

# Fluid Cooling Shell & Tube A Series

## Performance Notes

- ITT interchange
- B or HC series is recommended for new applications
- Competitively priced
- NPT, SAE O-Ring, SAE flange, or BSPP shell side connections available
- End bonnets removable for servicing
- Mounting feet included (may be rotated in 90° increments)



### Options

Non-ferrous construction (water-to-water service)  
90/10 copper nickel cooling tubes, bronze end bonnets for sea water service and zinc anodes

## Ratings

**Maximum Operating Pressure - Shell Side**  
300 PSI

**Maximum Operating Pressure - Tube Side**  
150 PSI

**Maximum Operating Temperature**  
300°F

## Materials

**Tubes** Copper  
**Hubs & Tubesheets** Steel or brass  
**Shell** Steel or brass  
**Baffles** Brass  
**End Bonnets** Cast iron  
**Mounting Brackets** Steel  
**Gaskets** Nitrile rubber/cellulose fiber  
**Nameplate** Aluminum foil

## How to Order

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<b>Model Series</b>		<b>Model Size Selected</b>		<b>Baffle Spacing</b>		<b>Tube Diameter Code</b>		<b>Tubeside Passes</b>		<b>Shell Material</b>		<b>Cooling Tube Material</b>		<b>End Bonnet Material</b>		<b>Zinc Anodes</b>
SA SAF A AS AM AF AFM						4 - 1/4" 6 - 3/8"		0 - One Pass T - Two Pass F - Four Pass		Blank - Steel BR - Brass		Blank - Copper CN - CuNi		Blank - Cast Iron B - Bronze		Blank - None Z - Zinc

**SA** = NPT Shell side, NPT Tube. Available in 1200 & 1600 models only.

**SAF** = SAE 4 Bolt Flange (with UNC threads) Shell side connections; NPT Tube side connections. Available in 1200 & 1600 models only.

**A** = NPT Shell side connections; NPT Tube side connections (Not available in 400s. See SA)

**AS** = SAE O-Ring Shell side connections; NPT Tube side connections

**AM** = BSPP Shell side connections; BSPP Tube side connections

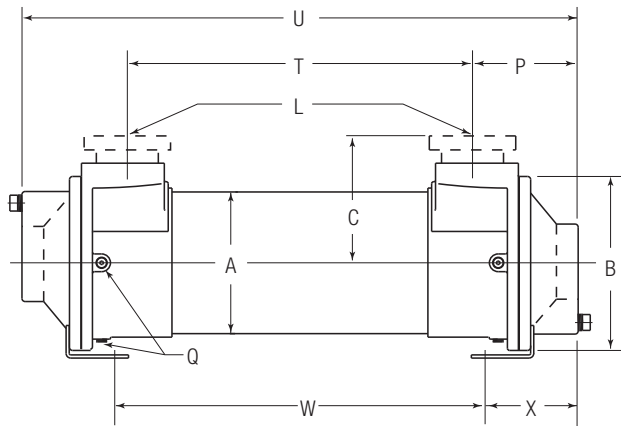
**AF** = SAE 4 Bolt Flange (with UNC threads) Shell side connections; NPT Tube side connections

**AFM** = SAE 4 Bolt Flange (with Metric threads) Shell side connections; BSPP Tube side connections

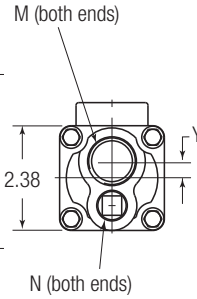
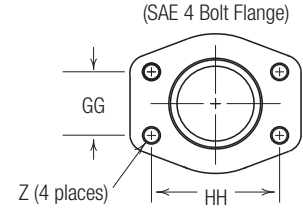
**SAE flanges available on some models. Consult factory for details.**

# Dimensions

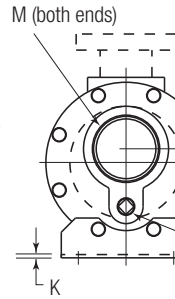
## One Pass



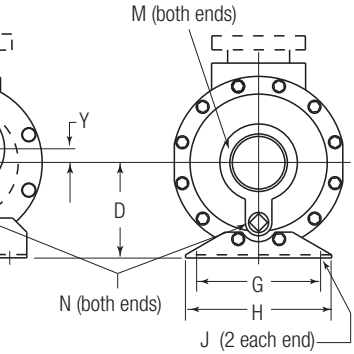
Y (Center of cooler to center of connection on opposite side)



**A-400 Series**



**A-600  
A-800 Series**



**A-1000, A-1200  
A-1600 Series**

Flange Size	GG	HH	Z - CF	Z - CFM
1	1.03	2.06	3/8-16 UNC	M-10
1.50	1.41	2.75	1/2-13 UNC	M-12
2	1.69	3.06	1/2-13 UNC	M-12
3	2.44	4.19	5/8-11 UNC	M-16

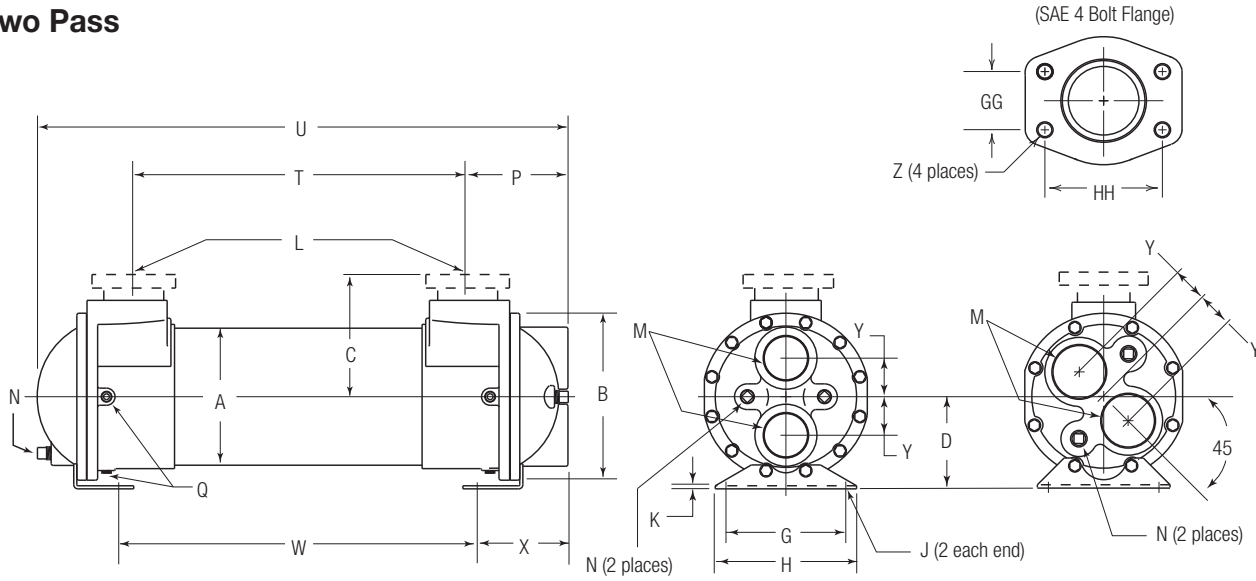
Model	A Dia.	B Dia.	C		D	G	H	J	K	L		M NPT	N NPT	P	Q NPT	T	U	W	X	Y
			NPT/BSPP SAE O-Ring	SAE 4 Bolt Flange						NPT/BSPP Flange	SAE O-Ring									
SA-408	2.12	—	1.69	—	—	—	—	—	1.00	N/A	.75	.38	2.38	—	6.25	11.00	—	—	—	.38
A-608	3.12	4.19	2.44	C/F	2.44	2.50	3.50	.38 x .88	.12	1.00	1.50	.38	2.56	(2) .25	6.12	11.25	5.47	3.06	.38	
A-614	3.12	4.19	2.44	C/F	2.44	2.50	3.50	.38 x .88	.12	1.00	1.50	.38	2.56	(2) .25	12.12	17.25	11.47	3.06	.38	
A-624	3.12	4.19	2.44	C/F	2.44	2.50	3.50	.38 x .88	.12	1.00	1.50	.38	2.56	(2) .25	22.12	27.25	21.47	3.06	.38	
A-814	4.12	5.88	3.12	C/F	3.50	3.50	4.75	.50 x 1.62	.12	1.50	2.00	.38	3.44	(6) .38	11.12	18.00	12.88	2.56	.50	
A-824	4.12	5.88	3.12	C/F	3.50	3.50	4.75	.50 x 1.62	.12	1.50	2.00	.38	3.44	(6) .38	21.12	28.00	22.88	2.56	.50	
A-836	4.12	5.88	3.12	C/F	3.50	3.50	4.75	.50 x 1.62	.12	1.50	2.00	.38	3.44	(6) .38	33.12	40.00	34.88	2.56	.50	
A-1014	5.12	6.50	3.62	4.34	3.50	4.00	5.00	.44 x 2.20	.12	1.50	2.50	.38	3.69	(6) .25	11.12	18.50	11.75	3.38	.50	
A-1024	5.12	6.50	3.62	4.34	3.50	4.00	5.00	.44 x 2.20	.12	1.50	2.50	.38	3.69	(6) .25	21.12	28.50	21.75	3.38	.50	
A-1036	5.12	6.50	3.62	4.34	3.50	4.00	5.00	.44 x 2.20	.12	1.50	2.50	.38	3.69	(6) .25	33.12	40.50	33.75	3.38	.50	
A-1224	6.12	7.50	4.25	4.84	4.12	5.00	6.00	.50 x .88	.12	2.00	3.00	.50	4.25	(6) .25	20.50	29.00	21.50	3.75	.50	
A-1236	6.12	7.50	4.25	4.84	4.12	5.00	6.00	.50 x .88	.12	2.00	3.00	.50	4.25	(6) .25	32.50	41.00	33.50	3.75	.50	
A-1248	6.12	7.50	4.25	4.84	4.12	5.00	6.00	.50 x .88	.12	2.00	3.00	.50	4.25	(6) .25	44.50	53.00	45.50	3.75	.50	
A-1260	6.12	7.50	4.25	4.84	4.12	5.00	6.00	.50 x .88	.12	2.00	3.00	.50	4.25	(6) .25	56.50	65.00	57.50	3.75	.50	
A-1624	8.00	9.75	5.62	6.12	5.38	7.00	8.25	.62 x 1.12	.19	3.00	3.00	.50	6.00	(6) .25	19.00	31.00	20.50	5.25	.50	
A-1636	8.00	9.75	5.62	6.12	5.38	7.00	8.25	.62 x 1.12	.19	3.00	3.00	.50	6.00	(6) .25	31.00	43.00	44.50	5.25	.50	
A-1648	8.00	9.75	5.62	6.12	5.38	7.00	8.25	.62 x 1.12	.19	3.00	3.00	.50	6.00	(6) .25	43.00	55.00	44.50	5.25	.50	
A-1660	8.00	9.75	5.62	6.12	5.38	7.00	8.25	.62 x 1.12	.19	3.00	3.00	.50	6.00	(6) .25	55.00	67.00	56.50	5.25	.50	
A-1672	8.00	9.75	5.62	6.12	5.38	7.00	8.25	.62 x 1.12	.19	3.00	3.00	.50	6.00	(6) .25	67.00	79.00	68.50	5.25	.50	

\*SA-408 SAE Flange not available. \*\*SAF-1200 5.88. \*\*\*SAF-1600 7.38.

NOTE: We reserve the right to make reasonable design changes without notice. Consult factory. All dimensions are inches.

# Dimensions

## Two Pass



**A-600, A-800, A-1000  
A-1600 Series**

**A-1200 Series**

Flange Size	GG	HH	Z - CF	Z - CFM
1	1.03	2.06	3/8-16 UNC	M-10
1.50	1.41	2.75	1/2-13 UNC	M-12
2	1.69	3.06	1/2-13 UNC	M-12
3	2.44	4.19	5/8-11 UNC	M-16

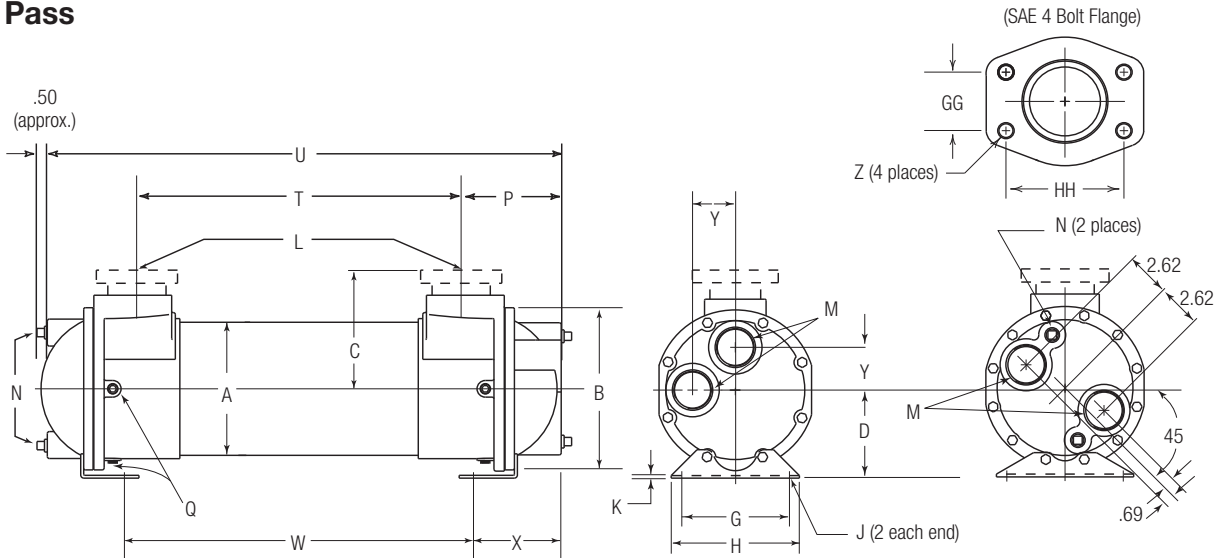
Model	A Dia.	B Dia.	C		D	G	H	J	K	L		M NPT	N NPT	P	Q NPT	T	U	W	X	Y
			NPT/BSPP SAE O-Ring	SAE 4 Bolt Flange						NPT/BSPP Flange	SAE O-Ring									
A-608	3.12	4.19	2.44	C/F	2.44	2.50	3.50	.38 x .88	.12	1.00	#16, 1 1/16-12 UNF-2b	1.00	.38	2.44	(2) .25	6.12	10.75	5.47	2.94	1.00
A-614	3.12	4.19	2.44	C/F	2.44	2.50	3.50	.38 x .88	.12	1.00	#16, 1 1/16-12 UNF-2b	1.00	.38	2.44	(2) .25	12.12	16.75	11.47	2.94	1.00
A-624	3.12	4.19	2.44	C/F	2.44	2.50	3.50	.38 x .88	.12	1.00	#16, 1 1/16-12 UNF-2b	1.00	.38	2.44	(2) .25	22.12	26.75	21.47	2.94	1.00
A-814	4.12	5.88	3.12	C/F	3.50	3.50	4.75	.50 x 1.62	.12	1.50	#24, 1 1/8-12 UN-2B	1.25	.38	3.44	(6) .38	11.12	17.62	12.88	2.56	1.19
A-824	4.12	5.88	3.12	C/F	3.50	3.50	4.75	.50 x 1.62	.12	1.50	#24, 1 1/8-12 UN-2B	1.25	.38	3.44	(6) .38	21.12	27.62	22.88	2.56	1.19
A-836	4.12	5.88	3.12	C/F	3.50	3.50	4.75	.50 x 1.62	.12	1.50	#24, 1 1/8-12 UN-2B	1.25	.38	3.44	(6) .38	33.12	39.62	34.88	2.56	1.19
A-1014	5.12	6.50	3.62	4.34	3.50	4.00	5.00	.44 x 2.20	.12	1.50	#24, 1 1/8-12 UN-2B	1.50	.38	3.69	(6) .25	11.12	18.31	11.75	3.38	1.50
A-1024	5.12	6.50	3.62	4.34	3.50	4.00	5.00	.44 x 2.20	.12	1.50	#24, 1 1/8-12 UN-2B	1.50	.38	3.69	(6) .25	21.12	28.31	21.75	3.38	1.50
A-1036	5.12	6.50	3.62	4.34	3.50	4.00	5.00	.44 x 2.20	.12	1.50	#24, 1 1/8-12 UN-2B	1.50	.38	3.69	(6) .25	33.12	40.31	33.75	3.38	1.50
A-1224	6.12	7.50	4.25	4.84	4.12	5.00	6.00	.50 x .88	.12	2.00	#32, 2 1/2-12 UN-2B	2.00	.50	4.25	(6) .25	20.50	28.75	21.50	3.75	1.56
A-1236	6.12	7.50	4.25	4.84	4.12	5.00	6.00	.50 x .88	.12	2.00	#32, 2 1/2-12 UN-2B	2.00	.50	4.25	(6) .25	32.50	40.75	33.50	3.75	1.56
A-1248	6.12	7.50	4.25	4.84	4.12	5.00	6.00	.50 x .88	.12	2.00	#32, 2 1/2-12 UN-2B	2.00	.50	4.25	(6) .25	44.50	52.75	45.50	3.75	1.56
A-1260	6.12	7.50	4.25	4.84	4.12	5.00	6.00	.50 x .88	.12	2.00	#32, 2 1/2-12 UN-2B	2.00	.50	4.25	(6) .25	56.50	64.75	57.50	3.75	1.56
A-1624	8.00	9.75	5.62	6.12	5.38	7.00	8.25	.62 x 1.12	.19	3.00	—	2.50	.50	6.00	(6) .25	19.00	30.50	20.50	5.25	2.25
A-1636	8.00	9.75	5.62	6.12	5.38	7.00	8.25	.62 x 1.12	.19	3.00	—	2.50	.50	6.00	(6) .25	31.00	42.50	44.50	5.25	2.25
A-1648	8.00	9.75	5.62	6.12	5.38	7.00	8.25	.62 x 1.12	.19	3.00	—	2.50	.50	6.00	(6) .25	43.00	54.50	44.50	5.25	2.25
A-1660	8.00	9.75	5.62	6.12	5.38	7.00	8.25	.62 x 1.12	.19	3.00	—	2.50	.50	6.00	(6) .25	55.00	66.50	56.50	5.25	2.25
A-1672	8.00	9.75	5.62	6.12	5.38	7.00	8.25	.62 x 1.12	.19	3.00	—	2.50	.50	6.00	(6) .25	67.00	78.50	68.50	5.25	2.25

\*SAF-1200 5.88. \*\*SAF-1600 7.38.

NOTE: We reserve the right to make reasonable design changes without notice. Consult factory. All dimensions are inches.

# Dimensions

## Four Pass



**A-600, A-800, A-1000  
A-1200 Series**

**A-1600 Series**

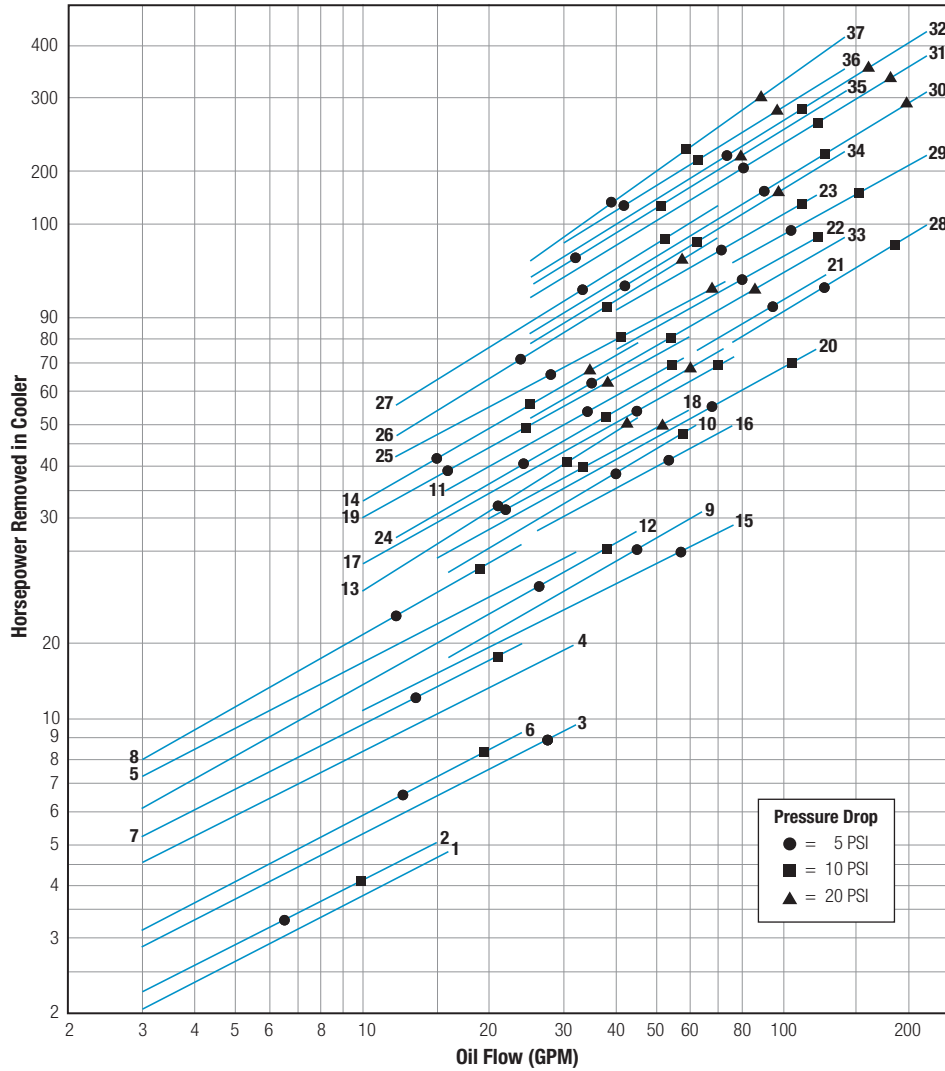
Flange Size	GG	HH	Z - CF	Z - CFM
1	1.03	2.06	3/8-16 UNC	M-10
1.50	1.41	2.75	1/2-13 UNC	M-12
2	1.69	3.06	1/2-13 UNC	M-12
3	2.44	4.19	5/8-11 UNC	M-16

Model	A Dia.	B Dia.	C		D	G	H	J	K	L		M NPT	N NPT	P	Q NPT	T	U	W	X	Y	
			NPT/BSPP SAE O-Ring	SAE 4 Bolt Flange						NPT/BSPP Flange	SAE O-Ring										
A-608	3.12	4.19	2.44	C/F	2.44	2.50	3.50	.38 x .88	.12	1.00	#16,	.75	.38	2.31	(2) .25	6.12	10.88	5.47	2.81	1.00	
A-614	3.12	4.19	2.44	C/F	2.44	2.50	3.50	.38 x .88	.12	1.00	1 1/16-12	.75	.38	2.31	(2) .25	12.12	16.88	11.47	2.81	1.00	
A-624	3.12	4.19	2.44	C/F	2.44	2.50	3.50	.38 x .88	.12	1.00	UNF-2b	.75	.38	2.31	(2) .25	22.12	26.88	21.47	2.81	1.00	
A-814	4.12	5.88	3.12	C/F	3.50	3.50	4.75	.50 x 1.62	.12	1.50	#24, 1 1/8-12 UN-2B	.75	.38	3.44	(6) .38	11.12	17.62	12.88	2.56	1.06	
A-824	4.12	5.88	3.12	C/F	3.50	3.50	4.75	.50 x 1.62	.12	1.50		.75	.38	3.44	(6) .38	21.12	27.62	22.88	2.56	1.06	
A-836	4.12	5.88	3.12	C/F	3.50	3.50	4.75	.50 x 1.62	.12	1.50		.75	.38	3.44	(6) .38	33.12	39.62	34.88	2.56	1.06	
A-1014	5.12	6.50	3.62	4.34	3.50	4.00	5.00	.44 x 2.20	.12	1.50		1.00	.38	3.56	(6) .25	11.12	18.38	11.75	3.25	1.69	
A-1024	5.12	6.50	3.62	4.34	3.50	4.00	5.00	.44 x 2.20	.12	1.50		1.00	.38	3.56	(6) .25	21.12	28.38	21.75	3.25	1.69	
A-1036	5.12	6.50	3.62	4.34	3.50	4.00	5.00	.44 x 2.20	.12	1.50		1.00	.38	3.56	(6) .25	33.12	40.38	33.75	3.25	1.69	
A-1224	6.12	7.50	4.25	4.84	4.12	5.00	6.00	.50 x .88	.12	2.00		#32, 2 1/2-12 UN-2B	1.50	.50	4.25	(6) .25	20.50	29.00	21.50	3.75	2.00
A-1236	6.12	7.50	4.25	4.84	4.12	5.00	6.00	.50 x .88	.12	2.00			1.50	.50	4.25	(6) .25	32.50	41.00	33.50	3.75	2.00
A-1248	6.12	7.50	4.25	4.84	4.12	5.00	6.00	.50 x .88	.12	2.00			1.50	.50	4.25	(6) .25	44.50	53.00	45.50	3.75	2.00
A-1260	6.12	7.50	4.25	4.84	4.12	5.00	6.00	.50 x .88	.12	2.00			1.50	.50	4.25	(6) .25	56.50	65.00	57.50	3.75	2.00
A-1624	8.00	9.75	5.62	6.12**	5.38	7.00	8.25	.62 x 1.12	.19	3.00	—	2.00	.50	6.00	(6) .25	19.00	30.75	20.50	5.25	—	
A-1636	8.00	9.75	5.62	6.12**	5.38	7.00	8.25	.62 x 1.12	.19	3.00	—	2.00	.50	6.00	(6) .25	31.00	42.75	44.50	5.25	—	
A-1648	8.00	9.75	5.62	6.12**	5.38	7.00	8.25	.62 x 1.12	.19	3.00	—	2.00	.50	6.00	(6) .25	43.00	54.75	44.50	5.25	—	
A-1660	8.00	9.75	5.62	6.12**	5.38	7.00	8.25	.62 x 1.12	.19	3.00	—	2.00	.50	6.00	(6) .25	55.00	66.75	56.50	5.25	—	
A-1672	8.00	9.75	5.62	6.12**	5.38	7.00	8.25	.62 x 1.12	.19	3.00	—	2.50	.50	6.00	(6) .25	67.00	78.75	68.50	5.25	—	

\*SAF-1200 5.88. \*\*SAF-1600 7.38.

NOTE: We reserve the right to make reasonable design changes without notice. Consult factory. All dimensions are inches.

# Performance Curves

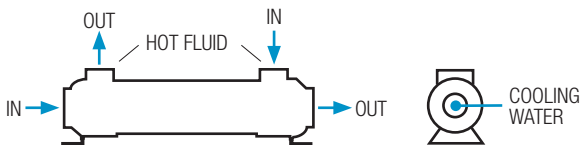


Curve Number	Model	Shipping Weight (LBS)
1	SA-408-2-4-0	7
2	SA-408-.75-4-0	7
3	A-608-2-4-F	12
4	A-614-4-4-F	17
5	A-624-4-4-F	20
6	A-608-1-4-F	12
7	A-614-1.5-4-F	17
8	A-624-2-4-F	20
9	A-814-3-4-F	40
10	A-824-4-4-F	50
11	A-836-4-4-F	58
12	A-814-1.5-4-F	40
13	A-824-2-4-F	50
14	A-836-2-4-F	58
15	A-1014-3-6-F	49
16	A-1024-4-6-F	63
17	A-1036-4-6-F	72
18	A-1024-2-6-F	63
19	A-1036-2-6-F	72
20	A-1224-4-6-F	78
21	A-1236-6-6-F	118
22	A-1248-6-6-F	143
23	A-1260-6-6-F	165
24	A-1224-2-6-F	78
25	A-1236-3-6-F	118
26	A-1248-3-6-F	143
27	A-1260-4-6-F	165
28	A-1624-6-6-F	180
29	A-1636-6-6-F	210
30	A-1648-6-6-F	250
31	A-1660-6-6-F	286
32	A-1672-6-6-F	330
33	A-1624-2-6-F	180
34	A-1636-3-6-F	210
35	A-1648-3-6-F	250
36	A-1660-4-6-F	286
37	A-1672-4-6-F	330

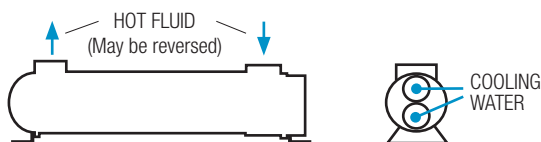
Shipping weights are approximate.

## Piping Diagram

### One Pass



### Two and Four Pass



Specific applications may have different piping arrangements. Contact factory for assistance.

# Selection Procedure

Performance Curves are based on 100SSU oil leaving the cooler 40°F higher than the water temperature used for cooling. This is also referred to as a 40°F approach temperature. Curves are based on a 2:1 oil to water flow ratio.

**STEP 1 Determine the Heat Load.** This will vary with different systems, but typically coolers are sized to remove 25 to 50% of the input nameplate horsepower. (Example: 100 HP Power Unit x .33 = 33 HP Heat load.)  
If BTU/HR is known:  $HP = \frac{BTU/HR}{2545}$

**STEP 1 Determine Approach Temperature.** Desired oil leaving cooler °F – Water Inlet temp. °F = Actual Approach (Max. reservoir temp.)

**STEP 1 Determine Curve Horsepower Heat Load.** Enter the information from above:  
Horsepower heat load x  $\frac{40}{\text{Actual Approach}}$  x  $\frac{\text{Viscosity}}{\text{Correction A}}$  =  $\frac{\text{Curve Horsepower}}{\text{Correction B}}$

**STEP 1 Enter curves** at oil flow through cooler and curve horsepower. Any curve above the intersecting point will work.

**STEP 1 Determine Oil Pressure Drop from Curves:**  
● = 5 PSI ■ = 10 PSI ▲ = 20 PSI Multiply pressure drop from curve by correction factor B found on oil viscosity correction curve.

## Oil Temperature

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

Typical operating temperature ranges are:  
Hydraulic Oil 110°F - 130°F  
Hydrostatic Drive Oil 130°F - 180°F  
Bearing Lube Oil 120°F - 160°F  
Lube Oil Circuits 110°F - 130°F

## 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 oil 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:

$$\text{Oil } \Delta T = (\text{BTUs/HR}) / (\text{GPM Oil Flow} \times 210)$$

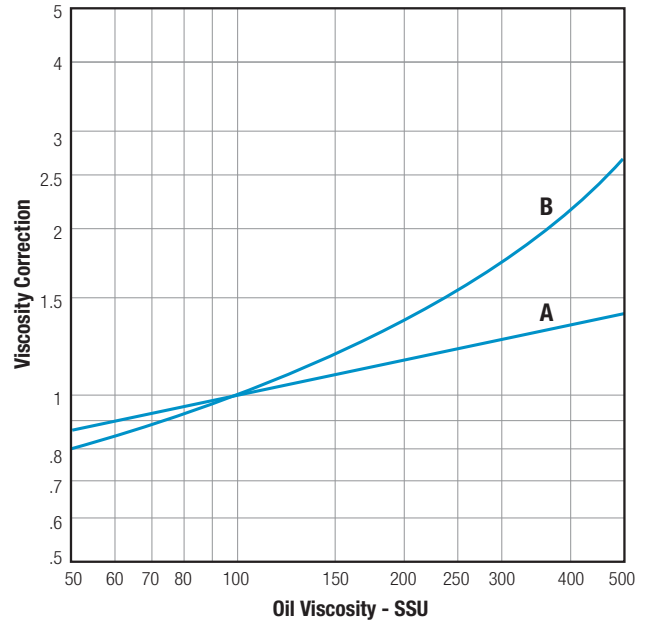
To calculate the oil leaving temperature from the cooler, use this formula:

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

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.

## Viscosity Correction



## Maximum Flow Rates

Example Model No.

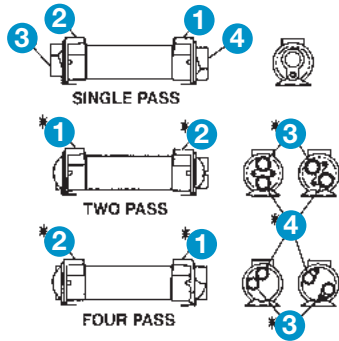
**A - 1024 - 2 - 6 - F**

Unit Size	Baffle Spacing	Shell Side (GPM)	Tube Side (GPM)		
			O	T	F
400	.75, 2	7, 19	18	–	–
608	1, 2	14, 29	48	24	12
614	1.5, 4	21, 29	48	24	12
624	2, 4	29	48	24	12
814	1.5, 3	29, 57	87	44	22
824 & 836	2, 4	38, 69	87	44	22
1014	1.5, 3	32, 64	146	73	37
1024 & 1036	2, 4	42, 69	146	73	37
1224	2, 4	51, 103	224	112	56
1236 & 1248	3, 6	77, 115	224	112	56
1260	4, 6	103, 115	224	112	56
1624	2, 6	66, 200	280	140	70
1636 & 1648	3, 6	100, 200	280	140	70
1660 & 1672	4, 6	133, 200	280	140	70

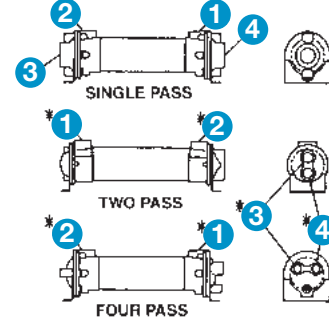
**Caution:** Incorrect installation can cause this product to fail prematurely, causing the shell side and tube side fluids to intermix.

# Piping Hook-up

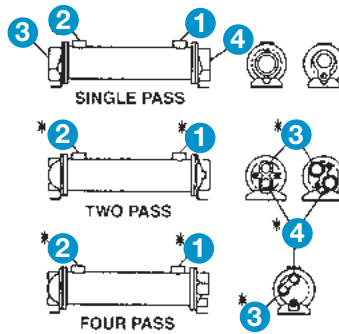
## A Series



## B Series

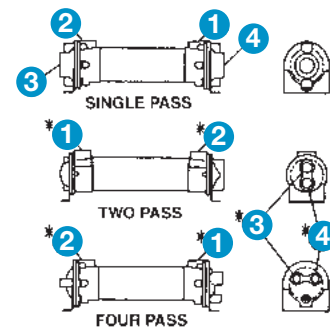


## HC / SSC / EC Series

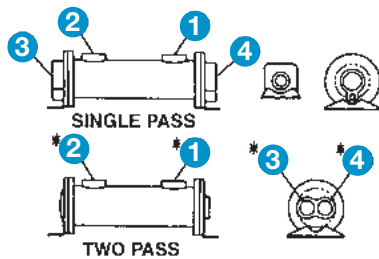


EC bonnet rotation is slightly different from what is shown. See Series literature for details.

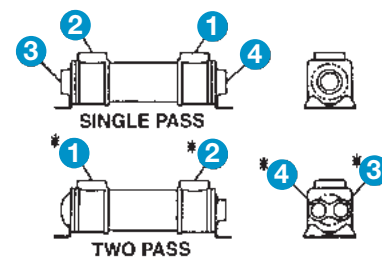
## SLE / SL / R Series



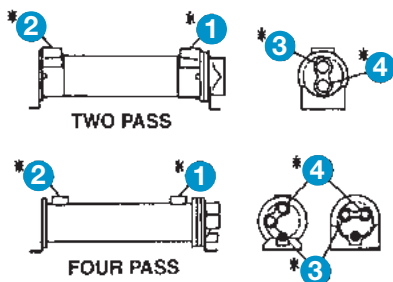
## EK / EKS / EKM Series



## K / KN Series



## U / UC / UR Series



Note baffle location when inserting bundle into shell assembly after cleaning.

- 1 Hot Fluid In
- 2 Cooled Fluid Out
- 3 Cooling Water In
- 4 Cooling Water Out

\*Note: For all two pass and four pass heat exchangers: connections 1 and 2 may be reversed, and connections 3 and 4 may be reversed with no effect on performance.

## Installation

The satisfactory use of this heat exchange equipment is dependent upon precautions which must be taken at the time of the installation.

1. Connect and circulate the hot fluid in the shell side (over small tubes) and the cooling water in the tube side (inside small tubes). Note piping diagrams.
2. If an automatic water regulating valve is used, place it on the INLET connection of the cooler. Arrange the water outlet piping so that the exchanger remains flooded with water, but at little or no pressure. The temperature probe is placed in the hydraulic reservoir to sense a system temperature rise. Write the factory for water regulating valve recommendations.
3. There are normally no restrictions as to how this cooler may be mounted. The only limitation regarding the mounting of this equipment is the possibility of having to drain either the water or the oil chambers after the cooler has been installed. Both fluid drain plugs should be located on the bottom of the cooler to accomplish the draining of the fluids. Drains are on most models.
4. It is possible to protect your cooler from high flow and pressure surges of hot fluid by installing a fast-acting relief valve in the inlet line to the cooler.
5. It is recommended that water strainers be installed ahead of this cooler when the source of cooling water is from other than a municipal water supply. Dirt and debris can plug the water passages very quickly, rendering the cooler ineffective. Write the factory for water strainer recommendations.
6. Fixed bundle heat exchangers are generally not recommended for steam service. For steam applications, a floating bundle exchanger is required. Note: When installing floating bundle unit, secure one end firmly and opposite end loosely to allow bundle to expand and contract. Consult factory for selection assistance.
7. Piping must be properly supported to prevent excess strain on the heat exchanger ports. If excessive vibration is present, the use of shock absorbing mounts and flexible connectors is recommended.

## Service

Each heat exchanger has been cleaned at the factory and should not require further treatment. It may be well to inspect the unit to be sure that dirt or foreign matter has not entered the unit during shipment. The heat exchanger should be mounted firmly in place with pipe connections tight.

## Caution

If sealant tape is used on pipe threads, the degree of resistance between mating parts is less, and there is a greater chance for cracking the heat exchanger castings. Do not overtighten. When storing the unit, be sure to keep the oil and water ports sealed. If storage continues into cold winter months, the water chamber must be drained to prevent damage by freezing.

Performance information should be noted and recorded on newly installed units so that any reduction in effectiveness can be detected. Any loss in efficiency can normally be traced to an accumulation of oil sludge, or water scale.

## Recommendations

Replace gaskets when removing end castings. It is recommended that gaskets be soaked in oil to prevent corrosion and ensure a tight seal.

Salt water should not be used in standard models. Use salt water in special models having 90/10 copper-nickel tubes, tube sheets\*, bronze bonnets and zinc anodes on the tube side. Brackish water or other corrosive fluids may require special materials of construction.

When zinc anodes are used for a particular application, they should be inspected two weeks after initial startup.

At this time, by visual inspection of the anode, determination of future inspection intervals can be made, based on the actual corrosion rate of the zinc metal.

The zinc anodes must be replaced when 70% of the zinc volume has been consumed.

It may be necessary to drain the water chambers of the exchanger to protect it from damage by freezing temperatures. Drains are provided in most standard models.

The oil chamber of the exchanger may become filled with sludge accumulation and require cleaning. It is recommended that the unit be flooded with a commercial solvent and left to soak for one-half hour. Backflowing with the solvent or regular oil will remove most sludge. Repeated soaking and backflowing may be required, depending on the degree of sludge buildup.

It may be necessary to clean the inside of the cooling tubes to remove any contamination and/or scale buildup. It is recommended that a fifty-fifty percent solution of inhibited muriatic acid and water may be used. For severe problems, the use of a brush through the tubes may be of some help. Be sure to use a soft bristled brush to prevent scouring the tube surface causing accelerated corrosion. Upon completion of cleaning, be certain that all chemicals are removed from the shellside and the tubeside before the heat exchanger is placed into service.

When ordering replacement parts or making an inquiry regarding service, mention model number, serial number, and the original purchase order number.

*\*Available on HC/SSC/SSCA Series models only.*



# Maximum Shell & Tube Flow Rates

## CAUTION

Incorrect installation can cause this product to fail prematurely, causing the shell side and tube side fluids to intermix. Maximum allowable flow rates are as charted below.

### B Series Model No. Example: B-702-A4-F

Unit Size	Shell Side (GPM) / Baffle Spacing					Tube Side (GPM)		
	A	B	C	D	E	O	T	T
400	9.6	—	—	—	—	25		
700	17	29	29	—	—	61	31	15
1000	24	48	69	69	—	146	73	37
1200	29	57	115	115	—	224	112	56
1600	37	75	149	253	—	363	181	91
2000	—	—	187	347*	457*	652	326	163

\*281 GPM maximum for all B-2005-D \*\*500 GPM maximum for all B-20080-E and 562 GPM maximum for all B2006-E6 or B-2006-E10  
562 GPM maximum for all B-2006-E6 or B-2006-E10

### A Series Model No. Example: A-1024-2-6-F

Unit Size	Baffle Spacing	Shell Side (GPM)	Tube Side (GPM)		
			O	T	F
SA-400	.75	7	18	—	—
	2	19			
600	1	14	48	24	12
	1.5	21			
	2	29			
800	4	29	87	43	21
	1.5	29			
	2	38			
1000	3	57	146	73	37
	4	69			
	1.5	32			
	2	42			
1200	3	60	224	112	56
	4	69			
	2	51			
	3	77			
1600	4	103	280	203	101
	6	115			
	26	66			
	3	100			
	4	133			
	6	200			

### HC / SSC Series Model No. Example: HC-1024-2-6-F

Unit Size	Baffle Size	Shell Side (GPM)	Tube Side (GPM)		
			O	T	F
600	1.38	19	48	24	12
	2	29			
	3	29			
800	1.38	26	84	42	21
	1.7	31			
	2	38			
	3	57			
1000	4	69	146	23	37
	1.38	24			
	2	41			
1200	3	64	224	112	56
	5	69			
	2.5	60			
	3	77			
1700	3.62	93	465	232	116
	5	115			
	6	115			
	3.	125			
	4	143			
	4.5	161			
	5	179			
6	215				
	7	251			
	8.4	253			

### EC Series Model No. Example: EC-1236-6-F

Unit Size	Baffle Size	Shell Side (GPM)	Tube Side (GPM)		
			O	T	F
1000	4	55	66	33	15
	6	70			
	8	70			
1200	4	65	120	60	28
	6	100			
	8	115			
	12	115			
1700	4	90	220	110	52
	6	140			
	8	190			
	12	255			

### K / EK Series Model No. Example: EK or K-712-F

Unit Size	Shell Side (GPM)	Tube Side (GPM)	
		O	T
500	20	13	—
100	70	24	12
1000	100	56	28