

Thermal Angel[®]

Blood and IV Fluid Infusion Warmer



TA-200 Product Information

The Thermal Angel is an in-line, battery-powered disposable, lightweight and completely portable blood and IV fluid infusion warming device, capable of intravenous application and irrigation warming. The Thermal Angel TA-200 will strive to achieve 38°C (100.4°F) \pm 3°C at a flow rate of 2 to 150 ml/min given a fluid input temperature of 20°C (68°F) with a fully charged TA-BCE Battery.

Features:

- Lightweight (9 oz), in-line, disposable, portable battery-powered blood and IV fluid infusion warmer
- Will strive to achieve 38°C (100.4°F) \pm 3°C at a flow rate of 2 to 150 ml/min given a fluid input temperature of 20°C (68°F) with a fully charged TA-BCE Battery
- Quick setup within 30 seconds, warms in approximately 45 seconds
- Placed at or near the infusion site for minimal heat loss through tubing
- The unit uses standard luer fittings and will accept all standard IV line sets
- Heaters adjust automatically in response to changes in flow rate
- Disposable (single patient use), no cartridges or cleaning
- Serves as a standard of care in the pre-hospital, hospital and outpatient markets
- Single point of heated infusion from first contact through the entire continuum of care
- Meets AABB standards for blood warming devices

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Thermal Angel TA-200 Performance Specifications:

Output Temperature:	38°C (100.4°F)
Accuracy:	±3°C (5.4°F)
Input Temperature:	20°C (68°F)
Input Flow Rate:	2 to 150 ml/min
Input Voltage:	12 Volts DC from a fully charged power source
Warm-up Time:	Approximately 45 seconds

Thermal Angel TA-200 Absolute Minimum and Maximum Specifications:

	Minimum	Maximum
Output Temperature:	NA	47°C (116.6°F) failsafe fuse
Input Temperature:	4°C (39.2°F)	38°C (100.4°F)
Input Flow Rate:	0 ml/min	200 ml/min
Input Voltage:	10.5 Volts DC	13.8 Volts DC
Storage Temperature:	0°C (32°F)	40°C (104°F)

Thermal Angel TA-200 External Physical Specifications:

Length:	9.0 in. (22.86 cm)
Width:	2.8 in. (7.11 cm)
Depth:	0.95 in. (2.41 cm)
Weight:	9.2 oz. (260.82 g)

Thermal Angel TA-200 Fluid Path Specifications:

Material:	Passivated 316L stainless steel tube
Tube Length:	50.25 in. (127.5 cm)
Tube Wall Thickness:	0.035 in. (.098 cm)
Tube I.D.:	0.117 in. (.30 cm)
Volume:	0.540 cu. in. (8.85 ml)

Thermal Angel TA-200 Heater Specifications:

Type:	Electrical resistance, band heater
Material:	1 oz. copper
Substrate:	3 mil polyester film
Approximate Area:	17 sq. in.
Nominal Power:	216 watts @ 12 Volts DC

Thermal Angel TA-200 Controller Specifications:

Operational Voltage:	5 Volts DC
Processor:	8-bit microcontroller
Clock Rate:	8 MHz
ADC Configuration:	8-bits
Sensor:	NTC Thermistor mounted in fluid stream
Control Algorithm:	Closed-loop PID (Proportional Integral Differential)
Sample Rate:	4.8 Ks/sec