Thermogard XP®

Intravascular Temperature Management System

ZOLL®

Targeted Temperature Management

When it matters most

Temperature is one of the four main vital signs

Maintaining target temperature is vital to life. Targeted Temperature Management, which includes fever control, therapeutic hypothermia (TH), and warming, has been shown to improve outcomes, reduce complications, and deliver a beneficial economic impact on society and hospitals.[1-6]

Major medical societies recommend temperature management as the standard of care for many critically ill or surgical patients.

- AANS American Association of Neurological Surgeons
- AHA American Heart Association
- ASA American Society of Anesthesiologists

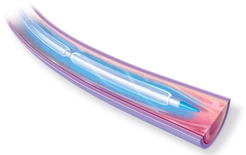
Thermogard XP® reaches and maintains target temperature within ± 0.2°C 100% of the time.[7-13]

Regardless of your target temperature, we can get you there.[11] **Every time.**[13]

How Intravascular Temperature Management works

Central to ZOLL's Thermogard XP system is its ability to cool and warm patients from the core. The system consists of the Thermogard XP (TGXP) console and a multi-balloon heat-exchange catheter. **Cool or warm saline circulates through the catheter (not infusing into the patient) in a closed loop design**, quickly cooling or warming the patient as venous blood passes over the balloons.

A direct line to advanced care



ZOLL's patented catheter **doubles as a standard central venous catheter (CVC)** as it delivers precise temperature management.

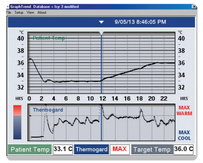
The catheter is placed in the femoral, subclavian, or internal jugular vein. Vein site selection is determined by the cooling/warming application and the unique needs of the patient.

Catheter Name	Quattro®	Icy®	Cool Line®	Solex 7®
Number of Heat-Exchange Balloons	4	3	2	Serpentine
Number of Infusion Lumens	3	3	3	3
Insertion Site	Femoral	Femoral	Subclavian Internal Jugular Femoral	Subclavian Internal Jugular
Outer Diameter (OD) at Insertion Site	9.3 F	9.3 F	9.3 F	9.3 F
Length	45 cm	38 cm	22 cm	20 cm
Dwell Time	4 days	4 days	7 days	7 and 4 days*

*Solex 7 is cleared for 7-day dwell time for fever control and 4-day dwell time for cardiac and neurosurgery use.

Focus on patient management

Thermogard XP (TGXP) is designed to let you **focus on the patient rather than on device management.** Once the catheter is placed and the target temperature is set, TGXP takes over — reaching and maintaining target temperature rapidly and reliably. TGXP constantly monitors the patient and automatically adjusts to the selected target temperature.

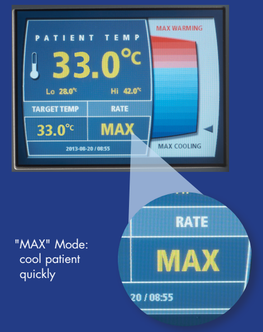


Track patient and system data, then electronically transfer it to the patient's file.

Once treatment is complete, it's easy to view and graph patient data using TempTrend™ software.

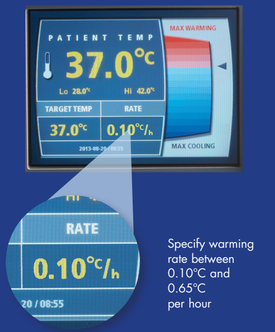
Consistent control for targeted temperature management

COOLING

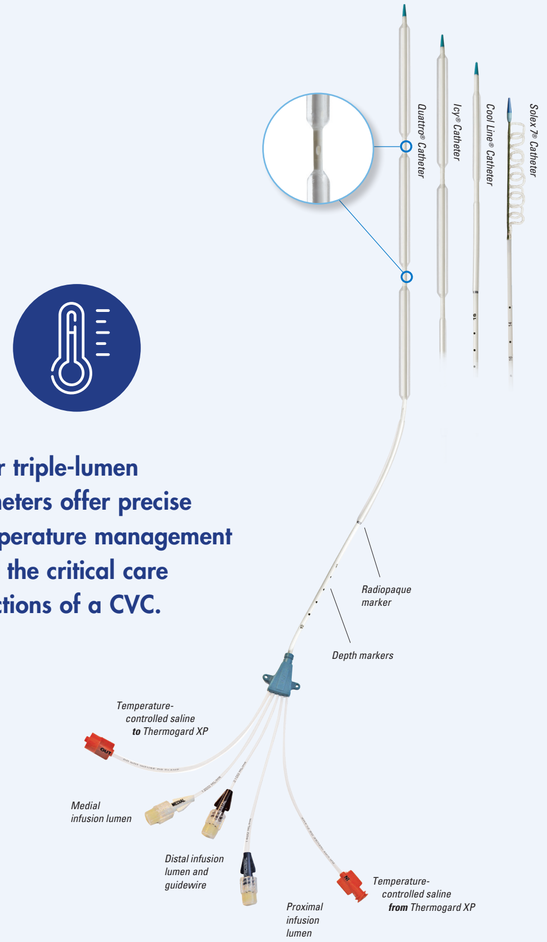


"MAX" Mode: cool patient quickly

WARMING



Specify warming rate between 0.10°C and 0.65°C per hour



Four triple-lumen catheters offer precise temperature management and the critical care functions of a CVC.

[1] Deye N, et al. Circulation. 2015; 132:182-193.

[2] 2020 AHA Guidelines.

[3] Medicare cost analysis data supplied by Freudman Healthcare Consulting LLC, 2008.

[4] Kapinos G, et al. Neurology. 2017; 88:1-2.

[5] Fink K, et al. Anaesthesist. 2008; 57(12):1155-1160.

[6] Waard MC, et al. Emergency Med Journal. 2014;0:1-6.

[7] Hoedemaekers CW, et al. Critical Care. 2007;11:R91.

[8] Diringer MN, et al. Critical Care Medicine. 2004;(32)2:559-564.

[9] Sonder P, et al. Resuscitation. 2018; 124:14-20.

[10] Bartlett E, et al. Resuscitation. 2019;124:82-85.

[11] Horn CM, et al. Journal of Neurointerventional Surgery. 2014 Mar;6(2):91-95.

[12] Knapik P, et al. Kardiologia Polska. 2011;69(11):1157-1163.

[13] Maekawa T., et al. Therapeutic Hypothermia and Temperature Management Journal. 2020;10(3):179-18.

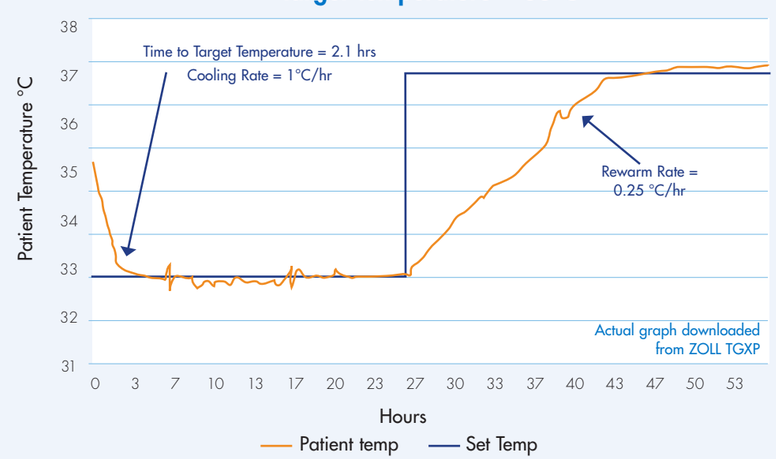
Speed, precision, and efficiency — when it matters most

Enabling efficiency in your workflow

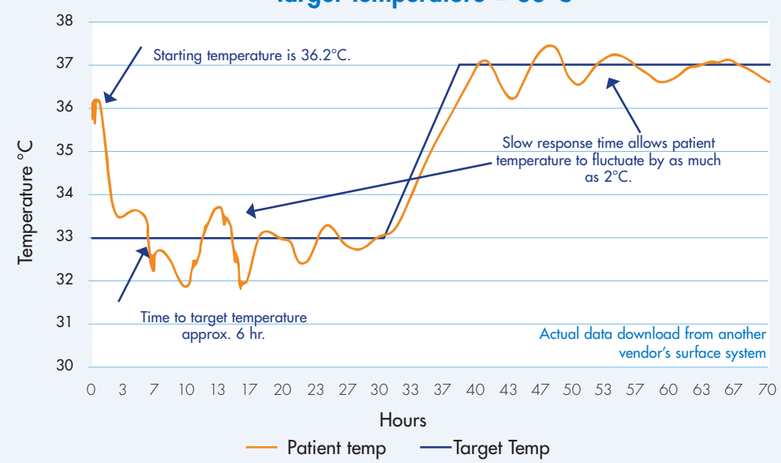
Because it cools and warms from the inside, TGXP offers unhindered patient access. And thanks to intelligent design, it integrates seamlessly into your workflow.

- Reduces nursing workload by 74%[1] — no need to constantly monitor temperature, manage shivering, check pads, etc.
- Doubles as a central venous catheter (CVC) — no other catheter is needed. The TGXP system delivers temperature management and doubles as a triple-lumen catheter.
- Reaches and maintains target temperature within ±0.2°C 100% of the time.[2-8]
- Results in a lower rate of shivering (4%[3] vs. 85%[9] with surface), which may require less sedation and can be used in awake, non-intubated patients.[10]
- Unhindered patient access allows for full-body counter-warming.
- Clinical evidence shows better outcomes: 35% better long-term neurological outcomes than surface cooling.[1]
- Can be used with patients who are not candidates for surface (i.e., burn, trauma, fragile skin).
- Effective choice for high BMI patients.[11]
- Console utilizes 50/50 propylene glycol (which is antibacterial in concentrations >20%) as the heat transfer media.

Intravascular Case Study



Surface Case Study



[1] ICEREA Deye N, et al. Circulation. 2015;132:182-193.
[2] Hoedemaekers CW, et al. Critical Care. 2007;11:R91.
[3] Diringer MN, et al. Critical Care Medicine. 2004;(32)2:559-564.
[4] Sonders P, et al. Resuscitation. 2018;124:14-20.
[5] Bartlett E, et al. Resuscitation. 2019;124:82-85.6
[6] Horn CM, et al. Journal of Neurointerventional Surgery. 2014 Mar;6(2):91-95.
[7] Knapik P, et al. Kardiologia Polska. 2011;69(11):1157-1163.
[8] Maekawa T., et al. Therapeutic Hypothermia and Temperature Management Journal. 2020;10(3):179-18.
[9] Carhuapoma JR, et al. Journal of Neurosurgical Anesthesiology. 2003;15(4):313-318.
[10] Erlinge D et al. Circulation. 2010
[11] Ricome S, et al: Ricome et al, Intensive Care Med 2013.

If you are looking to enhance your temperature management program within your hospital, ZOLL offers the resources you need to help ensure the success of your temperature management program within your hospital. ZOLL's Inside Track Clinical Consultants are ICU-trained, with extensive experience in TTM program development, and are up to date on current research and practices.

Partner with ZOLL's Inside Track Clinical Consultants who can help enhance your temperature management program.

Inside Track Program

Enhance Your Temperature Management Program

Our Inside Track Consultants, all experienced registered nurses in the ICU, CCU, or Cath Lab, can offer guidance in assessing your protocol for quality enhancements best suited for your program. ZOLL has a vast library of temperature management protocols from top medical centers around the world.

- Optimize patient flow
- Patient inclusion/exclusion
- Target temperature selection
- Shivering management

Improving Patient Outcomes Through Data-Driven Results

Seeing is believing. You need to see your results in order to measure performance. Our team of clinical consultants will interpret and review each case with you and your team, either virtually or in person.

- Interpretation
- Data review and follow-up
- Clinician feedback

The Importance of Clinical Support

Our clinical consultants have extensive experience in TTM program enhancement and are up to date on current research and practices. ZOLL also offers a variety of educational opportunities along with superior clinical support for your hospital.

Support includes:

- Device technology
- Patient management
- Current scientific evidence
- Clinical pathophysiology

Performance You Can Count On When It Matters Most

Clinical Parameters	Intravascular	Surface
Reaching Target Temperature	100% reached target temperature[1]	29% of patients did not reach target temperature.[2]
Target Temperature Maintained (± 0.2°C)	Superior: 97% of time in range[3]	Poor: 49% of time in range[3]
Time to Target Temperature	Rapid: 45 minutes[1]	Slow: 240 minutes[4]
Target Temperature Overshoot (<32°C)	0%[1]	34%[4]
Time from Event to Start of Cooling	65 minutes[5]	60 minutes[5]
Shivering	4% rate of shivering.[6] May require less sedation and lower doses of paralytics.[7]	85% rate of shivering.[8] May require higher doses of paralytics.[7]
Nursing Time	Minimal: Set temperature and device adjusts automatically. Enables more focus on other aspects of patient care.[9]	Extensive: requires management of temperature overshoot/undershoot,[10] pads, and shivering
Patient Eligibility		
Patients with spinal injuries	Yes	No[11]
Patients with skin issues	Yes	No[11]
Patients on multiple vasopressors	Yes	No[11]
Conscious patients	Yes	No[11]
Patient Access	Unhindered	Limited: at least 40%[11] of the patient is covered with pads and tubing
Adverse Events	Risk of DVT is no greater than a standard CVC[6]	Potential for skin injuries[12-14]
Central Venous Catheter (CVC) Requirement	Integrated: CVC integral to ZOLL catheter design	Additional: Separate CVC required[9]

[1] Maekawa T., et al. Therapeutic Hypothermia and Temperature Management Journal. 2020;10(3): 179-185.

[2] Heard KJ, et al. Resuscitation. 2010;81:9-14.

[3] Hoedemaekers CW, et al. Critical Care. 2007;11:R91.

[4] Glover G, et al. Critical Care (2016) 20:381.

[5] Tomte O, et al. Critical Care Medicine. 2011;39(3):443-449.

[6] Diringer MN, et al. Critical Care Medicine. 2004;(32)2:559-564.

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[9] Vaga A, et al. Resuscitation. 2008;76:25-30.

[10] Merchant RM, et al. Critical Care Medicine. 2006;34:S490-S494.

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[14] Liu YM, et al. Journal of Burn Care & Research. 2014;35(3):e184-186.

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