



**THERMALCARE**  
PiovanGroup



## Product Catalog

TSE Series Scroll Central Chillers

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## Standard Features

### Direct Drive Scroll Compressors

Direct-drive hermetically sealed scroll compressors with proven performance in industrial cooling for reliable, low maintenance, and efficient operation.

### Stainless Steel Evaporator

High-efficiency stainless steel plates with copper brazing provide maximum performance, long life, and an enhanced level of protection from harsh process conditions.

### Evaporator Inlet Strainer

The evaporator inlet strainer removes any debris present in the process fluid to prevent costly downtime and repair due to a clogged chiller evaporator.

### Fits through Doors

Single circuit chillers up to 80 tons are compact and easily fit through standard 36-inch wide doors for easy maneuvering into tight installation spaces.

### Dual Circuit Manifolds

Dual circuit chillers include evaporator manifolds and water-cooled condenser units include condenser water manifolds for quick and easy installation.

### Modular Expandable System

Our modular system design provides for system expansion to over 1,000 tons using up to six chillers and twelve refrigeration circuits.

### Single or Multiple Circuit Configurations

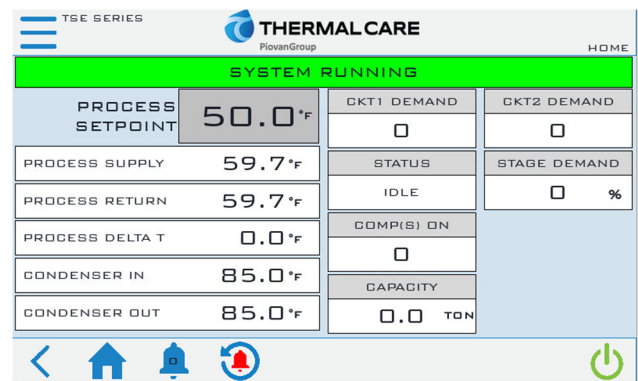
Dual-circuit chillers for redundancy and back up of critical processes or systems and single-circuit chillers for dedicated loads.

### UL 508A Industrial Control Panel

Every chiller has a UL label certifying our panel design and components comply with UL 508A standards ensuring the panels are safe and consistent for reliable operation.

### Color Touch-Screen Display

A high-resolution, high-speed, 7-inch color touch-screen with English text clearly shows chiller operation for quick and easy monitoring and control of the system.



Standard PLC Home Screen

### CONNEX4.0 Ready Controls

Every chiller is equipped with an Ethernet port and is fully compatible with the CONNEX4.0 plant-wide equipment control and monitoring system.

### Warranty

1 year entire unit parts

1 year labor

## Available Options

### Integral Reservoir and Pumping System

An integral stainless steel reservoir and pumping system all piped, insulated, and wired to the chiller control panel for a quick and easy complete chilled water system installation. Available on chillers up to 160 tons.

### Rotary Non-Fused Disconnect Switch

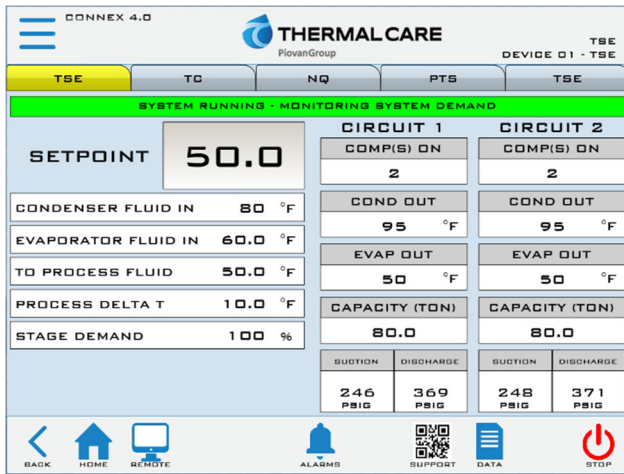
Adds a 5 kA SCCR (Short Circuit Current Rating) rotary non-fused disconnect switch to the control panel for safe lockout of main power.

### 12 inch HMI

Replaces the standard 7-inch screen with a 12-inch, high resolution, color screen with a built-in industrial computer to allow for remote monitoring and control using Teamviewer software installed on any remote Windows based PC or smart phone.

### 12-inch HMI and CONNEX4.0 Master Controller

Replaces the standard 7-inch screen with a 12-inch, high resolution, color screen with a built-in industrial computer to allow for remote monitoring and control using Teamviewer software installed on any remote Windows based PC or smart phone. This package also adds a second PLC to allow for connection of up to 15 total Thermal Care Connex4.0 ready devices for many ways to interact with the connected equipment such as smart phone/tablet control, configurable email and text alerts for alarms, warnings, event alerts, and data collection.



### BACnet Communications Port

Adds a ModBUS to BACnet gateway which is wired to a RS-485 connector on the chiller control panel.

### Hot Gas Bypass Valve

For applications with sudden batch loads or prolonged periods of extremely low loads, a hot-gas bypass valve is available to provide an added level of unloading and temperature control beyond compressor staging.

### Condenser Coil Coating

For applications where a chiller with a remote air-cooled condenser is in an area within 10 miles of a saltwater coast, this option provides an added level of protection for the aluminum condenser coil from possible corrosion from salt air.

# Physical Data

## Water-Cooled Condenser Single-Circuit Chillers

	TSEW010S	TSEW015S	TSEW020S	TSEW025S	TSEW030S	TSEW040S
Cooling Capacity <sup>1</sup>	11 tons (39 kW)	16 tons (56 kW)	22 tons (77 kW)	27 tons (95 kW)	32 tons (113 kW)	42 tons (148 kW)
Set Point Range	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C
Compressors (qty)	2	2	2	2	2	2
Process In/Out (in) – Standard	1½	1½	2	2	2½	2½
w/high flow evaporator option	2	2½	2½	3	3	4
Condenser Water In & Out (in)	1½	2	2	2½	2½	3
Length	68 in (173 cm)	72 in (183 cm)	75 in (191 cm)	75 in (191 cm)	77 in (196 cm)	102 in (259 cm)
Width	30 in (76 cm)	30 in (76 cm)	30 in (76 cm)	30 in (76 cm)	30 in (76 cm)	30 in (76 cm)
Height	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)
Ship Weight	990 lbs 449 kg	1,072 lbs 486 kg	1,149 lbs 521 kg	1,189 lbs 539 kg	1,339 lbs 607 kg	1,763 lbs 800 kg
Operating Weight	1,005 lbs 456 kg	1,092 lbs 495 kg	1,179 lbs 535 kg	1,222 lbs 554 kg	1,376 lbs 624 kg	1,823 lbs 827 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	23	37	48	57	64	82
MOP @ 460/3/60 (amps) <sup>3</sup>	35	60	70	90	100	125
Reservoir Capacity	275 gal (1,041 L)	275 gal (1,041 L)	275 gal (1,041 L)	275 gal (1,041 L)	275 gal (1,041 L)	275 gal (1,041 L)
Process / Chiller Pump (hp)	5/1.5	5/1.5	5/1.5	5/1.5	7.5/2	10/2
Process Connection Size (in)	1½	1½	2	2	2½	2½
Condenser Water In & Out (in)	1½	2	2	2½	2½	3
Length	99 in (252 cm)	99 in (252 cm)	99 in (252 cm)	99 in (252 cm)	99 in (252 cm)	99 in (252 cm)
Width	68 in (173 cm)	72 in (183 cm)	75 in (191 cm)	75 in (191 cm)	78 in (198 cm)	98 in (249 cm)
Height	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)
Ship Weight	2,337 lbs 1,061 kg	2,418 lbs 1,097 kg	2,496 lbs 1,132 kg	2,537 lbs 1,151 kg	2,769 lbs 1,256 kg	3,238 lbs 1,469 kg
Operating Weight	4,631 lbs 2,101 kg	4,712 lbs 2,137 kg	4,790 lbs 2,173 kg	4,831 lbs 2,191 kg	5,063 lbs 2,297 kg	5,532 lbs 2,509 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	33	45	55	63	74	94
MOP @ 460/3/60 (amps) <sup>3</sup>	45	70	80	100	110	150
Reservoir Capacity	400 gal (1,514 L)	400 gal (1,514 L)	400 gal (1,514 L)	400 gal (1,514 L)	400 gal (1,514 L)	400 gal (1,514 L)
Process/Chiller Pump (hp)	5/1.5	7.5/1.5	10/1.5	10/1.5	10/2	15/2
Process Connection Size (in)	2	2½	2½	3	3	4
Condenser Water In & Out (in)	1½	2	2	2½	2½	3
Length	99 in (252) cm	99 in (252 cm)	99 in (252 cm)	99 in (252 cm)	99 in (252 cm)	99 in (252) cm
Width	68 in (173 cm)	72 in (183 cm)	75 in (191 cm)	75 in (191 cm)	78 in (198 cm)	98 in (249 cm)
Height	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)
Ship Weight	2,850 lbs 1,293 kg	2,950 lbs 1,338 kg	3,100 lbs 1,406 kg	3,150 lbs 1,429 kg	3,450 lbs 1,565 kg	4,000 lbs 1,815 kg
Operating Weight	6,200 lbs 2,812 kg	6,300 lbs 2,858 kg	6,450 lbs 2,926 kg	6,500 lbs 2,948 kg	6,800 lbs 3,084 kg	7,350 lbs 3,334 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	33	51	65	74	81	106
MOP @ 460/3/60 (amps) <sup>3</sup>	45	70	90	100	110	150

<sup>1</sup>Cooling capacity when cooling water with 50°F (10°C) set point, 60°F (16°C) return, 85°F (29°C) condenser water, R410A or R454B refrigerant.

<sup>2</sup>MCA-Minimum Circuit Amps under full load, used for minimum wire size requirement.

<sup>3</sup>MOP-Maximum Overcurrent Protection, used for sizing main power protection device.

## Water-Cooled Condenser Single-Circuit Chillers (continued)

	TSEW050S	TSEW060S	TSEW080S	TSEW100S	TSEW120S
Cooling Capacity <sup>1</sup>	53 tons (186 kW)	69 tons (243 kW)	86 tons (302 kW)	110 tons (387 kW)	128 tons (450 kW)
Set Point Range	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C
Compressors (qty)	2	2	2	3	3
Process In/Out (in) – Standard	3	4	4	4	4
w/high flow evaporator option	4	4	n/a	6	6
Condenser Water In & Out (in)	3	4	4	4	4
Length	92 in (234 cm)	102 in (259 cm)	102 in (259 cm)	123 in (312 cm)	125 in (318 cm)
Width	36 in (91 cm)	36 in (91 cm)	36 in (91 cm)	30 in (76 cm)	30 in (76 cm)
Height	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)	70 in (178 cm)	71 in (180 cm)
Ship Weight	1,802 lbs 817 kg	2,294 lbs 1,041 kg	2,467 lbs 1,119 kg	3,230 lbs 1,465 kg	3,250 lbs 1,474 kg
Operating Weight	1,872 lbs 849 kg	2,380 lbs 1,080 kg	2,557 lbs 1,160 kg	3,330 lbs 1,510 kg	3,350 lbs 1,520 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	100	124	172	209	247
MOP @ 460/3/60 (amps) <sup>3</sup>	150	175	250	300	350
Reservoir Capacity	275 gal (1,041 L)	450 gal (1,703 L)	450 gal (1,703 L)	The TSEW100S and TSEW120S are not available with an integral reservoir	
Process / Chiller Pump (hp)	10/3	10/3	15/3		
Process Connection Size (in)	3	3	4		
Condenser Water In & Out (in)	3	4	4		
Length	102 in (259 cm)	114 in (290 cm)	114 in (290 cm)		
Width	102 in (259 cm)	101 in (257 cm)	101 in (257 cm)		
Height	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)		
Ship Weight	3,374 lbs 1,530 kg	4,147 lbs 1,881 kg	4,370 lbs 1,982 kg		
Operating Weight	5,668 lbs 2,571 kg	7,901 lbs 3,584 kg	8,124 lbs 3,685 kg		
MCA @ 460/3/60 (amps) <sup>2</sup>	111	132	184		
MOP @ 460/3/60 (amps) <sup>3</sup>	175	200	300		
Reservoir Capacity	400 gal (1,514 L)	650 gal (2,461 L)	650 gal (2,461 L)	The TSEW100S and TSEW120S are not available with an integral reservoir	
Process/Chiller Pump (hp)	15/3	20/3	25/3		
Process Connection Size (in)	4	4	6		
Condenser Water In & Out (in)	3	4	4		
Length	102 in (259 cm)	114 in (290 cm)	114 in (290 cm)		
Width	102 in (259 cm)	101 in (257 cm)	101 in (257 cm)		
Height	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)		
Ship Weight	4,250 lbs 1,928 kg	4,950 lbs 2,245 kg	5,750 lbs 2,608 kg		
Operating Weight	7,600 lbs 3,447 kg	10,400 lbs 4,717 kg	11,200 lbs 5,080 kg		
MCA @ 460/3/60 (amps) <sup>2</sup>	126	155	211		
MOP @ 460/3/60 (amps) <sup>3</sup>	175	200	300		

<sup>1</sup>Cooling capacity when cooling water with 50°F (10°C) set point, 60°F (16°C) return, 85°F (29°C) condenser water, R410A or R454B refrigerant.

<sup>2</sup>MCA Minimum Circuit Amps under full load, used for minimum wire size requirement

<sup>3</sup>MOP-Maximum Overcurrent Protection, used for sizing main power protection device.

## Water-Cooled Condenser Dual-Circuit Chillers

	TSEW020D	TSEW030D	TSEW040D	TSEW050D	TSEW060D	TSEW080D
Cooling Capacity <sup>1</sup>	22 tons (77 kW)	32 tons (113 kW)	44 tons (155 kW)	54 tons (190 kW)	65 tons (229 kW)	84 tons (295 kW)
Set Point Range	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C
Compressors Circuit 1 (qty)	2	2	2	2	2	2
Compressors Circuit 2 (qty)	2	2	2	2	2	2
Process In/Out (in) – Standard	2	2½	2½	3	3	4
w/high flow evaporator option	2½	3	4	4	4	6
Condenser Water In/Out (in)	2	2½	3	3	4	4
Length	76 in (193 cm)	77 in (196 cm)	80 in (203 cm)	81 in (206 cm)	87 in (221 cm)	117 in (297 cm)
Width	48 in (122 cm)	49 in (125 cm)	50 in (127 cm)	50 in (127 cm)	52 in (132 cm)	51 in (130 cm)
Height	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)
Ship Weight	1,925 lbs 873 kg	2,093 lbs 949 kg	2,255 lbs 1,023 kg	2,343 lbs 1,063 kg	2,657 lbs 1,205 kg	3,516 lbs 1,595 kg
Operating Weight	1,955 lbs 887 kg	2,133 lbs 968 kg	2,315 lbs 1,050 kg	2,409 lbs 1,093 kg	2,731 lbs 1,239 kg	3,636 lbs 1,649 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	42	69	90	107	120	154
MOP @ 460/3/60 (amps) <sup>3</sup>	60	90	125	150	150	200
Reservoir Capacity	275 gal (1,041 L)	275 gal (1,041 L)	275 gal (1,041 L)	275 gal (1,041 L)	450 gal (1,703 L)	450 gal (1,703 L)
Process/Chiller Pump (hp)	5/1.5	7.5/2	10/2	10/3	10/3	15/3
Process Connection Size (in)	2	2½	2½	3	3	4
Condenser Water In/Out (in)	2	2½	3	3	4	4
Length	123 in (312 cm)	123 in (312 cm)	123 in (312 cm)	123 in (312 cm)	135 in (343 cm)	135 in (343 cm)
Width	74 in (188 cm)	74 in (188 cm)	77 in (196 cm)	78 in (198 cm)	81 in (206 cm)	98 in (249 cm)
Height	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)	75 in (191 cm)	75 in (191 cm)	79 in (201 cm)
Ship Weight	3,486 lbs 1,581 kg	3,748 lbs 1,700 kg	3,948 lbs 1,791 kg	4,068 lbs 1,845 kg	4,546 lbs 2,062 kg	5,390 lbs 2,445 kg
Operating Weight	5,780 lbs 2,622 kg	6,042 lbs 2,741 kg	6,229 lbs 2,825 kg	6,362 lbs 2,886 kg	8,300 lbs 3,765 kg	9,144 lbs 4,148 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	53	84	108	126	139	180
MOP @ 460/3/60 (amps) <sup>3</sup>	70	100	150	175	175	225
Reservoir Capacity	400 gal (1,514 L)	400 gal (1,514 L)	400 gal (1,514 L)	400 gal (1,514 L)	650 gal (2,461 L)	650 gal (2,461 L)
Process/Chiller Pump (hp)	10/1.5	10/2	15/2	15/3	20/3	25/3
Process Connection Size (in)	2½	3	4	4	4	6
Condenser Water In/Out (in)	2	2½	3	3	4	4
Length	123 in (312 cm)	123 in (312 cm)	123 in (312 cm)	123 in (312 cm)	135 in (343 cm)	135 in (343 cm)
Width	74 in (188 cm)	74 in (188 cm)	77 in (196 cm)	78 in (198 cm)	81 in (206 cm)	98 in (249 cm)
Height	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)	75 in (191 cm)	75 in (191 cm)	79 in (201 cm)
Ship Weight	5,950 lbs 2,699 kg	6,400 lbs 2,903 kg	6,750 lbs 3,062 kg	6,950 lbs 3,153 kg	8,950 lbs 4,060 kg	10,300 lbs 4,672 kg
Operating Weight	7,200 lbs 3,266 kg	7,650 lbs 3,470 kg	8,000 lbs 3,629 kg	8,200 lbs 3,720 kg	10,900 lbs 4,944 kg	12,250 lbs 5,557 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	61	87	115	133	152	193
MOP @ 460/3/60 (amps) <sup>3</sup>	80	110	150	175	200	250

<sup>1</sup>Cooling capacity when cooling water with 50°F (10°C) set point, 60°F (16°C) return, 85°F (29°C) condenser water, R410A or R454B refrigerant.

<sup>2</sup>MCA is Minimum Circuit Amps under full load, used for minimum wire size requirement.

<sup>3</sup>MOP is Maximum Overcurrent Protection, used for sizing main power protection device.

<sup>4</sup>To keep shipping dimensions within the 102" (259cm) width of a standard flatbed, the condenser inlet manifold ships separately.



## Water-Cooled Condenser Dual-Circuit Chillers (continued)

	TSEW 100D	TSEW 120D	TSEW 160D	TSEW 200D	TSEW 240D
Cooling Capacity <sup>1</sup>	106 tons (373 kW)	137 tons (482 kW)	171 tons (601 kW)	220 tons (774 kW)	256 tons (900 kW)
Set Point Range	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C
Compressors Circuit 1 (qty)	2	2	2	3	3
Compressors Circuit 2 (qty)	2	2	2	3	3
Process In/Out (in) – Standard	4	4	6	6	6
w/high flow evaporator option	6	6	n/a	8	8
Condenser Water In/Out (in)	4	6	6	6	6
Length	113 in (287 cm)	119 in (302 cm)	120 in (305 cm)	139 in (353 cm)	141 in (368 cm)
Width	52 in (132 cm)	54 in (137 cm)	54 in (137 cm)	60 in (152 cm)	60 in (152 cm)
Height	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)	70 in (178 cm)	71 in (180 cm)
Ship Weight	3,595 lbs 1,631 kg	4,361 lbs 1,978 kg	4,736 lbs 2,148 kg	5,760 lbs 2,613 kg	5,780 lbs 2,622 kg
Operating Weight)	3,735 lbs 1,694 kg	4,533 lbs 2,056 kg	4,916 lbs 2,230 kg	5,960 lbs 2,703 kg	5,980 lbs 2,713 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	188	233	324	397	474
MOP @ 460/3/60 (amps) <sup>3</sup>	250	300	400	500	600
Reservoir Capacity	700 gal (2,650 L)	700 gal (2,650 L)	1,000 gal (3,785 L)	The TSEW200D and TSEW240D are not available with an integral reservoir	
Process/Chiller Pump (hp)	15/5	20/7.5	25/10		
Process Connection Size (in)	4	4	6		
Condenser Water In/Out (in)	4	6	6		
Length	135 in (343 cm)	135 in (343 cm)	148 in (376 cm)		
Width	102 in (259 cm)	111 <sup>4</sup> in (282 cm)	111 <sup>4</sup> in (282 cm)		
Height	79 in (201 cm)	79 in (201 cm)	90 in (229 cm)		
Ship Weight	6,067 lbs 2,752 kg	7,160 lbs 3,248 kg	8,168 lbs 3,705 kg		
Operating Weight	11,936 lbs 5,414 kg	12,999 lbs 5,896 kg	16,510 lbs 7,489 kg		
MCA @ 460/3/60 (amps) <sup>2</sup>	217	267	372		
MOP @ 460/3/60 (amps) <sup>3</sup>	300	300	450		
Reservoir Capacity	1,000 gal (3,785 L)	1,000 gal (3,785 L)	1,000 gal (3,785 L)	The TSEW200D and TSEW240D are not available with an integral reservoir	
Process/Chiller Pump (hp)	30/5	40/7.5	40/10		
Process Connection Size (in)	6	6	6		
Condenser Water In/Out (in)	4	6	6		
Length	135 in (343 cm)	135 in (343 cm)	148 in (376 cm)		
Width	102 in (259 cm)	111 <sup>4</sup> in (282 cm)	111 <sup>4</sup> in (282 cm)		
Height	79 in (201 cm)	79 in (201 cm)	90 in (229 cm)		
Ship Weight	13,050 lbs 5,919 kg	14,150 lbs 6,418 kg	18,500 lbs 8,392 kg		
Operating Weight	16,250 lbs 7,371 kg	17,250 lbs 7,825 kg	19,500 lbs 8,845 kg		
MCA @ 460/3/60 (amps) <sup>2</sup>	236	292	390		
MOP @ 460/3/60 (amps) <sup>3</sup>	300	350	500		

<sup>1</sup>Cooling capacity when cooling water with 50°F (10°C) set point, 60°F (16°C) return, 85°F (29°C) condenser water, R410A or R454B refrigerant.

<sup>2</sup>MCA is Minimum Circuit Amps under full load, used for minimum wire size requirement.

<sup>3</sup>MOP is Maximum Overcurrent Protection, used for sizing main power protection device.

<sup>4</sup>To keep shipping dimensions within the 102" (259cm) width of a standard flatbed, the condenser inlet manifold ships separately.

## Remote Air-Cooled Condenser Single-Circuit Chillers

	TSER 010S	TSER 015S	TSER 020S	TSER 025S	TSER 030S
Cooling Capacity <sup>1</sup>	10 tons (35 kW)	15 tons (53 kW)	20 tons (70 kW)	25 tons (88 kW)	30 tons (105 kW)
Set Point Range	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C
Compressors (qty)	2	2	2	2	2
Process In/Out(in) – Standard	1½	1½	2	2	2½
w/high flow evaporator option	2	2½	2½	3	3
Refrigerant Discharge Line (in)	¾	1⅛	1⅛	1¾	1¾
Refrigerant Liquid Line (in)	⅝	⅞	⅞	1⅛	1⅛
Length	64 in (163 cm)	65 in (165 cm)	68 in (173 cm)	68 in (173 cm)	74 in (188 cm)
Width	30 in (76 cm)	30 in (76 cm)	30 in (76 cm)	30 in (76 cm)	30 in (76 cm)
Height	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)
Ship Weight	897 lbs 407 kg	1,024 lbs 465 kg	1,060 lbs 481 kg	1,076 lbs 488 kg	1,202 lbs 545 kg
Operating Weight	912 lbs 414 kg	1,044 lbs 474 kg	1,090 lbs 494 kg	1,109 lbs 503 kg	1,239 lbs 562 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	23	37	48	57	64
MOP @ 460/3/60 (amps) <sup>3</sup>	35	60	70	90	100
Reservoir Capacity	275 gal (1,041 L)	275 gal (1,041 L)	275 gal (1,041 L)	275 gal (1,041 L)	275 gal (1,041 L)
Process/Chiller Pump (hp)	5/1.5	5/1.5	5/1.5	5/1.5	7.5/2
Process Connection Size (in)	1½	1½	2	2	2½
Refrigerant Discharge Line (in)	¾	1⅛	1⅛	1¾	1¾
Refrigerant Liquid Line (in)	⅝	⅞	⅞	1⅛	1⅛
Length	99 in (252 cm)	99 in (252 cm)	99 in (252 cm)	99 in (252 cm)	99 in (252 cm)
Width	66 in (168 cm)	66 in (168 cm)	67 in (170 cm)	67 in (170 cm)	71 in (180 cm)
Height	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)
Ship Weight	2,267 lbs 1,028 kg	2,370 lbs 1,075 kg	2,407 lbs 1,092 kg	2,423 lbs 1,099 kg	2,628 lbs 1,192 kg
Operating Weight	4,561 lbs 2,069 kg	4,664 lbs 2,116 kg	4,701 lbs 2,132 kg	4,717 lbs 2,140 kg	4,922 lbs 2,233 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	33	45	55	63	74
MOP @ 460/3/60 (amps) <sup>3</sup>	45	70	80	100	110
Reservoir Capacity	400 gal (1,514 L)	400 gal (1,514 L)	400 gal (1,514 L)	400 gal (1,514 L)	400 gal (1,514 L)
Process/Chiller Pump (hp)	5/1.5	7.5/1.5	10/1.5	10/1.5	10/2
Process Connection Size(in)	2	2½	2½	3	3
Refrigerant Discharge Line (in)	¾	1⅛	1⅛	1¾	1¾
Refrigerant Liquid Line (in)	⅝	⅞	⅞	1⅛	1⅛
Length	99 in (252 cm)	99 in (252 cm)	99 in (252 cm)	99 in (252 cm)	99 in (252 cm)
Width	66 in (168 cm)	66 in (168 cm)	67 in (170 cm)	67 in (170 cm)	71 in (180 cm)
Height	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)
Ship Weight	2,800 lbs 1,270 kg	2,950 lbs 1,338 kg	2,950 lbs 1,338 kg	3,000 lbs 1,361 kg	3,300 lbs 1,497 kg
Operating Weight	6,150 lbs 2,790 kg	6,300 lbs 2,858 kg	6,300 lbs 2,858 kg	6,350 lbs 2,880 kg	6,650 lbs 3,016 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	33	51	65	74	81
MOP @ 460/3/60 (amps) <sup>3</sup>	45	70	90	100	110

<sup>1</sup>Cooling capacity when cooling water with 50°F (10°C) set point, 60°F (16°C) return, 95°F (35°C) condenser air, R410A or R454B refrigerant.

<sup>2</sup>MCA is Minimum Circuit Amps under full load, used for minimum wire size requirement.

<sup>3</sup>MOP is Maximum Overcurrent Protection, used for sizing main power protection device.

## Remote Air-Cooled Condenser Single-Circuit Chillers (continued)

	TSER 040S	TSER 050S	TSER 060S	TSER 080S
Cooling Capacity <sup>1</sup>	39 tons (137 kW)	49 tons (172 kW)	64 tons (225 kW)	79 tons (278 kW)
Set Point Range	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C
Compressors (qty)	2	2	2	2
Process In/Out(in) – Standard	2½	3	4	4
w/high flow evaporator option	4	4	4	n/a
Refrigerant Discharge Line (in)	1¾	1¾	1½	2½
Refrigerant Liquid Line (in)	1½	1½	1¾	1½
Length	102 in (259 cm)	99 in (252 cm)	102 in (259 cm)	102 in (259 cm)
Width	30 in (76 cm)	36 in (91 cm)	36 in (91 cm)	36 in (91 cm)
Height	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)
Ship Weight	1,554 lbs 705 kg	1,588 lbs 720 kg	1,995 lbs 905 kg	2,161 lbs 980 kg
Operating Weight	1,614 lbs 732 kg	1,658 lbs 752 kg	2,081 lbs 944 kg	2,251 lbs 1021 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	82	100	124	172
MOP @ 460/3/60 (amps) <sup>3</sup>	125	150	175	250
Reservoir Capacity	275 gal (1,041 L)	275 gal (1,041 L)	450 gal (1,703)	450 gal (1,703)
Process/Chiller Pump (hp)	10/2	10/3	10/3	15/3
Process Connection Size (in)	2½	3	3	4
Refrigerant Discharge Line (in)	1¾	1¾	1½	2½
Refrigerant Liquid Line (in)	1½	1½	1¾	1½
Length	99 in (252 cm)	102 in (259 cm)	114 in (290 cm)	114 in (290 cm)
Width	98 in (249 cm)	102 in (259 cm)	101 in (257 cm)	101 in (257 cm)
Height	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)
Ship Weight	3,030 lbs 1,374 kg	3,158 lbs 1,432 kg	3,846 lbs 1,745 kg	4,063 lbs 1,843 kg
Operating Weight	5,324 lbs 2,415 kg	5,452 lbs 2,473 kg	7,600 lbs 3,447 kg	7,817 lbs 3,546 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	94	111	132	184
MOP @ 460/3/60 (amps) <sup>3</sup>	150	175	200	300
Reservoir Capacity	400 gal (1,514 L)	400 gal (1,514 L)	650 gal (2,461 L)	650 gal (2,461 L)
Process/Chiller Pump (hp)	15/2	15/3	20/3	25/3
Process Connection Size(in)	4	4	4	6
Refrigerant Discharge Line (in)	1¾	1¾	1½	2½
Refrigerant Liquid Line (in)	1½	1½	1¾	1½
Length	99 in (252 cm)	102 in (259 cm)	114 in (290 cm)	114 in (290 cm)
Width	98 in (249 cm)	102 in (259 cm)	101 in (257 cm)	101 in (257 cm)
Height	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)	73 in (185 cm)
Ship Weight	3,750 lbs 1,701 kg	4,000 lbs 1,814 kg	4,600 lbs 2,087 kg	5,350 lbs 2,427 kg
Operating Weight	7,100 lbs 3,221 kg	7,350 lbs 3,334 kg	10,050 lbs 4,559 kg	10,800 lbs 4,899 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	106	126	155	211
MOP @ 460/3/60 (amps) <sup>3</sup>	150	175	200	300

<sup>1</sup>Cooling capacity when cooling water with 50°F (10°C) set point, 60°F (16°C) return, 95°F (35°C) condenser air, R410A or R454B refrigerant.

<sup>2</sup>MCA is Minimum Circuit Amps under full load, used for minimum wire size requirement.

<sup>3</sup>MOP is Maximum Overcurrent Protection, used for sizing main power protection device.

## Remote Air-Cooled Condenser Dual-Circuit Chillers

	TSER 020D	TSER 030D	TSER 040D	TSER 050D	TSER 060D
Cooling Capacity <sup>1</sup>	20 tons (70 kW)	30 tons (105 kW)	41 tons (144 kW)	50 tons (176 kW)	60 tons (211 kW)
Set Point Range	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C
Compressors Circuit 1 (qty)	2	2	2	2	2
Compressors Circuit 2 (qty)	2	2	2	2	2
Process In/Out(in) – Standard	2	2½	2½	3	3
w/high flow evaporator option	2½	3	4	4	4
Refrigerant Discharge Line/Circuit (in)	¾	1⅛	1⅛	1¾	1¾
Refrigerant Liquid Line/Circuit (in)	⅝	¾	¾	1⅛	1⅛
Length	76 in (193 cm)	77 in (196 cm)	80 in (203 cm)	81 in (206 cm)	87 in (221 cm)
Width	48 in (122 cm)	48 in (122 cm)	48 in (122 cm)	48 in (122 cm)	48 in (122 cm)
Height	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)
Ship Weight	1,722 lbs 781 kg	1,760 lbs 798 kg	1,834 lbs 832 kg	2,091 lbs 949 kg	2,335 lbs 1,059 kg
Operating Weight	1,752 lbs 795 kg	1,800 lbs 817 kg	1,894 lbs 859 kg	2,157 lbs 978 kg	2,409 lbs 1,093 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	42	69	90	107	120
MOP @ 460/3/60 (amps) <sup>3</sup>	60	90	125	150	150
Reservoir Capacity	275 gal (1,041 L)	275 gal (1,041 L)	275 gal (1,041 L)	275 gal (1,041 L)	450 gal (1,703 L)
Process/Chiller Pump (hp)	5/1.5	7.5/2	10/2	10/3	10/3
Process Connection Size (in)	2	2½	2½	3	3
Refrigerant Discharge Line/Circuit (in)	¾	1⅛	1⅛	1¾	1¾
Refrigerant Liquid Line/Circuit (in)	⅝	¾	¾	1⅛	1⅛
Length	123 in (312 cm)	123 in (312 cm)	123 in (312 cm)	123 in (312 cm)	135 in (343 cm)
Width	66 in (168 cm)	66 in (168 cm)	67 in (170 cm)	68 in (173 cm)	71 in (180 cm)
Height	72 in (183 cm)	72 in (183 cm)	72 in (183 cm)	75 in (191 cm)	75 in (191 cm)
Ship Weight	3,335 lbs 1,513 kg	3,634 lbs 1,648 kg	3,624 lbs 1,644 kg	3,814 lbs 1,730 kg	4,224 lbs 1,916 kg
Operating Weight	5,629 lbs 2,553 kg	5,928 lbs 2,689 kg	5,918 lbs 2,684 kg	6,109 lbs 2,771 kg	7,978 lbs 3,619 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	53	84	108	126	139
MOP @ 460/3/60 (amps) <sup>3</sup>	70	100	150	175	175
Reservoir Capacity	400 gal (1,514 L)	400 gal (1,514 L)	400 gal (1,514 L)	400 gal (1,514 L)	650 gal (2,461 L)
Process/Chiller Pump (hp)	10/1.5	10/2	15/2	15/3	20/3
Process Connection Size (in)	2½	3	4	4	4
Refrigerant Discharge Line/Circuit (in)	¾	1⅛	1⅛	1¾	1¾
Refrigerant Liquid Line/Circuit (in)	⅝	¾	¾	1⅛	1⅛
Length	123 in (312 cm)	123 in (312 cm)	123 in (312 cm)	123 in (312 cm)	135 in (343 cm)
Width	66 in (168 cm)	66 in (168 cm)	67 in (170 cm)	68 in (173 cm)	71 in (180 cm)
Height	72 in (183 cm)	72 in (183 cm)	72 in (183 cm)	75 in (191 cm)	75 in (191 cm)
Ship Weight	3,850 lbs 1,746 kg	4,200 lbs 1,905 kg	4,400 lbs 1,996 kg	4,550 lbs 2,064 kg	5,050 lbs 2,291 kg
Operating Weight	7,200 lbs 3,266 kg	7,550 lbs 3,425 kg	7,750 lbs 3,515 kg	7,900 lbs 3,583 kg	10,500 lbs 4,763 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	61	87	115	133	152
MOP @ 460/3/60 (amps) <sup>3</sup>	80	110	150	175	200

<sup>1</sup>Cooling capacity when cooling water with 50°F (10°C) set point, 60°F (16°C) return, 95°F (35°C) condenser air, R410A or R454B refrigerant.

<sup>2</sup>MCA is Minimum Circuit Amps under full load, used for minimum wire size requirement.

<sup>3</sup>MOP is Maximum Overcurrent Protection, used for sizing main power protection device.

## Remote Air-Cooled Condenser Dual-Circuit Chillers (continued)

	TSER 080D	TSER 100D	TSER 120D	TSER 160D
Cooling Capacity <sup>1</sup>	78 tons (274 kW)	98 tons (345 kW)	127 tons (447 kW)	158 tons (556 kW)
Set Point Range	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C	20 to 80°F -7 to 27°C
Compressors Circuit 1 (qty)	2	2	2	2
Compressors Circuit 2 (qty)	2	2	2	2
Process In/Out(in) – Standard	4	4	4	6
w/high flow evaporator option	6	6	6	n/a
Refrigerant Discharge Line/Circuit (in)	1 <sup>3</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>8</sub>
Refrigerant Liquid Line/Circuit (in)	1 <sup>1</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>
Length	117 in (297 cm)	113 in (287 cm)	116 in (295 cm)	120 in (305 cm)
Width	49 in (125 cm)	49 in (125 cm)	49 in (125 cm)	51 in (130 cm)
Height	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)	68 in (173 cm)
Ship Weight	3,061 lbs 1,388 kg	3,129 lbs 1,419 kg	3,820 lbs 1,733 kg	4,069 lbs 1,846 kg
Operating Weight	3,181 lbs 1,443 kg	3,269 lbs 1,483 kg	3,992 lbs 1,811 kg	4,249 lbs 1,927 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	154	188	233	324
MOP @ 460/3/60 (amps) <sup>3</sup>	200	250	300	400
Reservoir Capacity	450 gal (1,703 L)	700 gal (2,650 L)	700 gal (2,650 L)	1,000 gal (3,785 L)
Process/Chiller Pump (hp)	15/3	15/5	20/7.5	25/10
Process Connection Size (in)	4	4	4	6
Refrigerant Discharge Line/Circuit (in)	1 <sup>5</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>8</sub>
Refrigerant Liquid Line/Circuit (in)	1 <sup>1</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>
Length	135 in (343 cm)	135 in (343 cm)	135 in (343 cm)	148 in (376 cm)
Width	99 in (252 cm)	99 in (252 cm)	98 in (249 cm)	101 in (257 cm)
Height	75 in (191 cm)	78 in (198 cm)	79 in (201 cm)	90 in (229 cm)
Ship Weight	5,040 lbs 2,286 kg	5,628 lbs 2,553 kg	6,478 lbs 2,938 kg	7,499 lbs 3,402 kg
Operating Weight	8,794 lbs 3,989 kg	11,467 lbs 5,201 kg	12,317 lbs 5,587 kg	15,841 lbs 7,186 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	180	217	267	372
MOP @ 460/3/60 (amps) <sup>3</sup>	225	300	300	450
Reservoir Capacity	650 gal (2,461 L)	1,000 gal (3,785 L)	1,000 gal (3,785 L)	1,000 gal (3,785 L)
Process/Chiller Pump (hp)	25/3	30/5	40/7.5	40/10
Process Connection Size (in)	6	6	6	6
Refrigerant Discharge Line/Circuit (in)	1 <sup>5</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>8</sub>
Refrigerant Liquid Line/Circuit (in)	1 <sup>1</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>
Length	135 in (343 cm)	135 in (343 cm)	135 in (343 cm)	148 in (376 cm)
Width	99 in (252 cm)	99 in (252 cm)	98 in (249 cm)	101 in (257 cm)
Height	75 in (191 cm)	78 in (198 cm)	79 in (201 cm)	90 in (229 cm)
Ship Weight	6,250 lbs 2,835 kg	7,300 lbs 3,311 kg	8,100 lbs 3,674 kg	10,300 lbs 4,672 kg
Operating Weight	11,700 lbs 5,307 kg	15,650 lbs 7,099 kg	16,450 lbs 7,462 kg	18,650 lbs 8,460 kg
MCA @ 460/3/60 (amps) <sup>2</sup>	193	236	292	390
MOP @ 460/3/60 (amps) <sup>3</sup>	250	300	350	500

<sup>1</sup>Cooling capacity when cooling water with 50°F (10°C) set point, 60°F (16°C) return, 95°F (35°C) condenser air, R410A or R454B refrigerant.

<sup>2</sup>MCA is Minimum Circuit Amps under full load, used for minimum wire size requirement.

<sup>3</sup>MOP is Maximum Overcurrent Protection, used for sizing main power protection device.

## Remote Condensers (Single-Circuit)

Model	KCM014	KCL023	KCL030	KCL037	KCL045	KCL056	KCL068	KCL095	KCL110
Chiller Used With	TSER010S	TSER015S	TSER020S	TSER025S	TSER030S	TSER040S	TSER050S	TSER060S	TSER080S
Number of Fans	2	2	2	2	3	3	4	5	6
Refrigerant Inlet (in)	1 $\frac{3}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{5}{8}$	2 $\frac{5}{8}$	2 $\frac{5}{8}$	3 $\frac{1}{8}$	3 $\frac{1}{8}$
Refrigerant Outlet (in)	1 $\frac{1}{8}$	1 $\frac{3}{8}$	1 $\frac{5}{8}$	1 $\frac{5}{8}$	1 $\frac{5}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{5}{8}$	2 $\frac{5}{8}$
Length	83 in 211 cm	113 in 287 cm	113 in 287 cm	113 in 287 cm	168 in 427 cm	168 in 427 cm	223 in 566 cm	278 in 706 cm	333 in 846 cm
Width	43 in 109 cm	45 in 114 cm	45 in 114 cm	45 in 114 cm	45 in 114 cm	45 in 114 cm	45 in 114 cm	45 in 114 cm	45 in 114 cm
Height	48 in 122 cm	54 in 137 cm	54 in 137 cm	54 in 137 cm	54 in 137 cm	54 in 137 cm	54 in 137 cm	54 in 137 cm	54 in 137 cm
Shipping Weight	415 lbs 188 kg	680 lbs 308 kg	720 lbs 327 kg	1,050 lbs 476 kg	1,075 lbs 488 kg	1,450 lbs 658 kg	1,475 lbs 669 kg	1,950 lbs 885 kg	2,300 lbs 1,043 kg
Operating Weight (lbs)	Varies based on system refrigerant charge and operating conditions								
MCA @ 460/3/60 (amps) <sup>1</sup>	3	7	7	7	10	10	16	16	21
MOP @ 460/3/60 (amps) <sup>2</sup>	15	15	15	15	15	15	20	20	25

<sup>1</sup>MCA is Minimum Circuit Amps, used for minimum wire size requirement.

<sup>2</sup>MOP is Maximum Overcurrent Protection, used for sizing main power protection device.

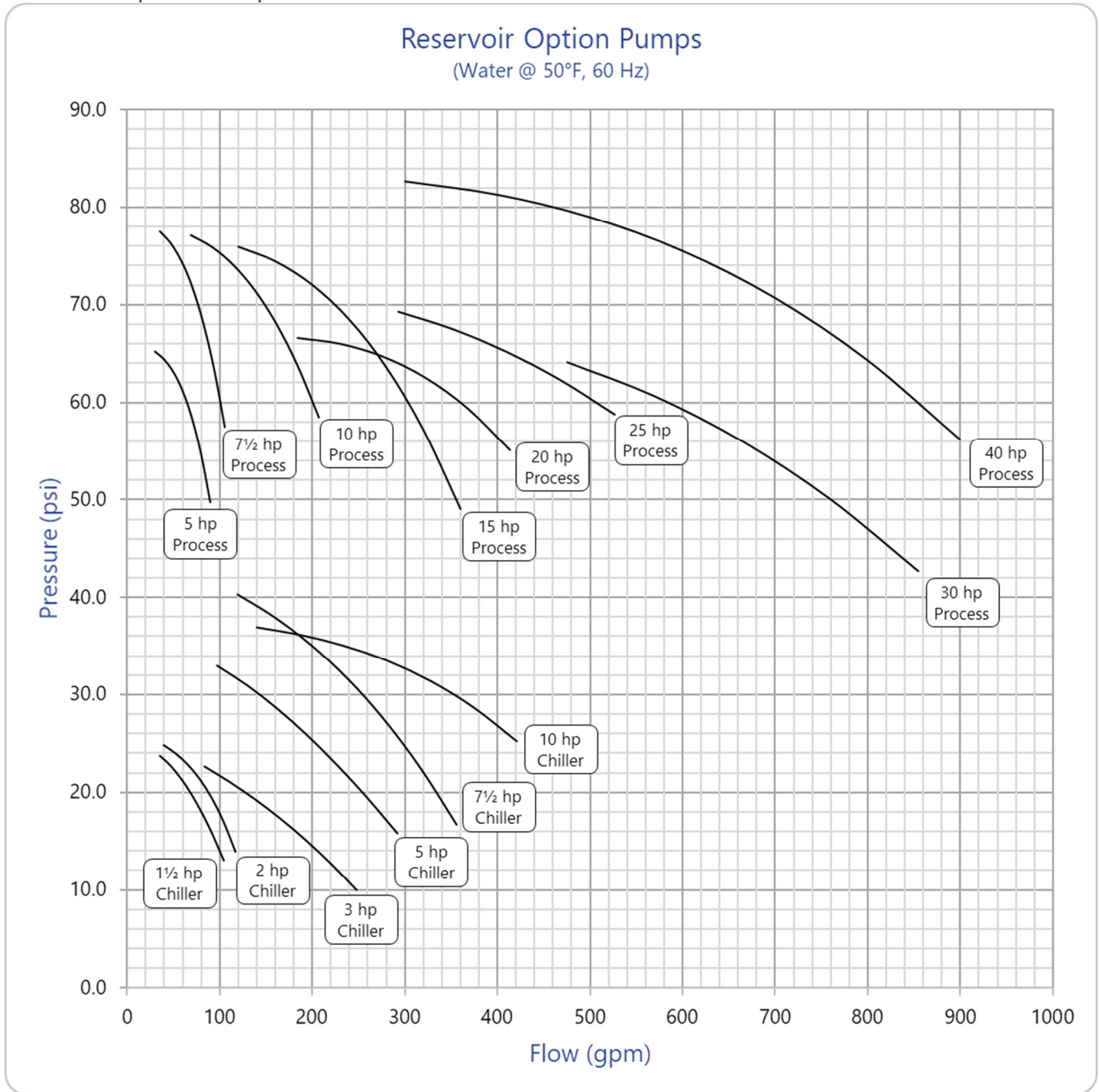
## Remote Condensers (Dual-Circuit)

Model	KCM034	KCL047	KCL060	KCL074	KCL090	KCL112	KCL137	KCL190	KCL224
Chiller Used With	TSER020D	TSER030D	TSER040D	TSER050D	TSER060D	TSER080D	TSER100D	TSER120D	TSER160D
Number of Fans	4	4	4	4	6	6	8	10	12
Refrigerant Inlet (in)	1 $\frac{5}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{5}{8}$	2 $\frac{5}{8}$	3 $\frac{1}{8}$	3 $\frac{1}{8}$
Refrigerant Outlet (in)	1 $\frac{1}{8}$	1 $\frac{3}{8}$	1 $\frac{5}{8}$	1 $\frac{5}{8}$	1 $\frac{5}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{5}{8}$	2 $\frac{5}{8}$
Length	83 in 211 cm	113 in 287 cm	113 in 287 cm	113 in 287 cm	168 in 427 cm	168 in 427 cm	223 in 566 cm	278 in 706 cm	333 in 846 cm
Width	83 in 211 cm	87 in 221 cm	87 in 221 cm	87 in 221 cm	87 in 221 cm	87 in 221 cm	87 in 221 cm	87 in 221 cm	87 in 221 cm
Height	48 in 122 cm	54 in 137 cm	54 in 137 cm	54 in 137 cm	54 in 137 cm	54 in 137 cm	54 in 137 cm	54 in 137 cm	54 in 137 cm
Ship Weight	830 lbs 377 kg	1,175 lbs 533 kg	1,525 lbs 692 kg	1,525 lbs 692 kg	2,000 lbs 907 kg	2,275 lbs 1,032 kg	2,800 lbs 1,270 kg	3,700 lbs 1,678 kg	4,400 lbs 1,996 kg
Operating Weight (lbs)	Varies based on system refrigerant charge and operating conditions								
MCA @ 460/3/60 (amps) <sup>1</sup>	5	16	16	16	21	21	31	36	46
MOP @ 460/3/60 (amps) <sup>2</sup>	15	20	20	20	25	25	35	40	50

<sup>1</sup>MCA is Minimum Circuit Amps, used for minimum wire size requirement.

<sup>2</sup>MOP is Maximum Overcurrent Protection, used for sizing main power protection device.

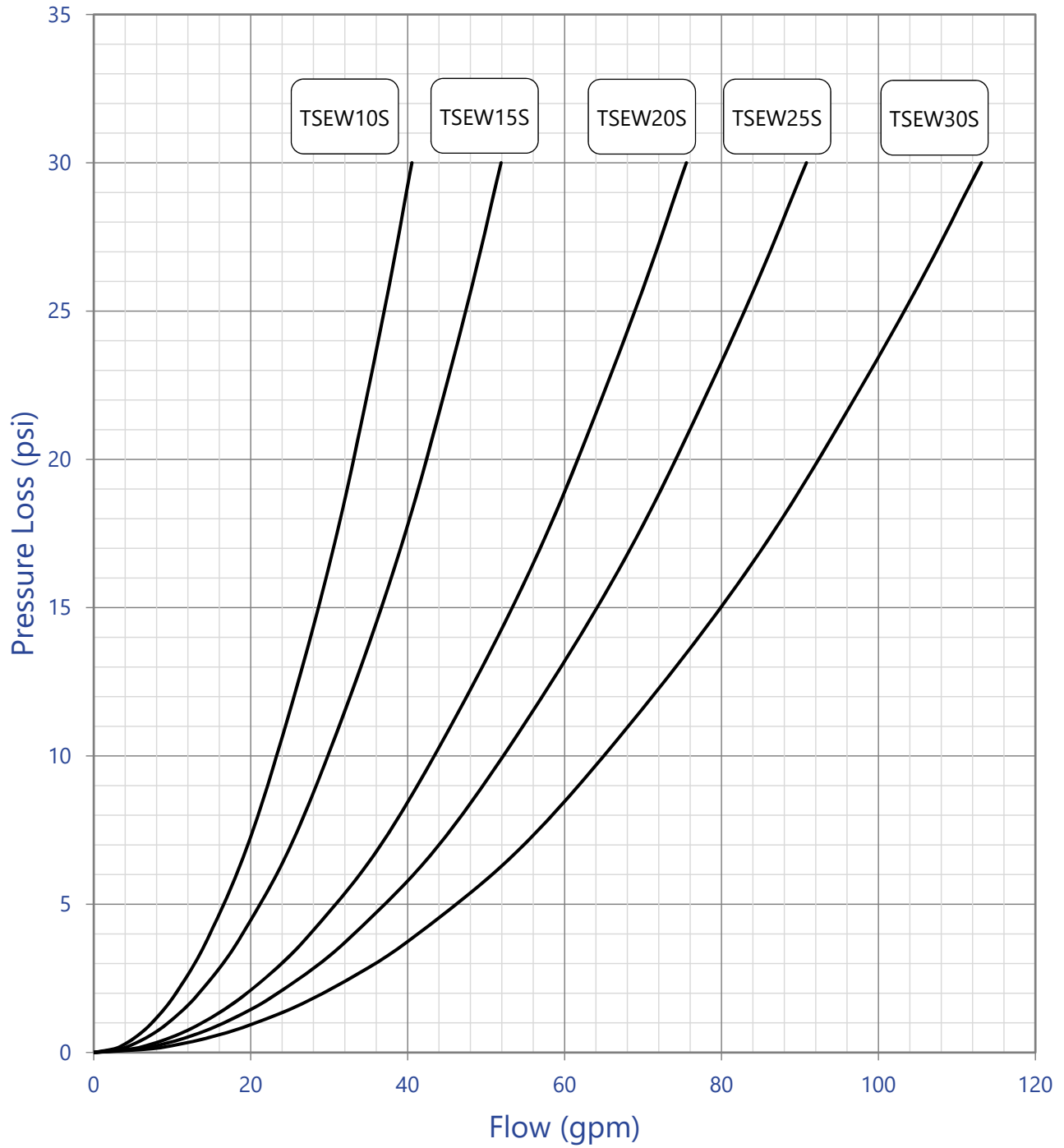
# Reservoir Option Pump Performance



Standard Single-Circuit Chiller Process Circuit Pressure Loss (10 to 30 Ton)

### Standard Single-Circuit Chiller Process Circuit Pressure Loss

(Water @ 50°F)

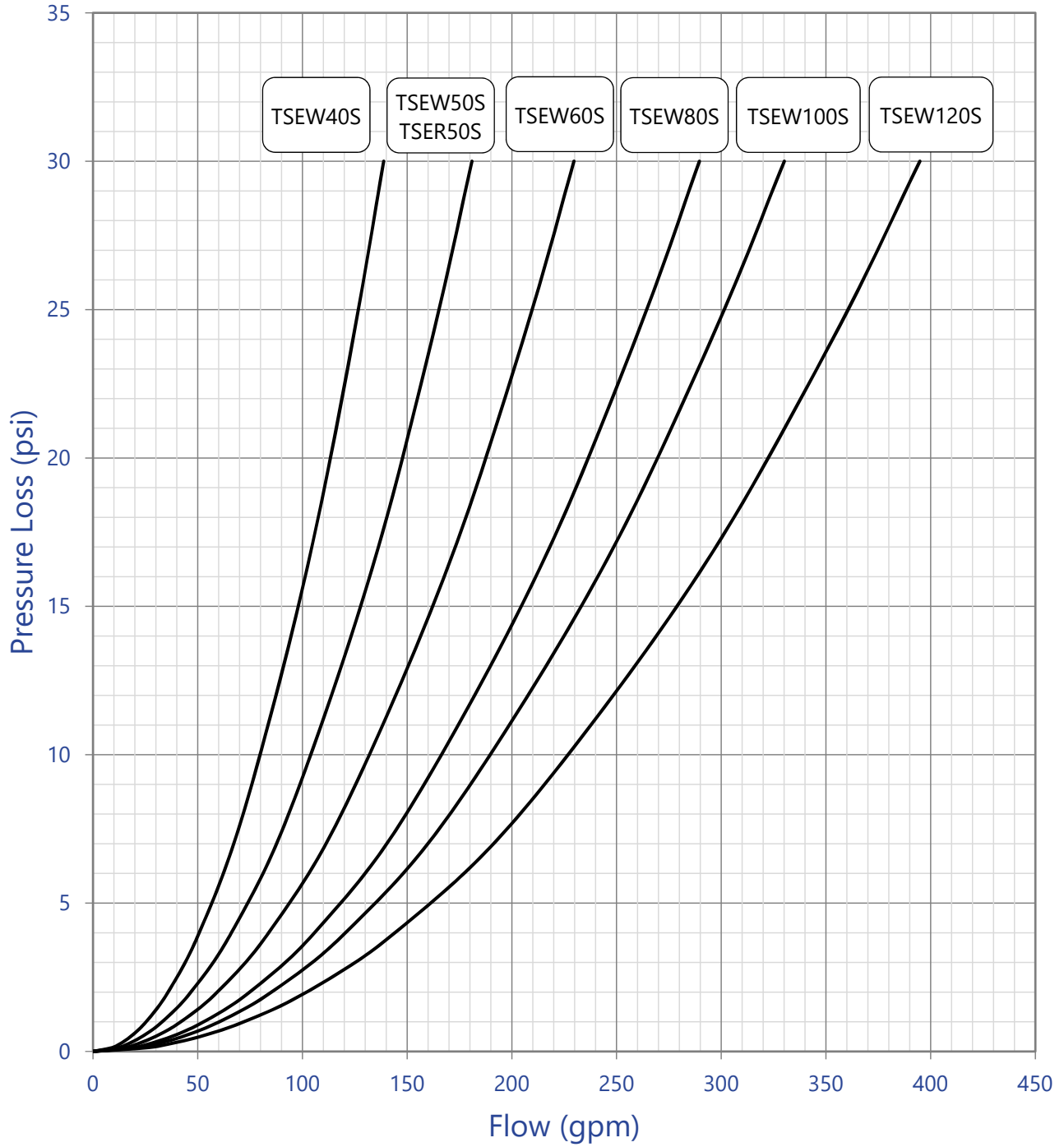




Standard Single-Circuit Chiller Process Circuit Pressure Loss (40 to 120 Ton)

### Standard Single-Circuit Chiller Process Circuit Pressure Loss

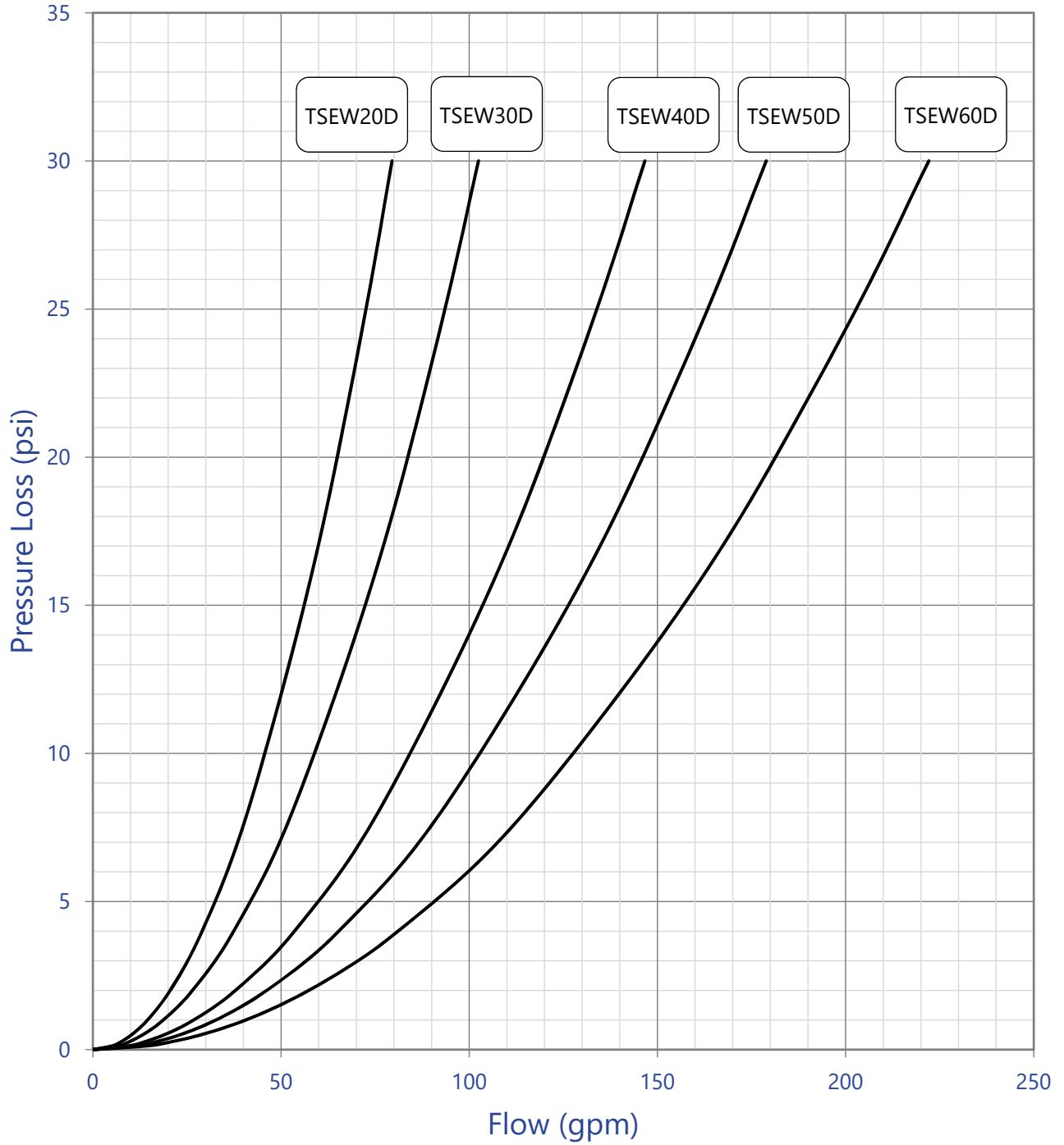
(Water @ 50°F)



Standard Dual-Circuit Chiller Process Circuit Pressure Loss (20 to 60 Ton)

### Standard Dual-Circuit Chiller Process Circuit Pressure Loss

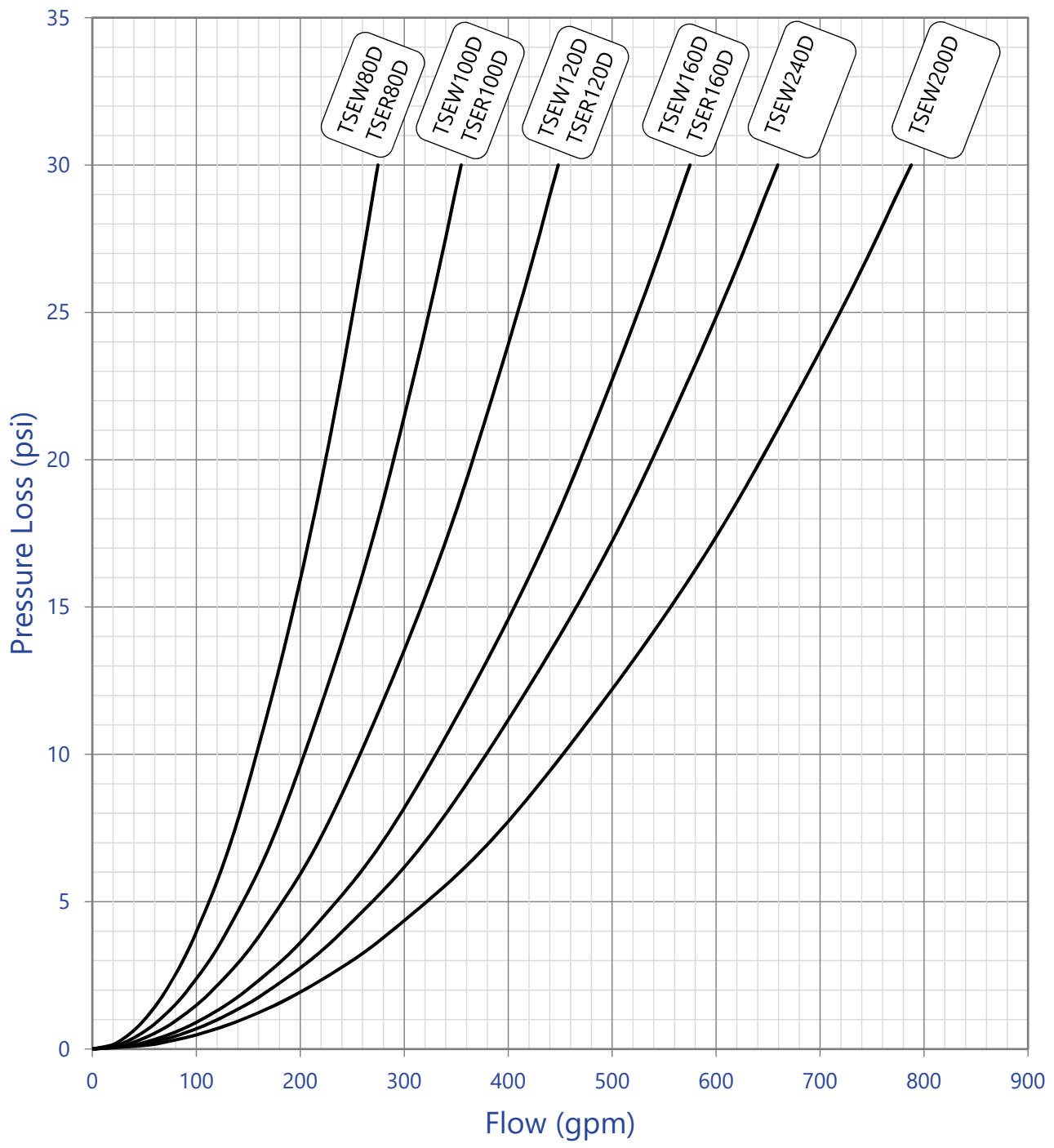
(Water @ 50°F)



Standard Dual-Circuit Chiller Process Circuit Pressure Loss (80 to 240 Ton)

### Standard Dual-Circuit Chiller Process Circuit Pressure Loss

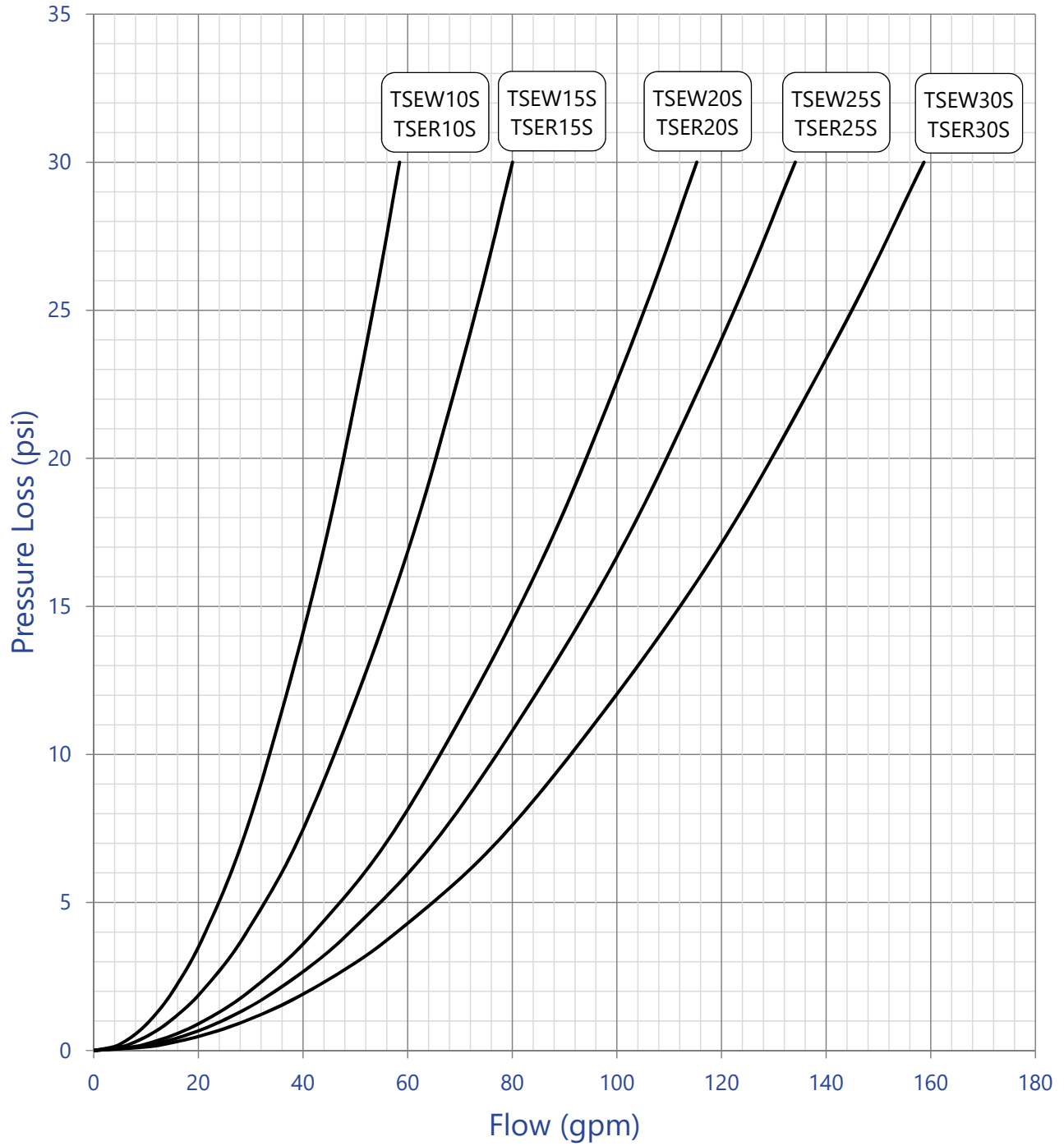
(Water @ 50°F)



Single-Circuit Chiller with High Flow Evaporator Process Circuit Pressure Loss (10 to 30 Ton)

### Single-Circuit Chiller with High Flow Evaporator Option Process Circuit Pressure Loss

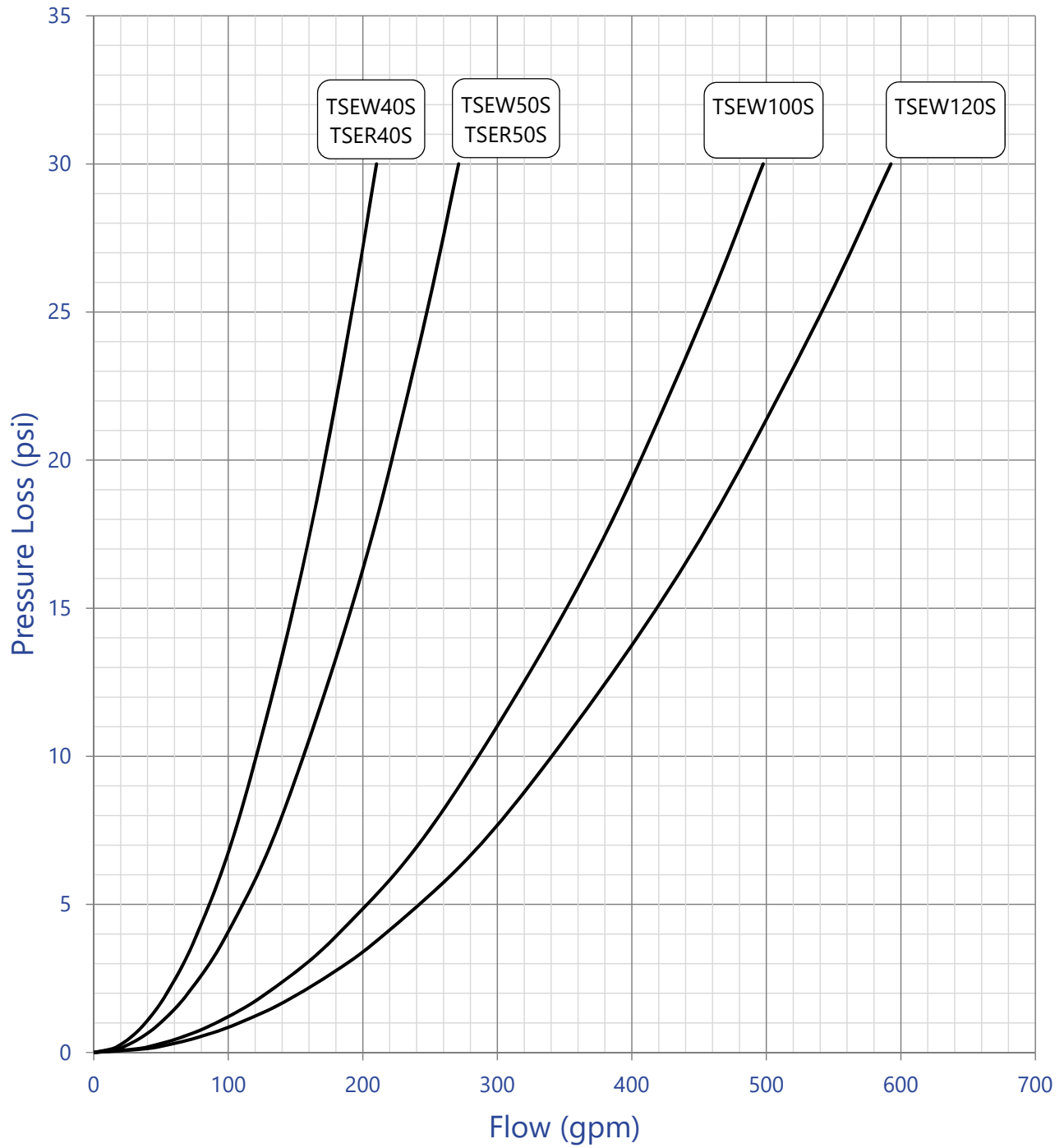
(Water at 50°F)



Single-Circuit Chiller with High Flow Evaporator Process Circuit Pressure Loss (40 to 120 Ton)

### Single-Circuit Chiller with High Flow Evaporator Option Process Circuit Pressure Drop

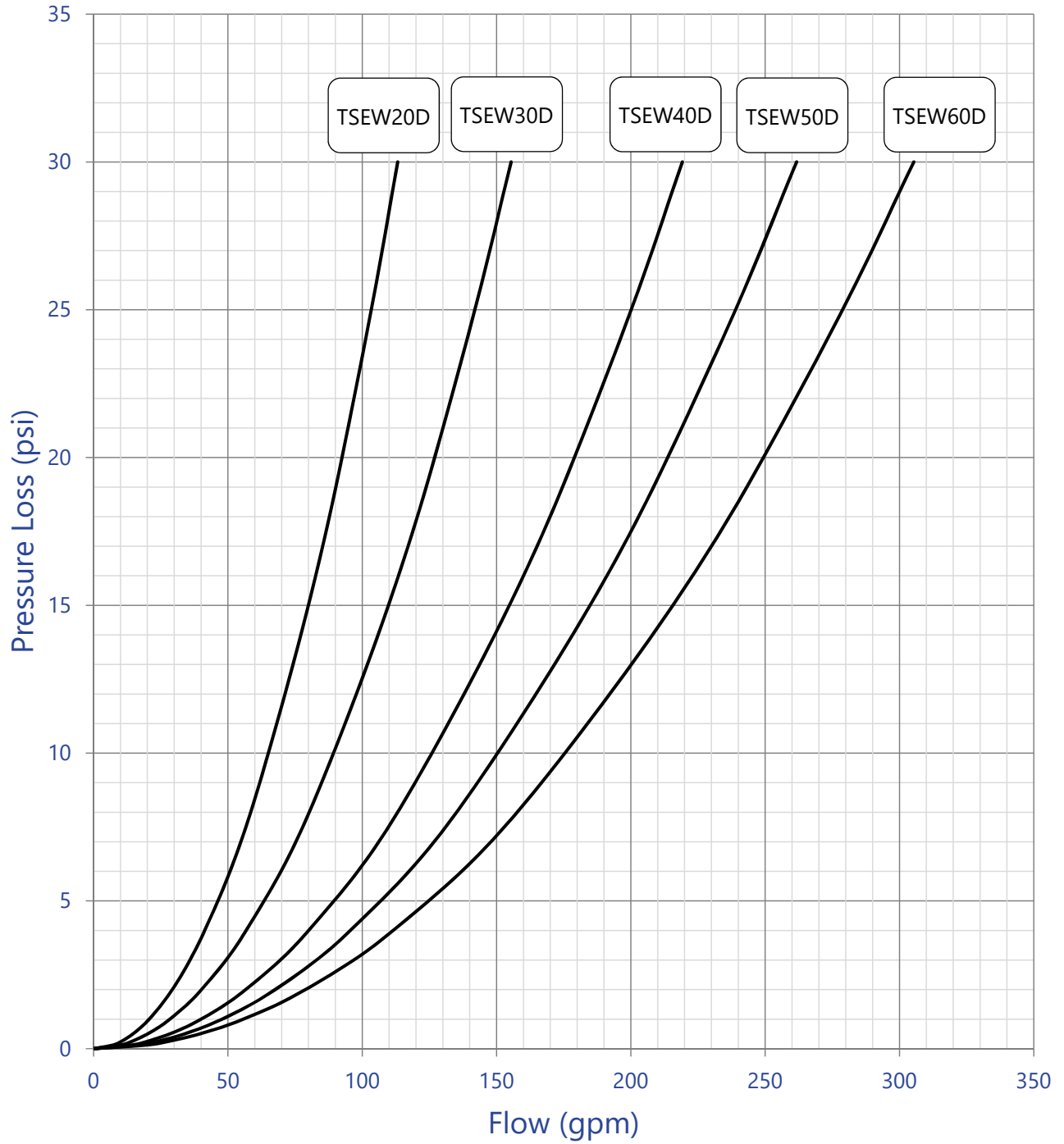
(Water at 50°F)



Dual-Circuit Chiller with High Flow Evaporator Process Circuit Pressure Loss (20 to 60 Ton)

### Dual-Circuit Chiller with High Flow Evaporator Option Process Circuit Pressure Loss

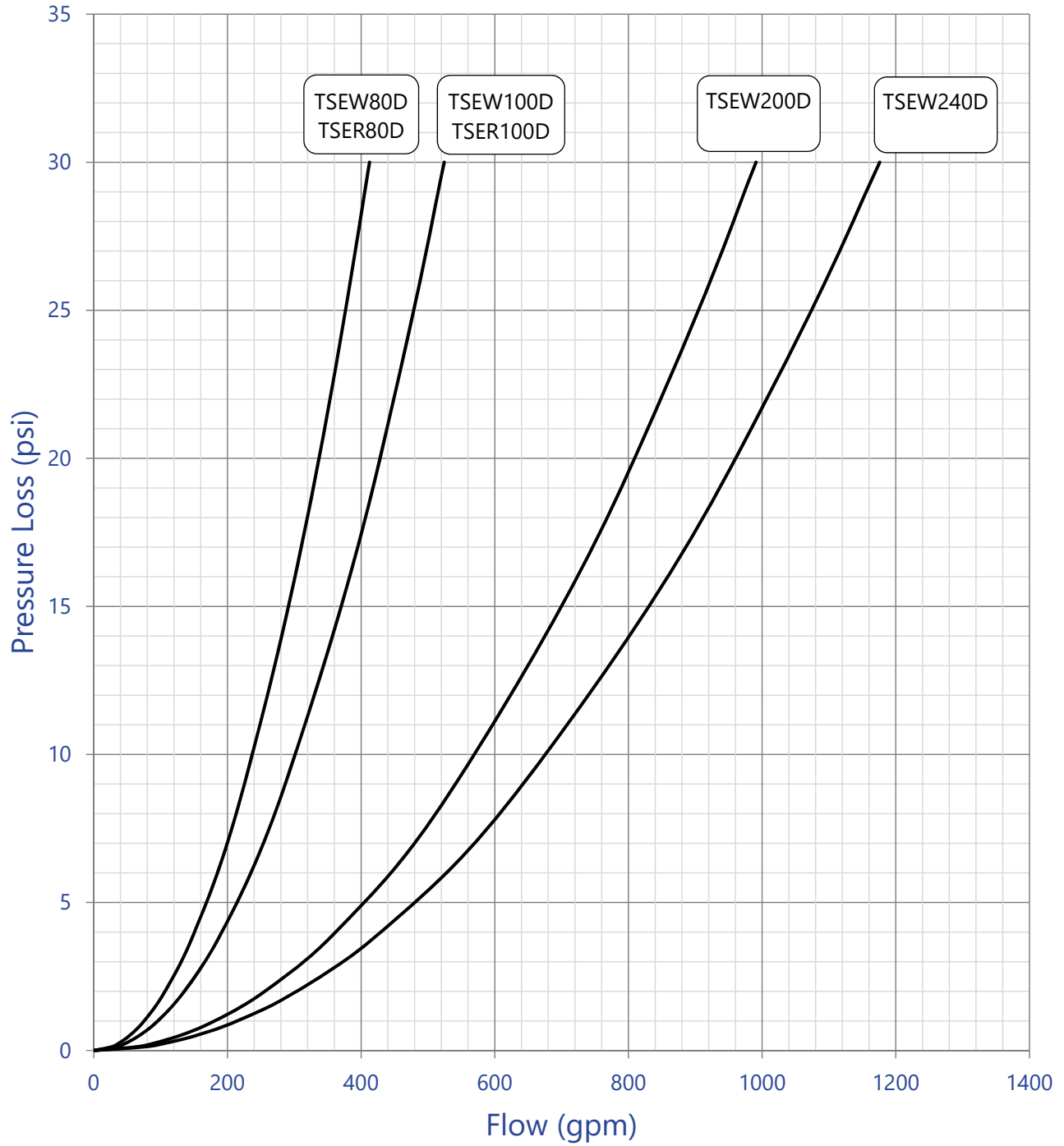
(Water at 50°F)



Dual-Circuit Chiller with High Flow Evaporator Process Circuit Pressure Loss (80 to 240 Ton)

### Dual-Circuit Chiller with High Flow Evaporator Option Process Circuit Pressure Drop

(Water at 50°F)



# Electrical Data

## Chiller Electrical Data (60 Hz)

Rated Voltage	Single-Circuit Chillers							Dual-Circuit Chillers						
	Model	Chiller		Chiller with Standard Flow Pumps		Chiller with High Flow Pumps		Model	Chiller		Chiller with Standard Flow Pumps		Chiller with High Flow Pumps	
		MCA <sup>2</sup>	MOP <sup>3</sup>	MCA <sup>2</sup>	MOP <sup>3</sup>	MCA <sup>2</sup>	MOP <sup>3</sup>		MCA <sup>2</sup>	MOP <sup>3</sup>	MCA <sup>2</sup>	MOP <sup>3</sup>	MCA <sup>2</sup>	MOP <sup>3</sup>
208	TSEW10S & TSER10S	44	60	67	80	68	80	TSEW20D & TSER20D	83	100	106	110	123	150
230		44	60	65	80	66	80		83	100	104	110	119	125
460		23	30	33	40	33	40		42	50	53	60	61	70
575		18	20	26	30	26	30		33	40	41	45	47	50
208	TSEW15S & TSER15S	71	100	91	125	102	125	TSEW30D & TSER30D	134	150	165	175	172	200
230		71	100	89	110	99	125		134	150	162	175	168	175
460		37	50	45	60	51	60		69	80	84	90	87	100
575		30	40	37	50	42	50		56	60	68	80	70	80
208	TSEW20S & TSER20S	101	125	117	150	138	175	TSEW40D & TSER40D	189	225	227	250	243	250
230		101	125	115	150	135	175		189	225	224	250	238	250
460		48	60	55	70	65	80		90	110	108	125	115	125
575		39	50	45	60	53	60		73	90	87	100	93	110
208	TSEW25S & TSER25S	112	150	127	175	149	175	TSEW50D & TSER50D	210	250	251	300	267	300
230		112	150	125	175	146	175		210	250	248	250	262	300
460		57	80	63	90	74	90		107	125	126	150	133	150
575		48	60	53	70	62	80		90	110	105	125	111	125
208	TSEW30S & TSER30S	123	175	147	200	161	200	TSEW60D & TSER60D	231	250	273	300	303	350
230		123	175	144	200	158	200		231	250	269	300	295	300
460		64	90	74	100	81	100		120	125	139	150	152	175
575		57	80	65	90	71	90		107	125	122	125	133	150
208	TSEW40S & TSER40S	170	225	198	250	224	250	TSEW80D & TSER80D	321	350	377	450	406	450
230		170	225	193	250	219	250		321	350	372	400	398	450
460		82	110	94	125	106	125		154	175	180	200	193	225
575		64	90	73	100	84	110		120	125	141	150	151	175
208	TSEW50S & TSER50S	197	250	225	300	254	300	TSEW100D & TSER100D	372	450	434	500	476	500
230		197	250	220	300	249	300		372	450	429	500	467	500
460		100	125	111	150	126	150		188	225	217	250	236	250
575		71	100	81	110	92	110		133	150	156	175	171	200
208	TSEW60S & TSER60S	249	350	271	400	319	400	TSEW120D & TSER120D	469	500	545	600	601	600
230		249	350	266	350	313	400		469	500	538	600	588	600
460		113	150	123	175	145	175		214	250	248	250	274	300
575		91	125	99	125	117	150		171	200	199	225	219	250
208	TSEW80S & TSER80S	n/a	n/a	n/a	n/a	n/a	n/a	TSEW160D & TSER160D	n/a	n/a	n/a	n/a	n/a	n/a
230		n/a	n/a	n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a	n/a	n/a
460		172	225	184	250	211	250		324	400	372	400	390	450
575		125	175	136	200	156	200		235	250	273	300	287	300
208	TSEW100S	n/a	n/a	n/a	n/a	n/a	n/a	TSEW200D	n/a	n/a	n/a	n/a	n/a	n/a
230		n/a	n/a	n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a	n/a	n/a
460		209	250	n/a	n/a	n/a	n/a		397	450	n/a	n/a	n/a	n/a
575		189	250	n/a	n/a	n/a	n/a		359	400	n/a	n/a	n/a	n/a
208	TSEW120S	n/a	n/a	n/a	n/a	n/a	n/a	TSEW240D	n/a	n/a	n/a	n/a	n/a	n/a
230		n/a	n/a	n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a	n/a	n/a
460		247	300	n/a	n/a	n/a	n/a		474	500	n/a	n/a	n/a	n/a
575		232	300	n/a	n/a	n/a	n/a		445	500	n/a	n/a	n/a	n/a

<sup>1</sup>Allowable voltage is  $\pm 10\%$  from rated voltage.

<sup>2</sup>MCA is Minimum Circuit Amps, used for minimum wire size requirement.

<sup>3</sup>MOP is Maximum Overcurrent Protection, used for sizing main power protection device.



## Remote Condenser Electrical Data

Rated Voltage	Single-Circuit Remote Condensers			Dual-Circuit Remote Condensers		
	Model	MCA <sup>2</sup>	MOP <sup>3</sup>	Model	MCA <sup>2</sup>	MOP <sup>3</sup>
208	KCM014	5.2	15	KCM034	9.8	15
230		5.2	15		9.8	15
460		2.6	15		4.9	15
575		2	15		3.8	15
208	KCL023	16	20	KCL047	31	35
230		16	20		31	35
460		7	15		16	20
575		5.6	15		10.6	15
208	KCL030	16	20	KCL060	31	35
230		16	20		31	35
460		7	15		16	20
575		5.6	15		10.6	15
208	KCL037	16	20	KCL074	31	35
230		16	20		31	35
460		7	15		16	20
575		5.6	15		10.6	15
208	KCL045	21.5	25	KCL090	46	50
230		21.5	25		46	50
460		10.1	15		21	25
575		8.1	15		16	20
208	KCL056	21.5	25	KCL112	46	50
230		21.5	25		46	50
460		10.1	15		21	25
575		8.1	15		16	20
208	KCL068	31	35	KCL137	61	70
230		31	35		61	70
460		16	20		31	35
575		10.6	15		21	25
208	KCL095	41	45	KCL190	81	90
230		41	45		81	90
460		16	20		36	40
575		16	20		31	35
208	KCL110	46	50	KCL224	91	100
230		46	50		91	100
460		21	25		46	50
575		16	20		36	40

<sup>1</sup>Allowable voltage is  $\pm 10\%$  from rated voltage.

<sup>2</sup>MCA is Minimum Circuit Amps as provided by the remote condenser manufacturer, used for minimum wire size requirement.

<sup>3</sup>MOP is Maximum Overcurrent Protection as provided by the remote condenser manufacturer, used for sizing main power protection device.

## Application Considerations

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When designing a chilled water system, it is important all aspects of the system are considered to ensure stable and reliable operation. The following provides some general guidelines for designing a system.

### Foundation

Install the unit on a rigid, non-warping mounting pad, concrete foundation, or level floor suitable to support the full operating weight of the equipment. When installed the equipment must be level within ¼ inch over its length and width.

### Chiller Unit Location

Proper ventilation is an important consideration when locating the condenser. In general, locate the unit in an area that will not rise above 110°F.

To ensure proper airflow and clearance space for proper operation and maintenance allow a minimum of 36 inches of clearance between the sides of the equipment and any walls or obstructions. Avoid locating piping or conduit over the unit to ensure easy access with an overhead crane or lift to lift out heavier components during replacement or service. In addition, ensure the condenser and evaporator refrigerant pressure relief valves can vent in accordance with all local and national codes.

Air-cooled chillers use the surrounding air for cooling the condenser and require free passage of air in and out of the chiller and provision for removal of the warm air from the area.

### Remote Air-Cooled Condenser Location

The remote air-cooled condenser is for outdoor use. Locate the remote condenser in an accessible area. The vertical air discharge must be unobstructed. Allow a minimum of 48 inches of clearance between the sides and ends of the condenser and any walls or obstructions. For installations with multiple condensers, allow a minimum of 96 inches between condensers placed side-by-side or 48 inches for condensers placed end-to-end.

When locating the condenser it is important to consider accessibility to the components to allow for

proper maintenance and servicing of the unit. Avoid locating piping or conduit over the unit to ensure easy access with an overhead crane or lift to lift out heavier components during replacement or service.

Avoid areas that can create a “micro-climate” such as an alcove with east, north, and west walls that can be significantly warmer than surrounding areas. The condenser needs to have unrestricted airways so it can easily move cool air in and heated air away. Consider locating the condenser where fan noise and vibration transmission into nearby workspaces is unlikely.

### Process Fluid Piping

Proper insulation of chilled process fluid piping is crucial to prevent condensation. The formation of condensation adds a substantial heat load to the chiller.

The importance of properly sized piping cannot be overemphasized. See the ASHRAE Handbook or other suitable design guide for proper pipe sizing. In general, run full size piping out to the process and reduce pipe size at connections as needed. One of the most common causes of unsatisfactory chiller performance is poor piping system design. Avoid long lengths of hoses, quick disconnect fittings, and manifolds wherever possible as they offer high resistance to water flow. When manifolds are required, install them as close to the use point as possible. Provide flow-balancing valves at each machine to assure adequate water distribution in the entire system.

### Process Fluid Temperature

The chiller can operate with a variety of different supply and return temperatures. The chiller is able to start and pull down with short-term entering fluid temperatures up to 20°F warmer than the maximum set point of the chiller. This allows the chiller to pull down the temperature of a reservoir or process fluid loop on start-up. Under normal operation, the entering water temperature should not exceed 10°F warmer than the maximum set point temperature of the chiller.

### Process Fluid Flow Rate

The nominal performance of the chiller is for a temperature rise of 10°F through the process. The chiller is capable of operating with different operating temperature differentials; however, careful consideration of flow limitations, correction to capacity, pressure drops, and other operating parameters is required when selecting the proper unit for the application. The minimum flow rate to prevent fouling and to ensure the chiller stays within normal refrigerant operating conditions is approximately 1.2 gpm per nominal ton of cooling capacity. The fouling factor used to calculate the ratings of the vessels are  $0.00010 \text{ Ft}^2 \cdot \text{Hr} \cdot \text{°F/Btu}$ .

If the process flow requirement is less than 1.2 gpm per nominal ton of cooling capacity use a primary pumping loop for the lower flow at a higher temperature rise and a secondary pumping loop for a higher flow and lower temperature drop through the chiller. If a secondary pumping loop is used, the mixed temperature of coolant entering the evaporator must be a minimum of 5°F above the design set point of the chiller.

The maximum flow limitation is determined based upon a 5°F drop through the chiller at the maximum capacity of the chiller; however, the flows often times result in impractical pressure drops through the chiller and are therefore not likely for system design. If the process flow requirement is higher than the maximum flow limitation use a bypass around the chiller or a primary pumping loop designed for the high flow at a lower temperature rise and a secondary pumping loop for a lower flow and high temperature drop through the chiller. If a secondary pumping loop is used, the mixed temperature of coolant entering the chiller must be a minimum 5°F above the design set point of the chiller.

The use of varying chiller flows is sometimes necessary; however, a dedicated evaporator circulation pump provides increased system stability. If the flow through the chiller is varied, the minimum fluid loop volume must be in excess of 3 gallons of coolant per ton of cooling and the flow rate must change at a rate of no greater than 10% per minute in order to maintain an acceptable level of temperature control. If the chiller sees a net rate of change greater than 10% per minute it may result in

temporary supply temperature fluctuations greater than 1°F.

### Condenser Water Temperature and Flow

All water-cooled condenser chillers include a factory mounted condenser water-regulating valve to regulate the flow of condenser water to maintain the proper refrigerant pressures. The minimum flow rate is approximately 0.5 gpm per nominal cooling ton to prevent fouling and to ensure the chiller stays within normal refrigerant operating conditions. The fouling factor used to calculate the ratings of the vessels are  $0.00025 \text{ Ft}^2 \cdot \text{Hr} \cdot \text{°F/Btu}$ .

The chiller will start and operate with an inlet water temperature between 55°F and 95°F. The actual flow requirements will vary. Lowering the condenser water supply temperature below 85°F is an effective way to reduce the overall cooling system input power requirements.

### Condenser Air Temperature

All remote air-cooled condenser chillers come with a factory selected remote air-cooled condenser to meet the needs of the chiller module to which it is connected. The chiller can start and operate with an inlet air temperature between -20°F and 100°F. The minimum ambient air temperature at which the chiller will start is -20°F based on still air.

### System Fluid Chemistry Requirements

The properties of water make it ideal for heat transfer applications. It is safe, non-flammable, non-poisonous, easy to handle, widely available, and inexpensive in most industrialized areas.

When using water as a heat transfer fluid it is important to keep it within certain chemistry limits to avoid unwanted side effects. Water is a "universal solvent" because it can dissolve many solid substances and absorb gases. As a result, water can cause the corrosion of metals used in a cooling system. Often water is in an open system (exposed to air) and when the water evaporates, the dissolved minerals remain in the process fluid. When the concentration exceeds the solubility of some minerals, scale forms. The life giving properties of water can also encourage biological growth that can foul heat transfer surfaces.

To avoid the unwanted side effects associated with water cooling, proper chemical treatment and preventive maintenance is required for continuous plant productivity.

#### Unwanted Side Effects of Improper Water Quality

- Corrosion
- Scale
- Fouling
- Biological Contamination

#### Cooling Water Chemistry Properties

- Electrical Conductivity
- pH
- Alkalinity
- Total Hardness
- Dissolved gases

Chillers at their simplest have two main heat exchangers: one that absorbs the heat from the process (evaporator) and one that removes the heat from the chiller (condenser). All our chillers use stainless steel brazed plate evaporators. Our air-cooled chillers use air to remove heat from the chiller; however, our water-cooled chillers use either a tube-in-tube or shell-in-tube condenser which has copper refrigerant tubes and a steel shell. These, as are all heat exchangers, are susceptible to fouling of heat transfer surfaces due to scale or debris. Fouling of these surfaces reduces the heat-transfer surface area while increasing the fluid velocities and pressure drop through the heat exchanger. All of these effects reduce the heat transfer and affect the efficiency of the chiller.

The complex nature of water chemistry requires a specialist to evaluate and implement appropriate sensing, measurement and treatment needed for satisfactory performance and life. The recommendations of the specialist may include filtration, monitoring, treatment and control devices. With the ever-changing regulations on water usage and treatment chemicals, the information is usually up-to-date when a specialist in the industry is involved.

### Fill Water Chemistry Requirements

Water Characteristic	Quality Limitation
Alkalinity (HCO <sub>3</sub> <sup>-</sup> )	70-300 ppm
Aluminum (Al)	Less than 0.2 ppm
Ammonium (NH <sub>3</sub> )	Less than 2 ppm
Chlorides (Cl <sup>-</sup> )	Less than 300 ppm
Electrical Conductivity	10-500µS/cm
Free (aggressive) Carbon Dioxide (CO <sub>2</sub> )†	Less than 5 ppm
Free Chlorine(Cl <sub>2</sub> )	Less than 1 PPM
HCO <sub>3</sub> <sup>-</sup> /SO <sub>4</sub> <sup>2-</sup>	Greater than 1.0
Hydrogen Sulfide (H <sub>2</sub> S)	Less than 0.05 ppm
Iron (Fe)	Less than 0.2 ppm
Manganese (Mn)	Less than 0.1 ppm
Nitrate (NO <sub>3</sub> )	Less than 100 ppm
pH	7.5-9.0
Sulfate (SO <sub>4</sub> <sup>2-</sup> )	Less than 70 ppm
Total Hardness (dH)k	4.0-8.5

† Dissolved carbon dioxide calculation is from the pH and total alkalinity values shown below or measured on the site using a test kit. Dissolved Carbon Dioxide, PPM = TA x 2<sup>[(6.3-pH)/0.3]</sup> where TA = Total Alkalinity, PPM as CaCO<sub>3</sub>

### Recommended Glycol Solutions

Chilled Water Temperature	Percent Glycol By Volume
50°F (10°C)	Not required
45°F (7.2°C)	5 %
40°F (4.4°C)	10 %
35°F (1.7°C)	15 %
30°F (-1.1°C)	20 %
25°F (-3.9°C)	25 %
20°F (-6.7°C)	30 %



**CAUTION:** When your application requires the use of glycol, use industrial grade glycol specifically designed for heat transfer systems and equipment. Never use glycol designed for automotive applications. Automotive glycols typically have additives engineered to benefit the materials and conditions found in an automotive engine; however, these additives can gel and foul heat exchange surfaces and result in loss of performance or even failure of the chiller. In addition, these additives can react with the materials of the pump shaft seals resulting in leaks or premature pump failures.



**WARNING:** Ethylene Glycol is flammable at higher temperatures in a vapor state. Carefully handle this material and keep away from open flames or other possible ignition sources.

### Over-Sizing Chillers

Over-sizing chillers for future growth is sometimes necessary. While this practice may be necessary, it is highly recommended that chillers be no more than 15% larger than design conditions to avoid unwanted reductions in system efficiency and excessive electrical power use and/or compressor cycling due to reduced chiller loading. If the system design requires prolonged operation at reduced loads considering using two smaller chillers as operating smaller chillers at higher loads is preferred to operating one larger chiller at or near its minimum load capacity.

### Strainers

Each evaporator has a 20-mesh inlet strainer to protect the evaporator. All water-cooled condensers require filtering with a minimum of a 20-mesh filtering system to protect the condenser from contamination.

### Remote Condenser Selection

Chillers using remote air-cooled condensers include a properly sized and selected remote condenser so there is no need for a separate remote condenser selection. For installation and line size guidelines please refer to the Installation and Operation manual of the chiller.



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