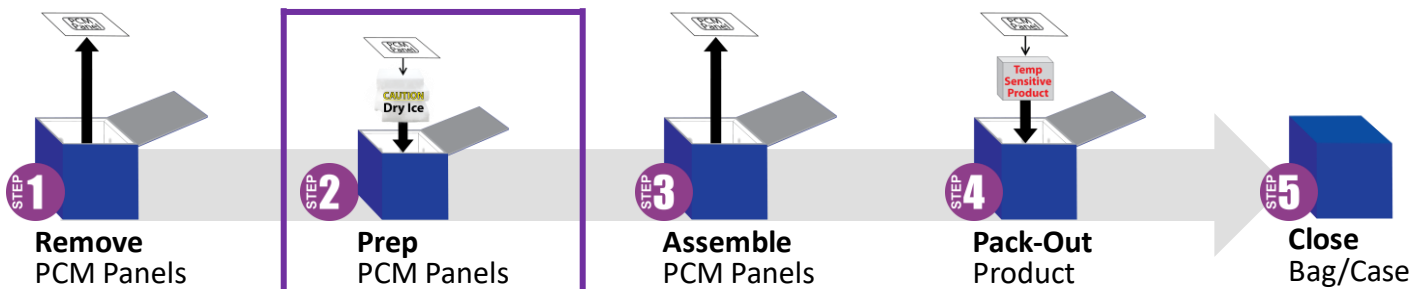
Grey Tab/Label



Video



Prep Method B: Dry Ice Prep to keep product frozen



Panel Prep

2.1 Pack out cooler with dry ice until the PCM (phase change material inside the panel) panels become solid. The more dry ice, the faster the PCM will solidify.*

* Time varies dependent on the starting temperature of the panels, size of panels, and amount of dry ice used. CAUTION: Dry ice has a surface temperature of -78.5°C/-109.3°F, so handle with care.

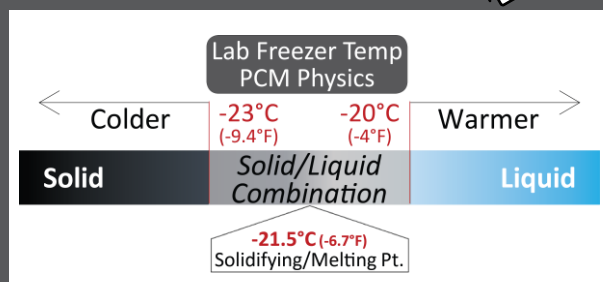
2.2 (Optional) If product to be packed out cannot withstand an initial -70°C temperature, transfer panels into a standard freezer at least 3 hours before use. Panels may be stored in the freezer until needed for assembly or the PCM melts.

If a freezer maintains -23°C or below, the PCM within the panels will not melt (melting point is -21.5°C), keeping the PCM solid indefinitely until pack-out. If the freezer maintains -21.5°C or above, periodically check for melting and restart at step 2.1 to ensure the longest hold time.

2.3 Shake panels to verify the PCM is solid. If there is liquid, restart at step 2.1 to ensure the longest hold time. Using liquid PCM or panels with a solid/liquid combination decreases the hold time.



PCM Panel Shake Test



ISTA 7D Thermal Performance Study

Lab-Qualified Hold Times When Starting with Solid PCM

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Cool Cube™ Lab Freezer PCM Panels

for varicella, MMRV, Zoster, FFP & more.

All Sizes



Grey Tab/Label



PCM Panel for **Lab Freezer** temps
(-23° to -20°C / -9 to -4°F)

Remove Prep (see User Guide) Assemble Pack-Out Close

Do not expose to extreme heat (275°C) or use abrasive cleaners.

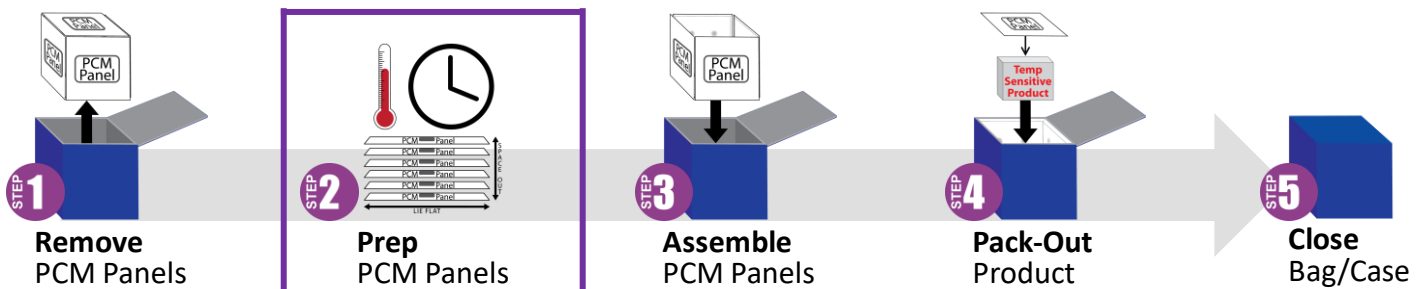
Part: CC-PCM-F(iz)
S/N: _____

tel: +1 608 526 6901
VeriCorMed.com/PCM

Video



Prep Method C: Standard Freezer Prep to keep product frozen



Panel Prep

2.1 Store panels in a standard freezer (turned down to its lowest setting) for a minimum of 24 hours before use. Unless the freezer is always below -23°C, the PCM (phase change material inside the panel) will never turn completely solid, but short-term use is still possible.*

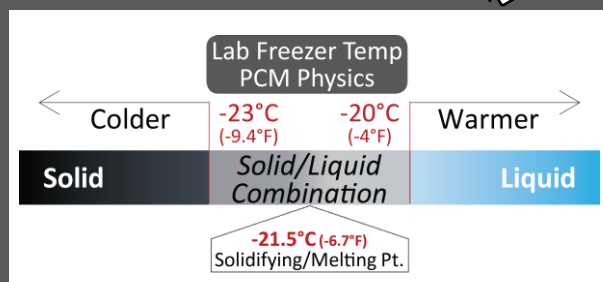
* Although PCM is liquid, it is at the temperature of storage environment after 3 hours. For instance, panels stored in a -18°C freezer are at -18°C even PCM is liquid. Assembling the Cool Cube™ with this additional thermal mass will keep product frozen, just for a shorter amount of time than the lab-validated results.

2.2 Shake panels to check the state of the PCM (phase change material inside the panel).



- If *liquid*...panel is at the freezer temp but above -20°C; anticipate shorter hold times.
- If *solid*...panel is at the freezer temp but below -23°C; ideal for maximum hold times.
- If *solid/liquid combination*...panel is at the freezer temp between -23 and -20°C; monitor longer use periods.

PCM Panel Shake Test



ISTA 7D Thermal Performance Study

Lab-Qualified Hold Times When Starting with Solid PCM

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Cool Cube™ 96	(Grey Tab/Label)	139 hrs

Times listed are based on lab-validated, 24-hour cycles of a summer profile (hot ambient temperatures) without the additional thermal mass of a payload, which if conditioned properly, will improve hold times. Actual performance times may vary.