

Fluid Cooling Brazed Plate BPSW Series

STAINLESS STEEL CONSTRUCTION

Performance Notes

- Short lead time
- Stacked plate
- Stainless steel
- Copper brazed (nickel option)
- Oil to water applications
- High performance
- Compact design
- SAE connections
- Corrosion resistant Type 316 stainless steel plates
- Mounting studs standard (except 8x3 plates)
- SAE oil connections, NPT water connections



Option
Foot Mounting Bracket
(except 8x3 plates)



Optional Foot Mounting Brackets
(See page 155)

Ratings

Maximum Working Pressure
450 psi (31 BAR)

Test Pressure
650 psi (44 BAR)

Minimum Working Temperature
-320°F (-19°C)

Maximum Working Temperature
437°F (225°C)

Materials

Plate Material - Fluid Contact
316 stainless steel

Braze Material Copper

Connectors 316 stainless steel

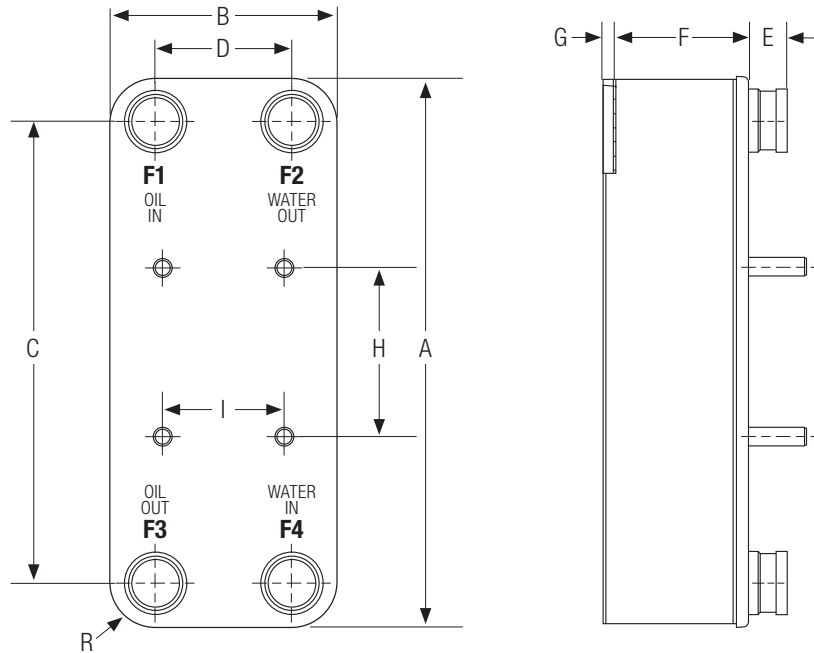
Stud Bolts 304 stainless steel

Foot Mounting Bracket Carbon steel

How to Order

BPSW	-		-														
Model Series BPSW		Number of Plates		Plate Size	Option Foot Mounting Brackets (ordered as a separate item)												
					<table border="0"> <thead> <tr> <th style="text-decoration: underline;">Part No.</th> <th style="text-decoration: underline;">Plate Size</th> </tr> </thead> <tbody> <tr> <td>56839</td> <td>- 12x5</td> </tr> <tr> <td>56840</td> <td>- 20x5</td> </tr> <tr> <td>56841</td> <td>- 15x5</td> </tr> <tr> <td>56842</td> <td>- 15x10</td> </tr> <tr> <td>56843</td> <td>- 20x10</td> </tr> </tbody> </table>	Part No.	Plate Size	56839	- 12x5	56840	- 20x5	56841	- 15x5	56842	- 15x10	56843	- 20x10
Part No.	Plate Size																
56839	- 12x5																
56840	- 20x5																
56841	- 15x5																
56842	- 15x10																
56843	- 20x10																

Dimensions



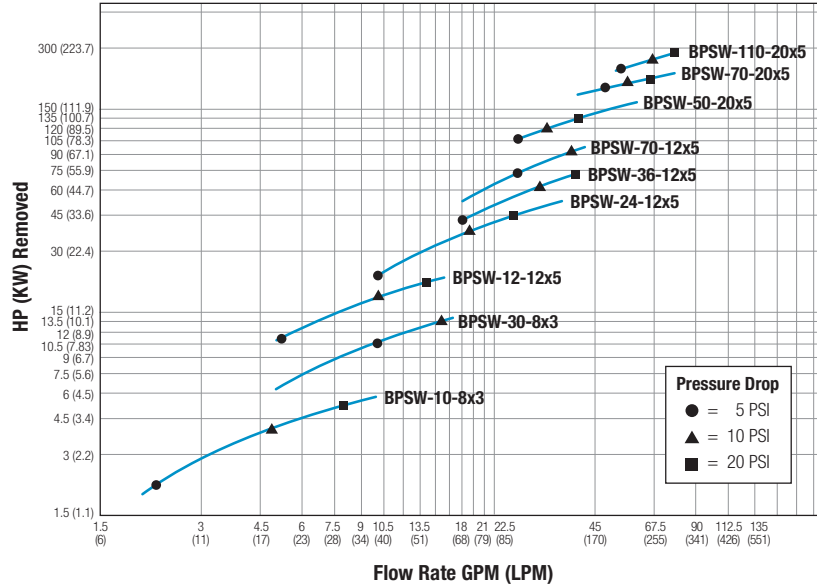
Model	A	B	C	D	E	G	F	F3, F1	F2, F4	H	I	Stud Bolt		R	Net Wt. LB (KG)
												Thread	Length		
BPSW-10-8x3	7.6 (193)	3 (76)	6.06 (154)	1.57 (40)	0.79 (20)	0.28 (7)	1.04 (26)	#10 SAE	3/4" NPT	NA	NA	NA	NA	0.70 (18)	2.1 (0.9)
BPSW-30-8x3	7.6 (193)	3 (76)	6.06 (154)	1.57 (40)	0.79 (20)	0.28 (7)	2.80 (71)	#10 SAE	3/4" NPT	NA	NA	NA	NA	0.70 (18)	4.0 (1.8)
BPSW-12-12x5	11.4 (290)	4.69 (119)	9.57 (243)	2.83 (72)	1.78 (45)	0.24 (6)	1.21 (31)	#12 SAE	3/4" NPT	5.51 (140)	2.36 (60)	M8	0.76 (19)	0.9 (23)	5.6 (2.5)
BPSW-24-12x5	11.4 (290)	4.69 (119)	9.57 (243)	2.83 (72)	1.78 (45)	0.24 (6)	2.27 (58)	#12 SAE	3/4" NPT	5.51 (140)	2.36 (60)	M8	0.76 (19)	0.9 (23)	8.1 (3.7)
BPSW-36-12x5	11.4 (290)	4.69 (119)	9.57 (243)	2.83 (72)	1.78 (45)	0.24 (6)	3.33 (84)	#20 SAE	1-1/4" NPT	5.51 (140)	2.36 (60)	M8	0.76 (19)	0.9 (23)	10.7 (4.9)
BPSW-70-12x5	11.4 (290)	4.69 (119)	9.57 (243)	2.83 (72)	1.78 (45)	0.24 (6)	6.32 (160)	#20 SAE	1-1/4" NPT	5.51 (140)	2.36 (60)	M8	0.76 (19)	0.9 (23)	17.9 (8.1)
BPSW-50-20x5	20.7 (526)	4.69 (119)	18.5 (470)	2.48 (63)	1.07 (27)	0.24 (6)	4.56 (116)	#20 SAE	1-1/4" NPT	8.86 (225)	2.36 (60)	M8	1.19 (30)	0.90 (23)	23.0 (10.5)
BPSW-70-20x5	20.7 (526)	4.69 (119)	18.5 (470)	2.48 (63)	1.07 (27)	0.24 (6)	6.32 (160)	#20 SAE	1-1/4" NPT	8.86 (225)	2.36 (60)	M8	1.19 (30)	0.90 (23)	30.3 (13.8)
BPSW-110-20x5	20.7 (526)	4.69 (119)	18.5 (470)	2.48 (63)	1.07 (27)	0.24 (6)	9.84 (250)	#20 SAE	1-1/4" NPT	8.86 (225)	2.36 (60)	M8	1.19 (30)	0.90 (23)	44.7 (20.3)
BPSW-50-15x5	14.8 (376)	4.69 (119)	12.6 (320)	2.48 (63)	1.07 (27)	0.24 (6)	4.56 (116)	#20 SAE	1-1/4" NPT	8.86 (225)	2.36 (60)	M8	0.79 (20)	0.90 (23)	17.0 (7.7)
BPSW-90-15x5	14.8 (376)	4.69 (119)	12.6 (320)	2.48 (63)	1.07 (27)	0.24 (6)	8.08 (205)	#20 SAE	1-1/4" NPT	8.86 (225)	2.36 (60)	M8	0.79 (20)	0.90 (23)	27.6 (12.5)
BPSW-130-15x10	15.5 (394)	9.57 (243)	12.76 (324)	6.85 (174)	1.07 (27)	0.12 (3)	12.28 (312)	#24 SAE	1-1/2" NPT	5.51 (140)	3.94 (100)	M12	0.75 (19)	1.38 (35)	112.9 (51.2)
BPSW-200-15x10	15.5 (394)	9.57 (243)	12.76 (324)	6.85 (174)	1.07 (27)	0.12 (3)	18.72 (475)	#24 SAE	1-1/2" NPT	5.51 (140)	3.94 (100)	M12	0.75 (19)	1.38 (35)	165.3 (75.1)
BPSW-24-20x10	20.7 (526)	9.57 (243)	17.95 (456)	6.85 (174)	1.07 (27)	0.16 (4)	2.55 (65)	#24 SAE	1-1/2" NPT	5.51 (140)	3.94 (100)	M12	1.53 (39)	1.38 (35)	44.0 (20.0)
BPSW-50-20x10	20.7 (526)	9.57 (243)	17.95 (456)	6.85 (174)	1.07 (27)	0.16 (4)	4.89 (124)	#24 SAE	1-1/2" NPT	5.51 (140)	3.94 (100)	M12	1.53 (39)	1.38 (35)	67.2 (30.5)
BPSW-80-20x10	20.7 (526)	9.57 (243)	17.95 (456)	6.85 (174)	1.07 (27)	0.16 (4)	7.59 (193)	#24 SAE	1-1/2" NPT	5.51 (140)	3.94 (100)	M12	1.53 (39)	1.38 (35)	93.9 (42.6)

All dimensions are inches (millimeters), unless noted otherwise.

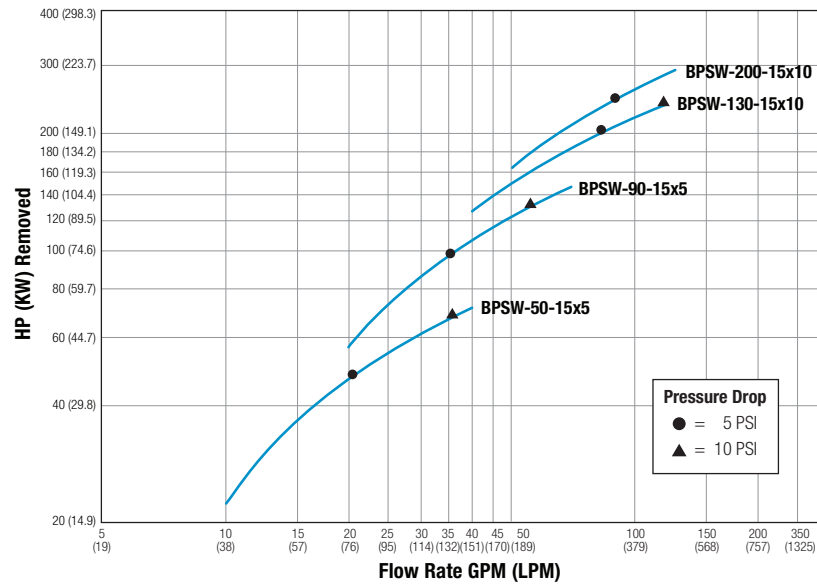
Note: We reserve the right to make reasonable design changes without notice.

Performance Curves

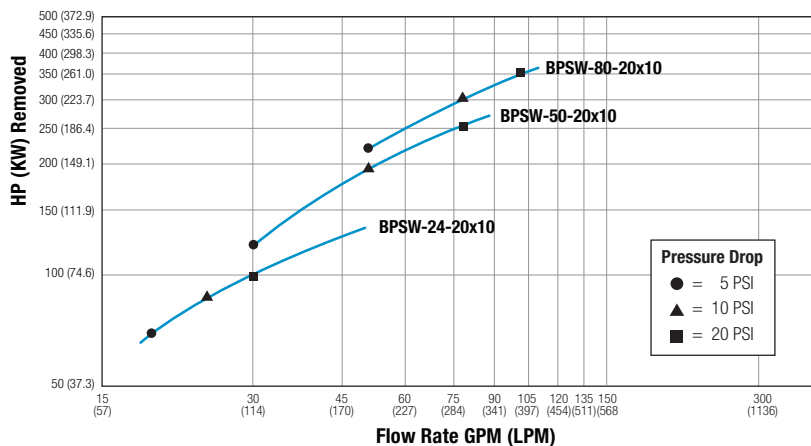
Low Flow



Medium Flow



High Flow



Selection Procedure

Performance Curves are based on 100SSU (21.7 cSt) oil at 40°F (22°C) approach temperature (125°F (52°C) oil leaving cooler, 85°F (29°C) water entering cooler), 2:1 oil: water ratio.

Step 1 Determine Curve Horsepower Heat to be Removed.

$$\text{HP (KW) heat load} \times \frac{40 (22)}{\text{Oil leaving cooler } ^\circ\text{F (}^\circ\text{C) minus water entering cooler } ^\circ\text{F (}^\circ\text{C)}} \times \text{Performance correction multiplier} = \text{Curve HP (KW) heat to be removed}$$

Step 2 Determine Actual Oil Pressure Drop.

Pressure drop shown on curve x Pressure drop correction multiplier = Actual pressure drop.

Oil Temperature

Oil coolers can be selected by using entering or leaving oil temperatures.

Typical operating temperature ranges are:

Hydraulic Motor Oil	110°F - 130°F (43°C - 54°C)
Hydrostatic Drive Oil	130°F - 180°F (54°C - 82°C)
Lube Oil Circuits	110°F - 130°F (43°C - 54°C)
Automatic Transmission Fluid	200°F - 300°F (93°C - 149°C)

Desired Reservoir Temperature

Return Line Cooling: Desired temperature is the oil temperature leaving the cooler. This will be the same temperature that will be found in the reservoir.

Off-Line Recirculation Cooling Loop: Desired temperature is the temperature entering the cooler. In this case, the oil temperature change must be determined so that the actual oil leaving temperature can be found. Calculate the oil temperature change (Oil ΔT) with this formula:

$$\text{Oil } \Delta T = (\text{BTUs/HR}) / (\text{GPM Oil Flow} \times 210). \quad (\text{Oil } \Delta C = \text{KW/LPM Oil Flow} \times .029)$$

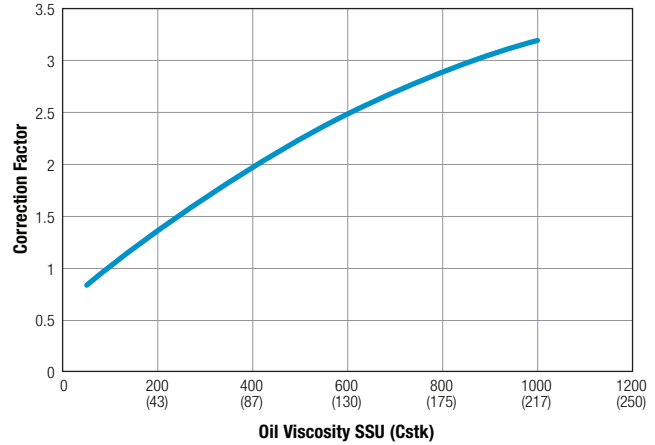
To calculate the oil leaving temperature from the cooler, use this formula:

$$\text{Oil Leaving Temperature} = \text{Oil Entering Temperature} - \text{Oil } \Delta T.$$

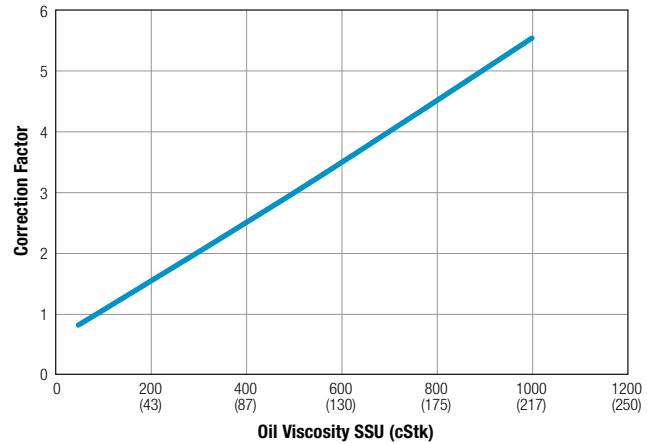
This formula may also be used in any application where the only temperature available is the entering oil temperature.

Oil Pressure Drop: Most systems can tolerate a pressure drop through the heat exchanger of 20 to 30 PSI. Excessive pressure drop should be avoided. Care should be taken to limit pressure drop to 5 PSI or less for case drain applications where high back pressure may damage the pump shaft seals.

Performance Correction



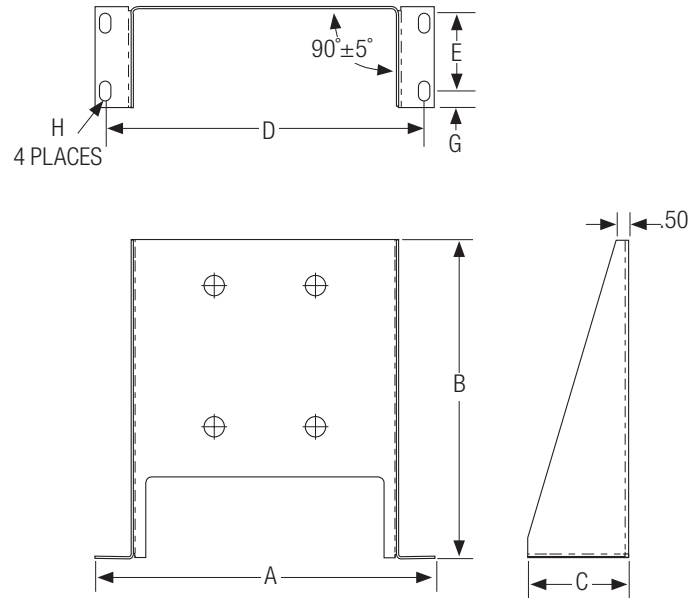
Pressure Drop Correction



	Model	Oil Conn (Female)	Water Conn (Female)
SMALL FLOW	BPSW-10-8x3	#10 SAE	3/4" NPT
	BPSW-30-8x3	#10 SAE	3/4" NPT
	BPSW-12-12x5	# 12 SAE	3/4" NPT
	BPSW-24-12x5	# 12 SAE	3/4" NPT
	BPSW-36-12x5	#20 SAE	1 1/4" NPT
	BPSW-70-12x5	#20 SAE	1 1/4" NPT
	BPSW-50-20x5	#20 SAE	1 1/4" NPT
	BPSW-70-20x5	#20 SAE	1 1/4" NPT
	BPSW-110-20x5	#20 SAE	1 1/4" NPT
MEDIUM FLOW	BPSW-50-15x5	#20 SAE	1 1/4" NPT
	BPSW-90-15x5	#20 SAE	1 1/4" NPT
	BPSW-130-15x10	#24 SAE	1 1/2" NPT
	BPSW-200-15x10	#24 SAE	1 1/2" NPT
LARGE	BPSW-24-20x10	#24 SAE	1 1/2" NPT
	BPSW-50-20x10	#24 SAE	1 1/2" NPT
	BPSW-80-20x10	#24 SAE	1 1/2" NPT

Foot Mounting Bracket

Optional Foot Mounting Bracket for BPSW and BPW Series (except 8x3 plates).
Constructed of carbon steel.



Mounting bracket for location purposes only. Bracket is not designed to support entire weight of the cooler. Customer to add extra support if necessary.

Part No.	Plate Size	A	B	C	D	E	G	H
56839	12x5 (305x127)	7.99 (203)	9.35 (237)	3.15 (80)	7.17 (182)	1.77 (45)	0.69 (18)	.40 x .59 (10 x 15)
56840	20x5 (508x127)	7.99 (203)	15.65 (398)	3.15 (80)	7.17 (182)	1.77 (45)	0.69 (18)	.40 x .59 (10 x 15)
56841	15x5 (381x127)	7.99 (203)	12.74 (324)	3.15 (80)	7.17 (182)	1.77 (45)	0.69 (18)	.40 x .59 (10 x 15)
56842	15x10 (381x254)	13.20 (335)	12.40 (315)	3.94 (100)	12.40 (315)	2.64 (67)	0.65 (17)	.40 x .75 (10 x 15)
56843	20x10 (508x254)	13.51 (343)	14.37 (365)	3.94 (100)	12.72 (323)	2.64 (67)	0.65 (17)	.40 x .75 (10 x 15)

All dimensions are in inches (millimeters), unless noted otherwise.