

	<b>⚠ CAUTION</b>
	<p><b>GENERAL HAZARD</b> If cooling water has not been connected damage to the equipment can result. Verify that cooling water has been connected before turning on the unit.</p>

### 3.2.5.1 Ensure Cooling Water is Adequate

Measure the inlet water temperature. It must be 55-85°F (13-29°C). Make sure the minimum flow rate for the water's temperature is adequate. See [Table 3-4](#).

**NOTE:** *Cooling water may be warmer in the summer than in the winter.*

Cooling water should be clean. Polycold recommends filtering cooling water if it is very dirty or has abrasives in it. Any chemical impurities in the cooling water must be compatible with copper.

Table 3-4: Cooling Water Flow Requirements

Refrigeration Unit	Water Inlet Temperature °F (°C)	Minimum Flow Rate gpm (L/min)	Pressure Drop Inside the Unit psi (kPa)	Pressure Drop in Supply Line† psi/ft (kPa/m)	Heat Rejection Btu/Hour (kW)
550, 551, 552	55 (13) (Min)	1.3 (4.9)	0.3 (2.1)	no data	23,900 (7.0)
	65 (18)	1.7 (6.4)	0.6 (4.1)	no data	23,900 (7.0)
	75 (24)	2.6 (9.8)	1.3 (9.0)	no data	23,900 (7.0)
	85 (29) (Max.)	5.2 (19.7)	5.3 (36.6)	0.06 (1.4)	23,900 (7.0)
660, 661, 662, 670, 672	55 (13) (Min)	1.8 (6.8)	0.5 (3.4)	no data	33,400 (9.8)
	65 (18)	2.4 (9.1)	0.8 (5.5)	no data	33,400 (9.8)
	75 (24)	3.6 (13.6)	1.8 (12.4)	no data	33,400 (9.8)
	85 (29) (Max.)	7.3 (27.6)	7.6 (52.4)	0.11 (2.5)	33,400 (9.8)

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1100, 1101, 1102	55 (13) (Min)	3.6 (13.6)	1.6 (11.0)	no data	65,500 (19.2)
	65 (18)	4.8 (18.2)	2.8 (19.3)	no data	65,500 (19.2)
	75 (24)	7.2 (27.3)	6.3 (43.4)	no data	65,500 (19.2)
	85 (29) (Max.)	14.3 (54.1)	24.8 (171)	0.15 (3.4)	65,500 (19.2)
<p><b>NOTE:</b> †For 550s, 660s, and 670s these numbers assume a 1/2-inch (15 mm) standard pipe size. For 1100s, these numbers assume a 3/4-inch (20 mm) standard pipe size. The maximum working pressure of the unit's cooling water circuit is 200 psig (1380 kPa).</p>					

### 3.2.5.2 Connect a Supply Line and a Drain Line to Refrigeration Unit

Use the correct size pipe, see “Tools and Materials Needed” at the beginning of this section. For 550, 551, 552, 660, 661, 662, 670, and 672 the COOLING WATER connections have 1/2-inch female NPT fittings. For 1100, 1101, and 1102 the COOLING WATER connections have 3/4-inch female NPT fittings.

Connect the supply line to the port marked IN. Connect the drain line to the port marked OUT. The cooling water must flow in this direction to properly cool the unit. (See [Figure 3-12](#).)

### 3.2.5.3 Estimate the Correct Flow Rate

Ensure that the minimum flow rate is achieved. (See [Table 3-4](#).)

To determine the correct flow rate, check both the liquid line temperature and the water outlet temperature when the unit is in COOL. (This will be checked in [section 3.4.4 Evaluate the Cryopump](#).)

**Optional:** Install pressure gauges to the cooling water supply and drain lines at the unit. Measure the cooling water pressures. Make sure pressure drops correspond to the flow rate needed for the cooling water temperature.