

# Technical Information

## Performance Specifications

Operating Temperature Range:	Model dependent; see table below	
Temperature Stability:	±0.01C (±0.02°F)	
Pump Type:	Variable speed pressure/suction	
	<u>60Hz models</u>	<u>50Hz models</u>
Maximum Pressure:	4.3 psi (0.30 bar)	3.6 psi (0.25 bar)
Maximum Pressure Flow Rate:	5.3 gpm (20.1 lpm)	4.4 gpm (16.7 lpm)
Maximum Suction Flow Rate:	3.9 gpm (14.7 lpm)	3.2 gpm (12.2 lpm)
Heater Wattage:	1100 watts	2200 watts

Model Type	Reservoir Capacity	Temperature Range	Electrical Requirements	
			60Hz Units	50Hz Units
AD7LR-20 Refrigerating / Heating Bath	7 liters	-20° to 200°C -4° to 392°F	120V, 60Hz, 12A	240V, 50Hz, 12A
AD07R-20 Refrigerating / Heating Bath	7 liters	-20° to 200°C -4° to 392°F	120V, 60Hz, 12A	240V, 50Hz, 12A
AD07R-40 Refrigerating / Heating Bath	7 liters	-40° to 200°C -40° to 392°F	120V, 60Hz, 12A	240V, 50Hz, 12A
AD15R-30 Refrigerating / Heating Bath	15 liters	-30° to 200°C -22° to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A
AD15R-40 Refrigerating / Heating Bath	15 liters	-40° to 200°C -40° to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A
AD20R-30 Refrigerating / Heating Bath	20 liters	-30° to 200°C -22° to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A
AD28R-30 Refrigerating / Heating Bath	28 liters	-30° to 200°C -22° to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A
AD45R-20 Refrigerating / Heating Bath	45 liters	-25° to 135°C -13° to 275°F	208-240V, 50/60Hz, 12A	208-240V, 50/60Hz, 12A
AD07H200 Heating Only Bath	7 liters	Ambient +10° to 200°C Ambient +20° to 392°F	120V, 60Hz, 10A	240V, 50Hz, 10A
AD15H200 Heating Only Bath	15 liters	Ambient +10° to 200°C Ambient +20° to 392°F	120V, 60Hz, 10A	240V, 50Hz, 10A
AD20H200 Heating Only Bath	20 liters	Ambient +10° to 200°C Ambient +20° to 392°F	120V, 60Hz, 10A	240V, 50Hz, 10A
AD28H200 Heating Only Bath	28 liters	Ambient +10° to 200°C Ambient +20° to 392°F	120V, 60Hz, 10A	240V, 50Hz, 10A
AD06S150 Open Bath System	6 liters	Ambient +10° to 150°C Ambient +20° to 302°F <sup>(1)</sup>	120V, 60Hz, 10A	240V, 50Hz, 10A
AD10S150 Open Bath System	10 liters	Ambient +10° to 150°C Ambient +20° to 302°F <sup>(1)</sup>	120V, 60Hz, 10A	240V, 50Hz, 10A
AD20S150 Open Bath System	20 liters	Ambient +10° to 150°C Ambient +20° to 302°F <sup>(1)</sup>	120V, 60Hz, 10A	240V, 50Hz, 10A
AD28S150 Open Bath System	28 liters	Ambient +10° to 150°C Ambient +20° to 302°F <sup>(1)</sup>	120V, 60Hz, 10A	240V, 50Hz, 10A
AD29VB5R Viscosity Bath	29 liters	Ambient +10° to 85°C Ambient +20° to 185°F <sup>(2)</sup>	120V, 60Hz, 10A	240V, 50Hz, 10A
AD29VB3S Viscosity Bath	29 liters	Ambient +10° to 85°C Ambient +20° to 185°F <sup>(2)</sup>	120V, 60Hz, 10A	240V, 50Hz, 10A

1. Maximum operating temperature at which ±0.01°C temperature stability can be maintained; Advanced Digital Controller is capable of higher temperatures.





2. Maximum operating temperature for polycarbonate tank. Advanced Digital Controller capable of higher temperatures.


Environmental Conditions	Indoor use only	
Maximum Altitude:	2000 meter	
Operating Ambient:	5° to 35°C (41° to 95°F)	
Relative Humidity:	80%, non-condensing	
Installation Category:	II	
Pollution Degree:	2	
Ingress Protection:	IP 31	
Climate Class:	SN	
Software Class:	B	
Output Waveform:	Sinusoidal	

Specifications subject to change without notice.

## Reservoir Fluids

Depending on your needs, a variety of fluids can be used with your Circulator. No matter what bath fluid is selected, it must be chemically compatible with the reservoir and the materials in your Circulator. It must also be suitable for the desired temperature range.

	<p><b>WARNING:</b> When using Class III flammable fluids per DIN 12876-1, the user must attach the following warning labels to the front of the unit so that they are well visible:</p>		
	<p><b>Warning Label</b> W09 Colors: Yellow/black</p>		<p><b>Danger Area.</b> <b>Attention! Observe instructions (operating manual, safety data sheet)</b></p>
	<p><b>Mandatory Label</b> M018 Colors: Blue/white</p> <p>or</p> <p>Semi S1-0701 Table A1-2 #9 Colors: Blue/white</p>	  	<p><b>Carefully read the user information prior to beginning operation.</b> Scope: EU</p> <p><b>Carefully read the user information prior to beginning operation.</b> Scope: NAFTA</p>

	<p><b>WARNING:</b> Always use fluids that satisfy safety, health, and equipment compatibility requirements. Be aware of the chemical hazards that may be associated with the bath fluid used. Observe all safety warnings for the fluids used as well as those contained in the material safety data sheet.</p>
---	---

For optimum temperature stability, the fluid's viscosity should be 50 centistokes (cSt) or less at its lowest operating temperature. This permits good fluid circulation and minimizes heating from the pump.

For temperatures from 10°C to 90°C, distilled water is recommended. For temperatures below 10°C, a mixture of laboratory grade ethylene glycol and water should be used. Do not use deionized water.

The following chart is intended to serve as a guide in selecting a bath fluid for your application. For optimum temperature stability and low vaporization, be sure to stay within the fluid's normal temperature range.

**You are responsible for proper selection and use of the fluids. Avoid extreme range operation.**

Fluid Description	Viscosity (cSt) @ 25°C	Specific Heat			Normal Temperature Range	Extreme Temperature Range
		@ Fluid Temperature	BTU/lb°F	KJ/Kg°C		
distilled water	1	50°C	1.00	4.18	10° to 90°C	2° to 100°C
polyclear MIX 30	1	50°C	1.00	4.18	15° to 90°C	2° to 100°C
polytherm S150	50	100°C	0.41	1.71	50° to 150°C	5° to 270°C*
polytherm S200	125	150°C	0.40	1.67	100° to 200°C	80° to 232°C*
polytherm S250	500	200°C	0.39	1.63	150° to 250°C	125° to 260°C*
polytherm M170	40	85°C	0.40	1.67	50° to 170°C	25° to 190°C
polycool HC -50	3	-30°C	0.62	2.59	-50° to 100°C	-62° to 118°C
polycool EG -25 (50/50 mix with distilled H <sub>2</sub> O)	20	-20°C	0.78	3.26	-25° to 100°C	-30° to 115°C
polycool EG -25 (30/70 mix with distilled H <sub>2</sub> O)	12	0°C	0.89	3.72	0° to 95°C	-15° to 107°C
polycool PG -20 (50/50 mix with distilled H <sub>2</sub> O)	20	-10°C	0.83	3.47	-20° to 100°C	-30° to 115°C
polycool PG -20 (30/70 mix with distilled H <sub>2</sub> O)	12	5°C	0.92	3.85	5° to 90°C	-10° to 107°C
polycool MIX -25 (50/50 mix with distilled H <sub>2</sub> O)	20	-20°C	0.78	3.26	-25° to 100°C	-30° to 115°C
polycool MIX -25 (30/70 mix with distilled H <sub>2</sub> O)	12	0°C	0.89	3.72	0° to 95°C	-15° to 107°C



**\*WARNING:** This is the fluid's flash point temperature.



**WARNING: DO NOT USE THE FOLLOWING LIQUIDS:**

- Automotive antifreeze with additives\*\*
- Hard tap water\*\*
- Deionized water with a specific resistance > 1 meg ohm
- Concentrations of acids or bases
- Solutions with halides: chlorides, fluorides, bromides, iodides or sulfur
- Bleach (Sodium Hypochlorite)
- Solutions with chromates or chromium salts
- Glycerine
- Syltherm fluids

\*\* At temperatures above 40°C, additives or mineral deposits can adhere to the heater. If deposits are allowed to build up, the heater may overheat and fail. Higher temperatures and higher concentrations of additives will hasten deposit build up.

## Application Notes

At a fluid's low temperature extreme:

- The presence of ice or slush adversely affects temperature stability.
- A viscosity above 10 centistokes adversely affects temperature uniformity.
- A high fluid viscosity and high pump speed adds heat to the fluid being pumped.

At a fluid's temperature above ambient without refrigeration:

- If your set point temperature is less than 15°C above the ambient temperature, the viscosity of the fluid should be 10 centistokes or less to minimize friction heating of the fluid.
- Heat loss should be encouraged by uncovering the fluid and lowering the pump speed.

At a fluid's high temperature extreme:

- Heat loss from vapor adversely affects temperature stability.
- To prevent the accumulation of vapors inside the room, the reservoir may need to be placed under a fume hood.
- Use a cover and/or floating hollow balls to help prevent heat and vapor loss.
- Replenish fluid lost from vapor frequently.

## Tubing and Fitting Temperature Ranges

Material	Temperature Range
Buna N tubing	-40° to 120°C
Viton® tubing	-32° to 200°C
Braided Teflon® lined tubing	-50° to 225°C
Stainless steel fittings	-45° to 225°C
Nylon fittings	-40° to 90°C
Brass fittings	-40° to 80°C

## Fluid Compatibility

	Buna N Tubing	Viton Tubing	Braided Teflon Tubing	Stainless Steel Fittings	Nylon Fittings	Brass Fittings
polycool EG -25	A	A	A	B	A	B
polycool PG -20	A	A	A	B		B
polycool HC -50	B	B	A	B	B	B
polytherm S150	B	B	A	B		B
polytherm S200	B	B	A	B		B
polytherm S250	B	B	A	B		B
polytherm M170)	A	A	A	A		B
polycool MIX -25	A	A	A	B	A	B
polyclear MIX 30	A	A	A	A	A	A

A = Excellent B = Good