

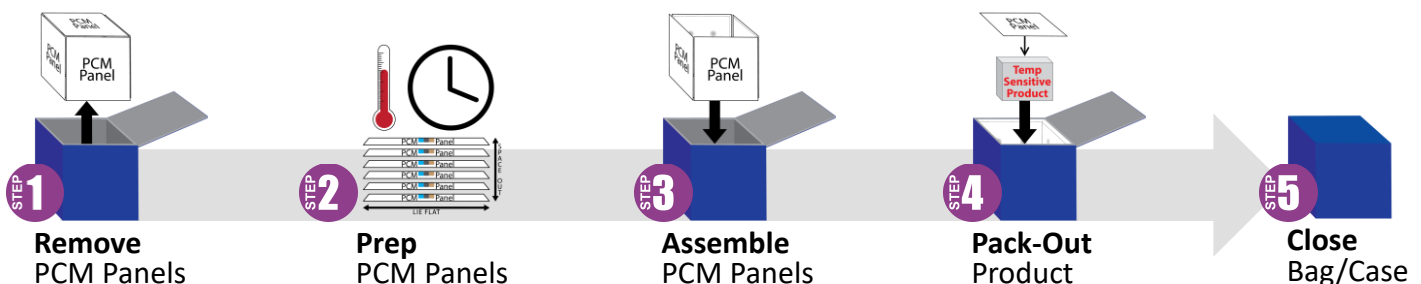
Cool Cube™

Best Practices

Call for
Technical Support
(608) 526-6901



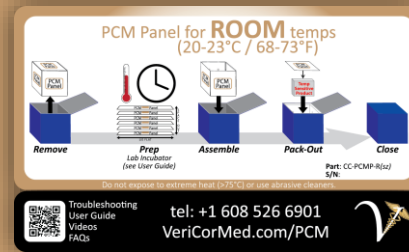
- Prep the PCM (phase change material) panels before use according to one of the described methods provided by VeriCor.
- Ensure all components are clean and free of damage.
- Lay panels flat when turning them solid (to disperse liquid throughout the panel).
- Enable ample air flow around all panel sides.
 - 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 are 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™ Room Temp PCM Panels

for FFPE, platelets, biospecimens & more



Tan 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 cool (in extreme heat) | Lab Incubator | Lab Incubator (≈ 3 hrs*) | Precise panel temperature Maximum hold times | Lab incubator required |
| | B | Keep product cool (in extreme heat) | Fridge | Fridge (≈ 2 hrs) Room (≈ 2 hrs*) | Uses a standard refrigerator | Multi-step Wait time before assembly |
| | C | Keep product warm (in cold conditions) | Lab Incubator | Lab Incubator (≈ 3 hrs*) | Precise panel temperature Maximum hold times | Lab incubator required |
| | D | Keep product warm (in cold conditions) | | Room (≈ 3 hrs*) | No equipment needed | Tight parameters on the room temperature |



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

About Room Temp 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 temperature-sensitive applications.

Cool Cube™ **Room Temp PCM** has a melting point of 21.5 °C/70.7 °F. When the PCM is solid, a panel helps the Cool Cube™ stay cool (about 22 °C) in hot environments. When the PCM is liquid, a panel helps the Cool Cube™ stay warm (about 21 °C) in cold conditions. It's right around that 21.5 °C/70.7 °F where a PCM panel's temperature plateaus for a while during the warming up and/or cooling down processes.

How to prepare Room Temp PCM panels for use in the Cool Cube™

Cool Cube™ Room Temp PCM Panels

for FFPE, platelets, biospecimens & more.

All Sizes



Tan Tab/Label



PCM Panel for **ROOM** temps
(20-23°C / 68-73°F)

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

Part: CC-PCMP-R102
S/N

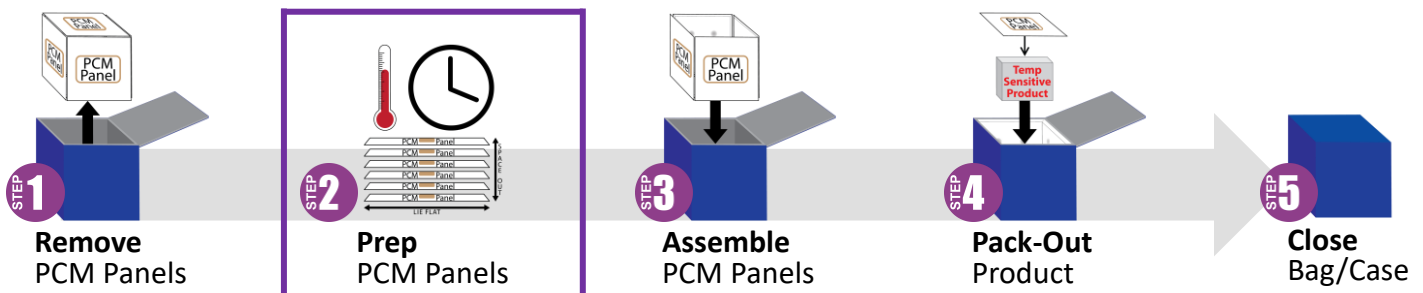
Do not expose to extreme heat (27°C/81°F) or use otherwise directed.

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VeriCorMed.com/PCM

Video



Prep Method A: Lab Incubator Prep to keep product cool



This prep is for when the Cool Cube™ will be used in hot environments (above 25°C).

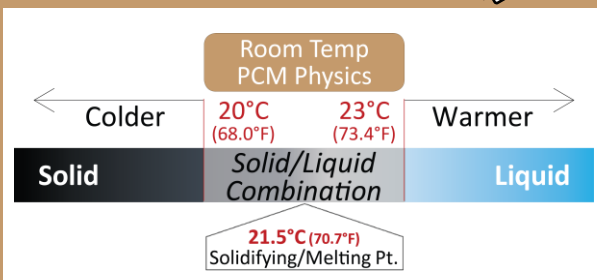
Panel Prep

2.1 Lay panels flat in a lab incubator (or other 15-20°C environment) until all the PCM (phase change material inside the panel) turns solid. At 15°C/59°F the PCM will solidify in a day or two.*

* If the incubator temperature is ever warmer than 20°C, panels may not get completely solid (manufacturing tolerances). If stored within the temperature parameters of the product, but are still liquid, panels may be used but the hold time will decrease. Although panels are liquid, the PCM inside is at the temperature of storage environment after 3 hours (i.e. stored in a 22°C incubator, the PCM panels are at 22°C). Assembling the Cool Cube™ with this additional thermal mass will keep product at room temperature, just for a shorter amount of time than the lab-validated results.

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 Temps: 15-25°C | 20-24°C |
|---------------|--------------------------|--------------------------|---------|
| Cool Cube™ 03 | Utilizing Six (6) | 91 hrs | 47 hrs |
| Cool Cube™ 08 | Lab Freezer Temp | 83 hrs | 66 hrs |
| Cool Cube™ 28 | PCM Panels | 141 hrs | 85 hrs |
| Cool Cube™ 96 | (Tan Tab/Label) | 143 hrs | 91 hrs |

Times listed are based on lab-validated, 24-hour cycles of summer & winter profiles (hot & cold 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™ Room Temp PCM Panels

for FFPE, platelets, biospecimens & more.

All Sizes



Tan Tab/Label



PCM Panel for **ROOM** temps
(20-23°C / 68-73°F)

Remove → Prep (Lay flat) → Assemble → Pack-Out → Close

Part: CC-PCMP-R102 S/N

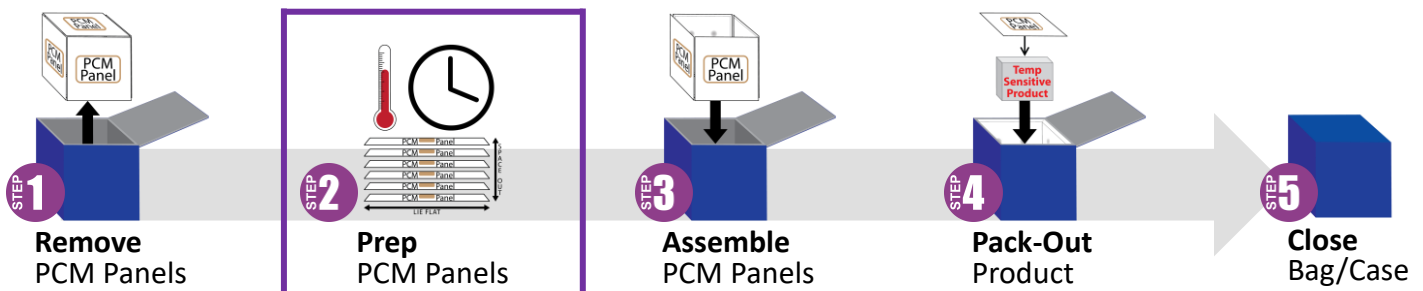
Do not expose to extreme heat (27°C/81°F) or use otherwise directed.

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Video



Prep Method B: Fridge/Room Prep to keep product cool



DO NOT assemble panels directly from a fridge, as they may be initially below 20°C.

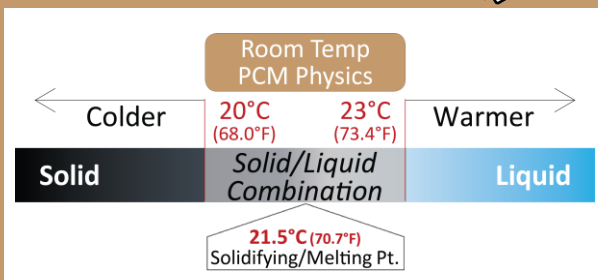
Panel Prep

- 2.1 Lay panels flat in a refrigerator until all the PCM (phase change material inside the panel) turns solid. At 4°C/39°F the PCM will solidify in a couple hours.
- 2.2 Spread panels out (enable airflow to all sides) in a room just before use to allow the PCM inside to rise to the appropriate operating temperature. Approximate times:

| | | |
|------------------------|-------------------------|------------------------|
| "03" size = 35 minutes | <i>Times based on a</i> | "28" size = 45 minutes |
| "08" size = 40 minutes | <i>22°C/72°F room.</i> | "96" size = 50 minutes |
- 2.3 Shake panels to verify the PCM is solid with just a little liquid. If a little liquid is heard, it is at 21.5°C. If there is a lot of 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. Wipe off condensate and proceed with assembly.



PCM Panel Shake Test



ISTA 7D Thermal Performance Study

Lab-Qualified Hold Times When Starting with Solid PCM

| | | Qualified Temps: 15-25°C | 20-24°C |
|---------------|-------------------|--------------------------|---------|
| Cool Cube™ 03 | Utilizing Six (6) | 91 hrs | 47 hrs |
| Cool Cube™ 08 | Lab Freezer Temp | 83 hrs | 66 hrs |
| Cool Cube™ 28 | PCM Panels | 141 hrs | 85 hrs |
| Cool Cube™ 96 | (Tan Tab/Label) | 143 hrs | 91 hrs |

Times listed are based on lab-validated, 24-hour cycles of summer & winter profiles (hot & cold 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™ Room Temp PCM Panels

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All Sizes



Tan Tab/Label



PCM Panel for **ROOM** temps
(20-23°C / 68-73°F)

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

Do not expose to extreme heat (27°C/81°F) or use pressure cleaner.

Part: CC-PCM-R102 S/N

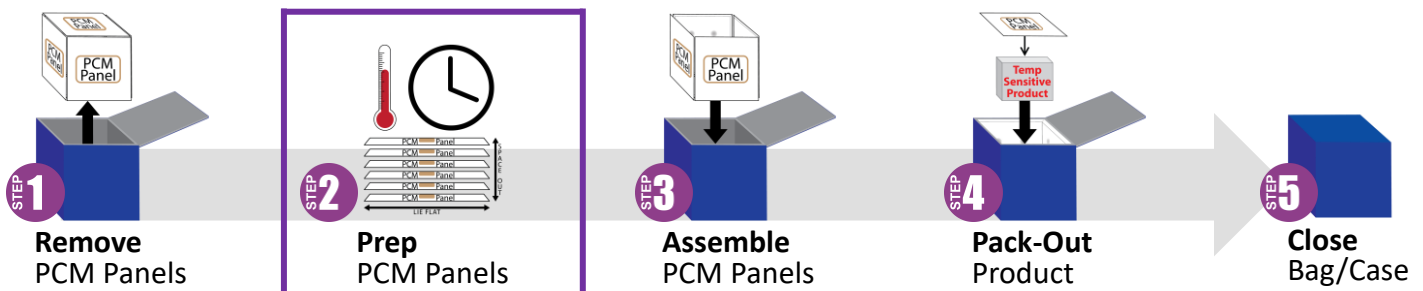
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Prep Method C: Lab Incubator Prep to keep product warm



This prep is for when the Cool Cube™ will be used in **cold conditions (below 15°C)**.

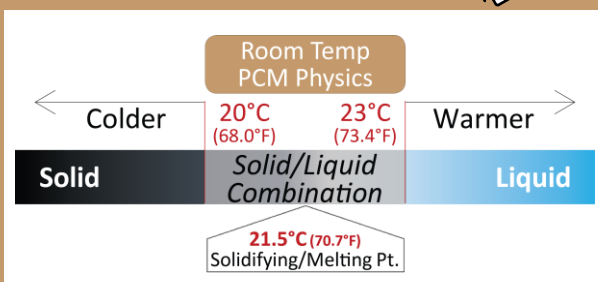
Panel Prep

2.1 Place panels in a lab incubator 23-24°C for at least 24 hours before use so the PCM (phase change material inside the panel) is liquid.*

* Panels may be stored in the fridge until needed for assembly or the PCM solidifies. If an incubator maintains 23°C or above, the PCM within the panels will not get solid (the solidifying point is 21.5°C), keeping the PCM liquid indefinitely until pack-out. Liquid panels will protect the product from getting cold until the PCM inside becomes completely solid.

2.2 Shake panels to verify the PCM is liquid. If they are solid, restart at step 2.1 to ensure the longest hold time. Liquid PCM panels will prevent the product from getting cold (at room temps) in a cold environment the longest. Using solid 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 Temps: 15-25°C | 20-24°C |
|---------------|--------------------------|--------------------------|---------|
| Cool Cube™ 03 | Utilizing Six (6) | 91 hrs | 47 hrs |
| Cool Cube™ 08 | Lab Freezer Temp | 83 hrs | 66 hrs |
| Cool Cube™ 28 | PCM Panels | 141 hrs | 85 hrs |
| Cool Cube™ 96 | (Tan Tab/Label) | 143 hrs | 91 hrs |

Times listed are based on lab-validated, 24-hour cycles of summer & winter profiles (hot & cold 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™ Room Temp PCM Panels

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All Sizes



Tan Tab/Label



PCM Panel for **ROOM** temps
(20-23°C / 68-73°F)

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

Do not expose to extreme heat (27°C/81°F) or use pressure cleaner.

Part: CC-PCM-R102 S/N

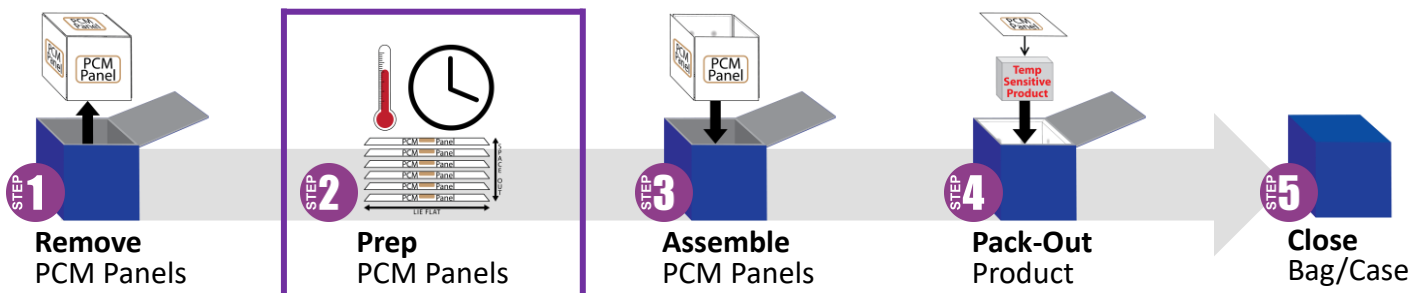
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Prep Method D: Room Prep to keep product warm



This prep is for when the Cool Cube™ will be used in **cold conditions (below 15°C)**.

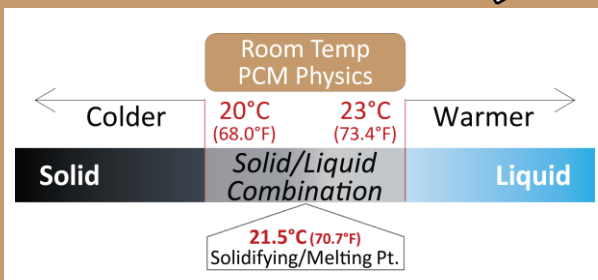
Panel Prep

2.1 Place panels in a room between 23-24°C for at least 24 hours before use so the PCM (phase change material inside the panel) is liquid.*

* Panels may be stored in a room until needed for assembly or the PCM solidifies. If a room maintains 23°C or above, the PCM within the panels will not get solid (the solidifying point is 21.5°C), keeping the PCM liquid indefinitely until pack-out. Liquid panels will protect the product from getting cold until the PCM inside becomes completely solid.

2.2 Shake panels to verify the PCM is liquid. If they are solid, restart at step 2.1 to ensure the longest hold time. Liquid PCM panels will prevent the product from getting cold (at room temps) in a cold environment the longest. Using solid 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 Temps: 15-25°C | 20-24°C |
|---------------|--------------------------|--------------------------|---------|
| Cool Cube™ 03 | Utilizing Six (6) | 91 hrs | 47 hrs |
| Cool Cube™ 08 | Lab Freezer Temp | 83 hrs | 66 hrs |
| Cool Cube™ 28 | PCM Panels | 141 hrs | 85 hrs |
| Cool Cube™ 96 | (Tan Tab/Label) | 143 hrs | 91 hrs |

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