Fluid Cooling Shell & Tube K Series

COPPER & STEEL CONSTRUCTION

Performance Notes

- Modine interchange
- Finned tube bundle
- 3/16" tube size
- Use EK for new application
- Cast iron hubs
- Steel shell

OPTION
SAE internal O-Ring ports shell side

Ratings

K-500 & K-700 Series

Maximum Operating Pressure - Shell Side
500 PSI

Maximum Operating Pressure - Tube Side
150 PSI

Test Pressure - Shell Side
550 PSI

Test Pressure - Tube Side
225 PSI

Maximum Operating Temperature
350°F

Ratings

K-1000 Series

Maximum Operating Pressure - Shell Side
400 PSI

Maximum Operating Pressure - Tube Side
150 PSI

Test Pressure - Shell Side
450 PSI

Test Pressure - Tube Side
225 PSI

Maximum Operating Temperature
350°F

Materials

Shell Steel
Tubes Copper
Baffles Steel
Mounting Brackets Steel
Gaskets Nitrile rubber/cellulose fiber
Fins Aluminum
End Hubs Cast malleable iron
End Bonnets Cast iron
Headers Cast malleable iron
Nameplate Aluminum foil

How to Order

[ ] - [ ] [ ] [ ] [ ] - [ ] - [ ]

Model Series
K
KN

Model Size Selected

Tubeside Passes

Cooling Tube Material
Blank - Copper
CN - CuNi

"K" Prefix designates N.P.T. shell configurations. "KN" Prefix designates SAE internal thread O-ring shell connections.

Unit Coding Example

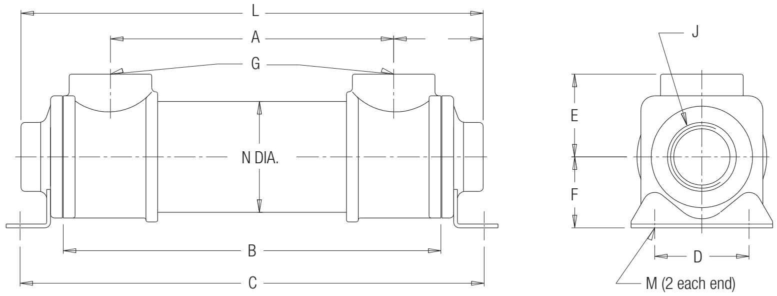
K-714-T

Extended Surface Design (K) · Shell Diameter (7) · Effective Tube Length (14) · Tube Side Passes (T)

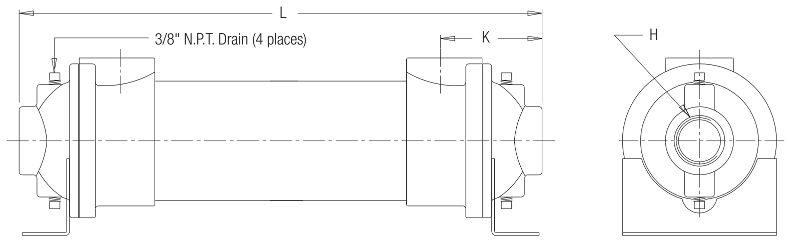
Dimensions

One Pass

K-500 & K-700 Series



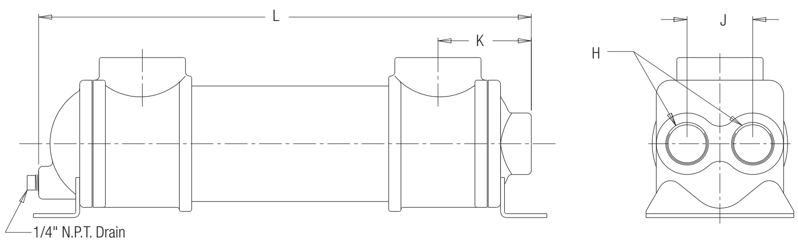
K-1000 Series



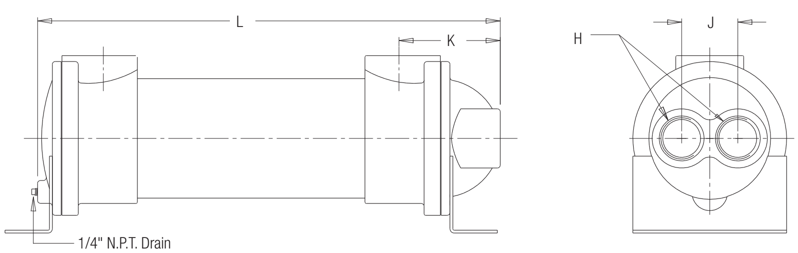
Model	L	H NPT	K
K-508-0	10.19	.75	2.22
K-512-0	14.19	.75	2.22
K-514-0	20.19	.75	2.22
K-708-0	10.69	1.25	2.87
K-712-0	14.69	1.25	2.87
K-714-0	16.69	1.25	2.87
K-718-0	20.69	1.25	2.87
K-1012-0	17.12	2.00	4.31
K-1014-0	19.12	2.00	4.31
K-1018-0	23.13	2.00	4.31
K-1024-0	29.12	2.00	4.31

Two Pass

K-700 Series



K-1000 Series



Model	L	H NPT	J	K
K-708-T	10.69	1.00	2.00	2.87
K-712-T	14.69	1.00	2.00	2.87
K-714-T	16.69	1.00	2.00	2.87
K-718-T	20.69	1.00	2.00	2.87
K-1012-T	15.62	1.00	2.00	4.31
K-1014-T	17.62	1.50	2.38	4.31
K-1018-T	21.62	1.50	2.38	4.31
K-1024-T	27.62	1.50	2.38	4.31

Model	A	B	C	D	E	F	G NPT	M	N DIA.	Weight (LBS)	G SAE (Optional)
K-508	5.75	8.00	10.25	2.50	1.88	1.62	.75	.34 X .50	2.50	7.75	#12 1-1/16 - 12 UN-2B
K-512	9.75	12.00	14.25	2.50	1.88	1.62	.75	.34 X .50	2.50	8.76	
K-514	11.75	14.00	16.25	2.50	1.88	1.62	.75	.34 X .50	2.50	9.12	
K-518	15.75	18.00	20.25	2.50	1.88	1.62	.75	.34 X .50	2.50	10.00	
K-708	5.00	8.00	10.75	3.00	2.62	2.25	1.50	.44 x .75	3.50	15.75	#24 1-7/8 - 12 UN-2B
K-712	9.00	12.00	14.75	3.00	2.62	2.25	1.50	.44 x .75	3.50	18.40	
K-714	11.00	14.00	16.75	3.00	2.62	2.25	1.50	.44 x .75	3.50	19.75	
K-718	15.00	18.00	20.75	3.00	2.62	2.25	1.50	.44 x .75	3.50	21.50	
K-1012	8.50	12.00	15.50	4.00	3.50	4.00	2.00	.44 x 1.00	5.00	42.50	#32 2-1/2 -12 UN-2B
K-1014	10.50	14.00	17.50	4.00	3.50	4.00	2.00	.44 x 1.00	5.00	44.25	
K-1018	14.50	18.00	21.50	4.00	3.50	4.00	2.00	.44 x 1.00	5.00	49.00	
K-1024	20.50	24.00	27.50	4.00	3.50	4.00	2.00	.44 x 1.00	5.00	57.00	

Note: We reserve the right to make reasonable design changes without notice. Dimensions are in inches.

Selection Procedure

Performance Curves are based on 100SSU oil leaving the cooler 40°F higher than the incoming water temperature (40°F approach temperature).

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 2 **Determine Approach Temperature.**

Desired oil leaving cooler °F – Water Inlet temp. °F = Actual Approach

STEP 3 **Determine Curve Horsepower Heat Load.** Enter the information from above:

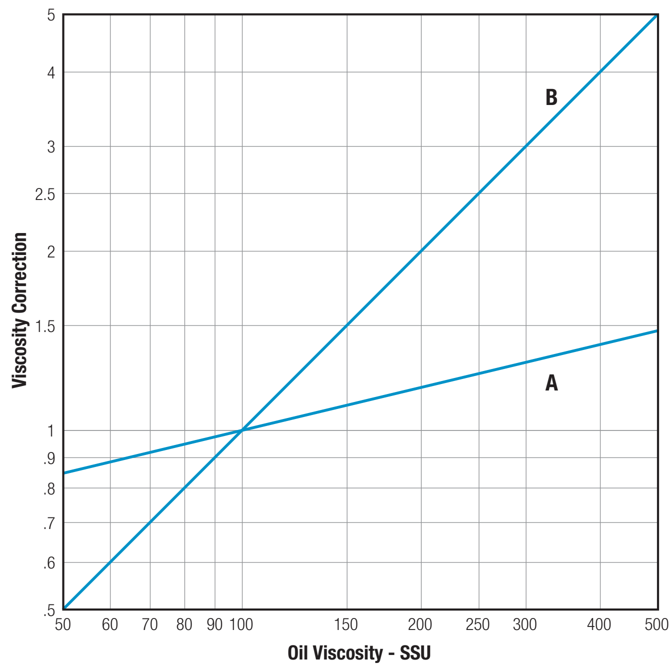
$$\text{HP heat load} \times \frac{40}{\text{Actual Approach}} \times \text{Viscosity Correction A} = \text{Curve Horsepower}$$

STEP 4 **Enter curves** at oil flow through cooler and curve horsepower. Any curve above the intersecting point will work.

STEP 5 **Determine Oil Pressure Drop from Curves.** Multiply pressure drop from curve by correction factor B found on oil viscosity correction curve.

● = 5 PSI ■ = 10 PSI ▲ = 20 PSI

Oil Viscosity Correction Multipliers



Oil Temperature

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

Typical operating temperature ranges are:

Hydraulic Motor Oil	110°F - 130°F
Hydrostatic Drive Oil	130°F - 180°F
Lube Oil Circuits	110°F - 130°F
Automatic Transmission Fluid	200°F - 300°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 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 $\triangle$T) with this formula:

Oil $\triangle$T=(BTUs/HR)/GPM Oil Flow x 210).

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

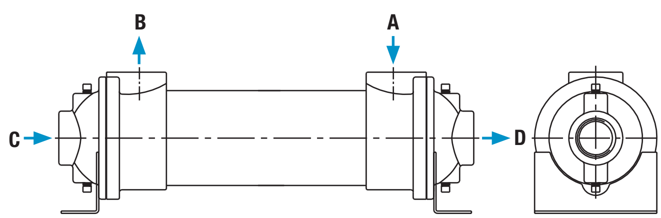
Oil Leaving Temperature = Oil Entering Temperature - Oil $\triangle$T.

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

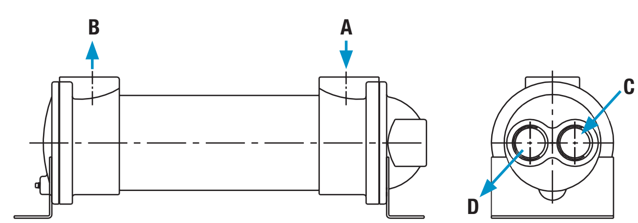
Oil Pressure Drop: Most systems can tolerate a pressure drop through the heat exchanger of 20 to 30 PSI. Excessive pressure drop should be avoided. Care should be taken to limit pressure drop to 5 PSI or less for case drain applications where high back pressure may damage the pump shaft seals.

Piping Diagram

Single Pass Model



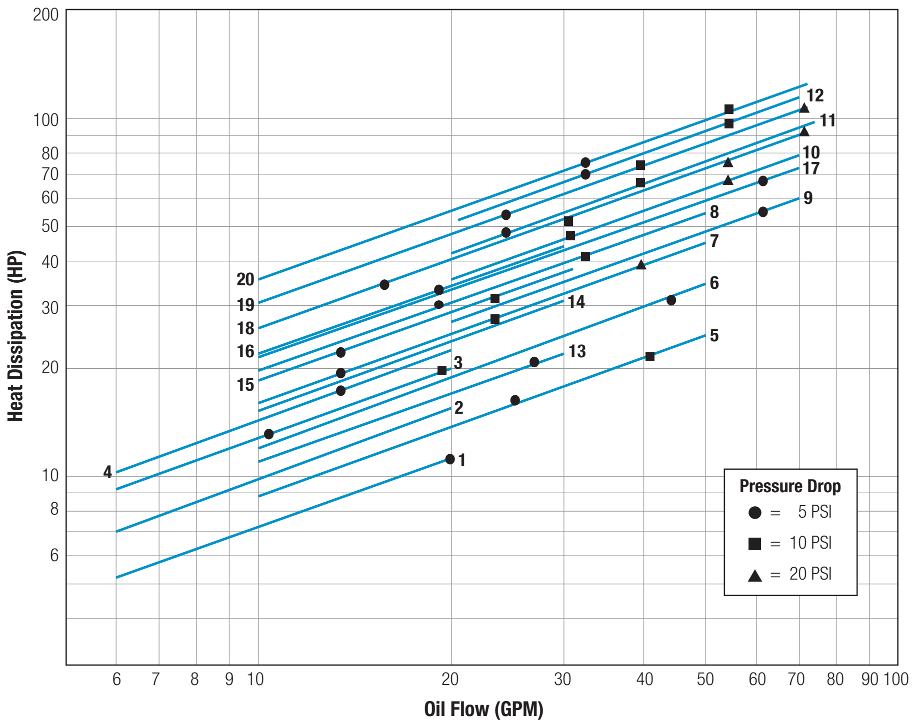
Two Pass Model



A = Hot fluid to be cooled
B = Cooled fluid
C = Cooling water in
D = Cooling water out

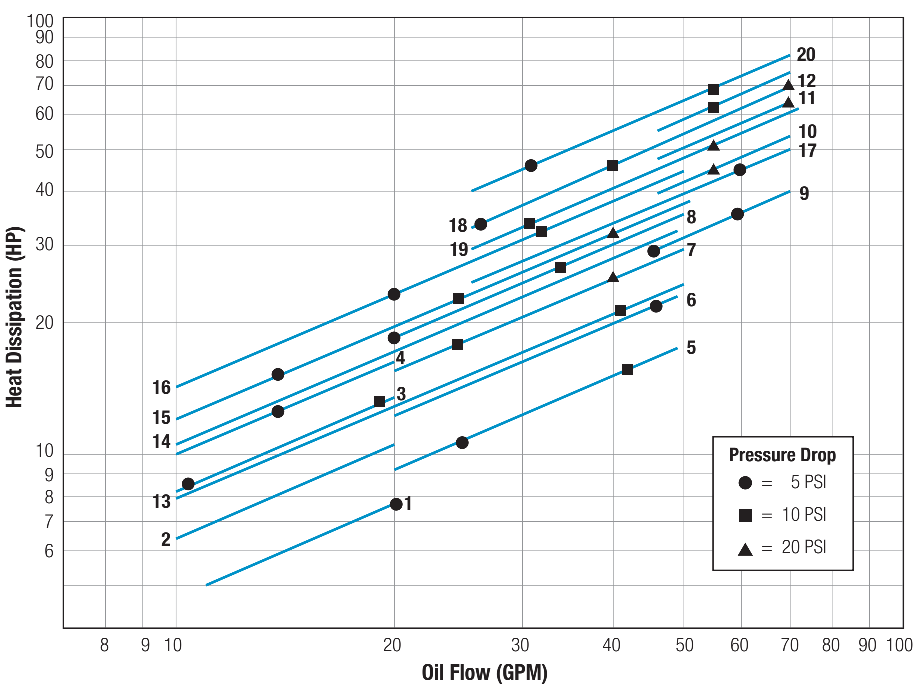
Performance Curves

2 to 1 Oil to Water Ratio



Curve Number	Model
1	K-508-0
2	K-512-0
3	K-514-0
4	K-518-0
5	K-708-0
6	K-712-0
7	K-714-0
8	K-718-0
9	K-1012-0
10	K-1014-0
11	K-1018-0
12	K-1024-0
13	K-708-T
14	K-712-T
15	K-714-T
16	K-718-T
17	K-1012-T
18	K-1014-T
19	K-1018-T
20	K-1024-T

4 to 1 Oil to Water Ratio



Maximum Flow Rates

Unit Size	Shell Side GPM	Tube Side	
		0	T
500	20	13	—
700	70	24	12
1000	100	56	28