

# AOC Series - Copper Tube/Aluminum Fins DC or Hydraulic Fan Drive 0223

The Mobile AOC Series features DC or hydraulic fan drives and is ideal for low flow applications. This cooler is a cost effective solution for mobile applications where remote mounting of the hydraulic heat exchanger is desirable away from the engine cooling. 12 or 24 VDC or hydraulic drive fans are available. Removable air filter prevents air-side core blockage (clogging of fins with debris) and can be easily removed for cleaning to maintain optimized cooling performance. Aggressive turbulators allow for optimal heat rejection at lower flow rates.

Consult catalog for additional sizes and technical information.

For additional sizing information consider using TTP's XSelector online sizing Program. \*



**OPTIONS**  
Serviceable internal pressure bypass  
NPT, BSPP or SAE connections

## How to Order

**Model Series**  
 **AOC**

**Model Size Selected**  
 **19, 22, 24, 33, 37, 50, 54, 57, 70**  
(See Performance Curve Chart on page 3)

**Connection Type**  
 **1 - NPT**  
**2 - SAE**  
**3 - BSPP**

**Bypass Setting\***  
 **Blank - No Bypass**  
**30 - 30 PSI (2 Bar) Pressure Bypass**  
**60 - 60 PSI (4.1 Bar) Pressure Bypass**  
This is a partial flow pressure bypass only. It is not designed to be a full flow system bypass.

**Specify Motor Required**  
 **4A - 12 VDC**  
**4B - 24 VDC**  
**9 - Hydraulic**  
**NM - No Motor**

## Features

**Designed for remote mounting away from engine cooling**

**Does not block main engine radiator**

**Heavy duty construction**

**High performance air side fin design**

**DC or Long life hydraulic motor fan drives**

**Core protected by serviceable stainless mesh screen**

**3/4" Tube size**

**SAE connections standard**

## Ratings

**Maximum Operating Pressure**  
300 PSI

**Test Pressure**  
300 PSI

**Maximum Operating Temperature**  
350°F

**Heat Removal** up to 160 HP

**Oil Flows** to 150 GPM

## Materials

**Tubes** Copper

**Fins** Aluminum

**Turbulators** Aluminum

**Fan Blade - DC Motor**  
High impact plastic

**Fan Blade - Hydraulic motor** Aluminum  
with steel hub

**Fan Guard - Hydraulic motor** Steel with  
black powder coat

**Manifolds** Steel

**Connections** Steel

**Cabinet** Steel with powder coat

**Filter** Stainless frame with washable media

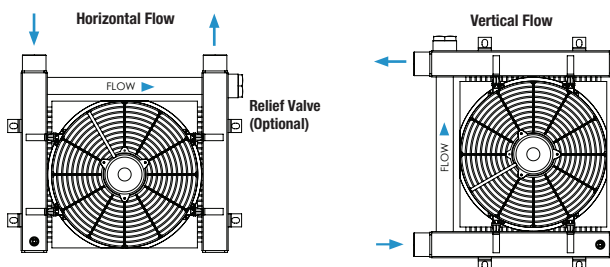
**Nameplate** Aluminum

**3/4" External, all steel valve**

**AOC-37 through AOC-70**

**1 1/2" External, all steel valve**

## Recommended Port Orientation



## Internal Pressure Bypass Option

**Available in either 30 PSI or 60 PSI settings.**

**Removable for Service**

This is a partial flow pressure bypass only. It is not designed to be a full flow system bypass.

**AOC-19 through AOC-33**  
3/4" external, all steel valve.

**AOC-37 through AOC-70**  
1 1/2" external, all steel valve.

\* To register for XSelector please go to [www.thermaltransfer.com/get-in-touch/](http://www.thermaltransfer.com/get-in-touch/) and complete the XSelector Inquiry form and submit. Download the XSelector for both Apple and Android formats by searching for XSelector in their App Stores. You must first register for XSelector before using it on mobile devices.

# Selection Procedure

Performance Curves are based on 50SSU oil entering the cooler 50°F higher than the ambient air temperature used for cooling. This is also referred to as a 50°F Entering Temperature Difference (ETD).

**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.)

To convert HP to BTU/HR: HP x 2545 = BTU/HR

**STEP 2 Entering Temperature Difference.** Desired oil entering cooler °F – Ambient air temp. °F = Actual ETD

**STEP 3 Determine Curve BTU/HR Heat Load.** Enter the information from above:

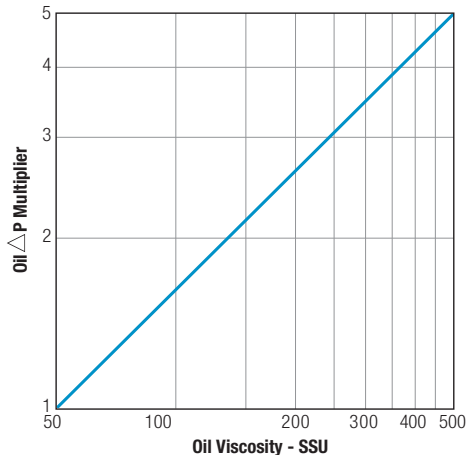
$$\text{BTU/HR heat load} \times \frac{50 \times C_v}{\text{ETD}} = \text{Curve BTU/HR}$$

**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:**

● = 5 PSI   ■ = 10 PSI   ▲ = 20 PSI Multiply pressure drop from curve by correction factor found in oil ΔP correction curve.

## Oil Pressure Correction



## C<sub>v</sub> Viscosity Correction

Average Oil Temp °F	OIL				
	SAE 5 110 SSU at 100°F 40 SSU at 210°F	SAE 10 150 SSU at 100°F 43 SSU at 210°F	SAE 20 275 SSU at 100°F 50 SSU at 210°F	SAE 30 500 SSU at 100°F 65 SSU at 210°F	SAE 40 750 SSU at 100°F 75 SSU at 210°F
100	1.14	1.22	1.35	1.58	1.77
150	1.01	1.05	1.11	1.21	1.31
200	.99	1.00	1.01	1.08	1.10
250	.95	.98	.99	1.00	1.00

## 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 Δ T) with this formula:

$$\text{Oil } \Delta T = (\text{BTU's/HR}) / (\text{GPM Oil Flow} \times 210)$$

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.

## Oil Temperature

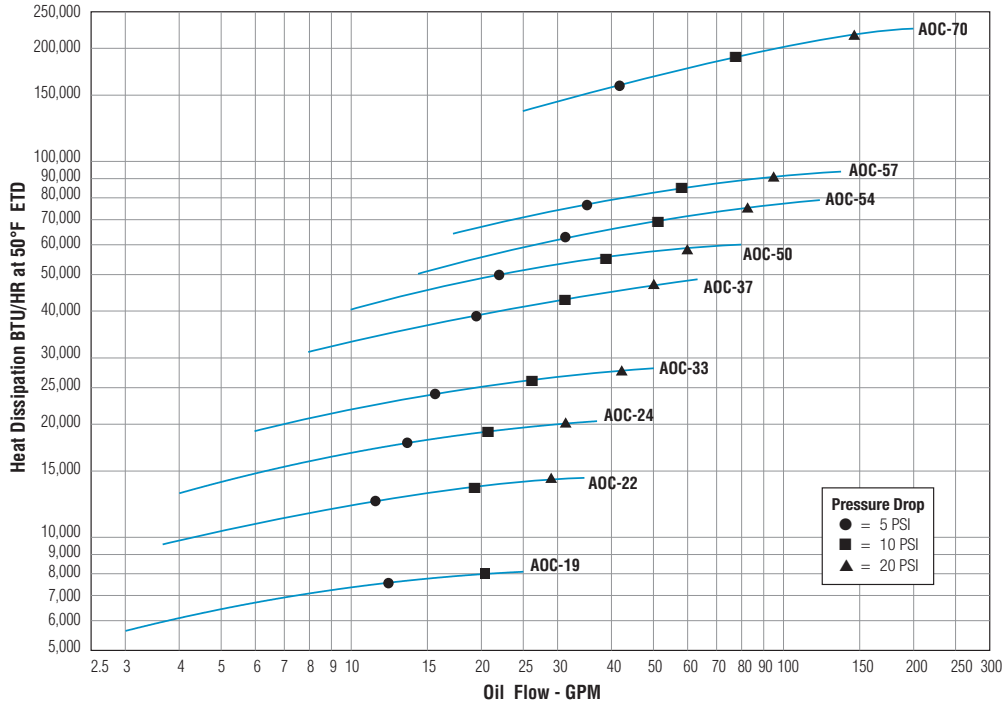
Typical operating temperature ranges are:

Hydraulic Motor Oil	110°- 130°F
Hydrostatic Drive Oil	130°- 180°F
Bearing Lube Oil	120°- 160°F
Lube Oil Circuits	110°- 130°F

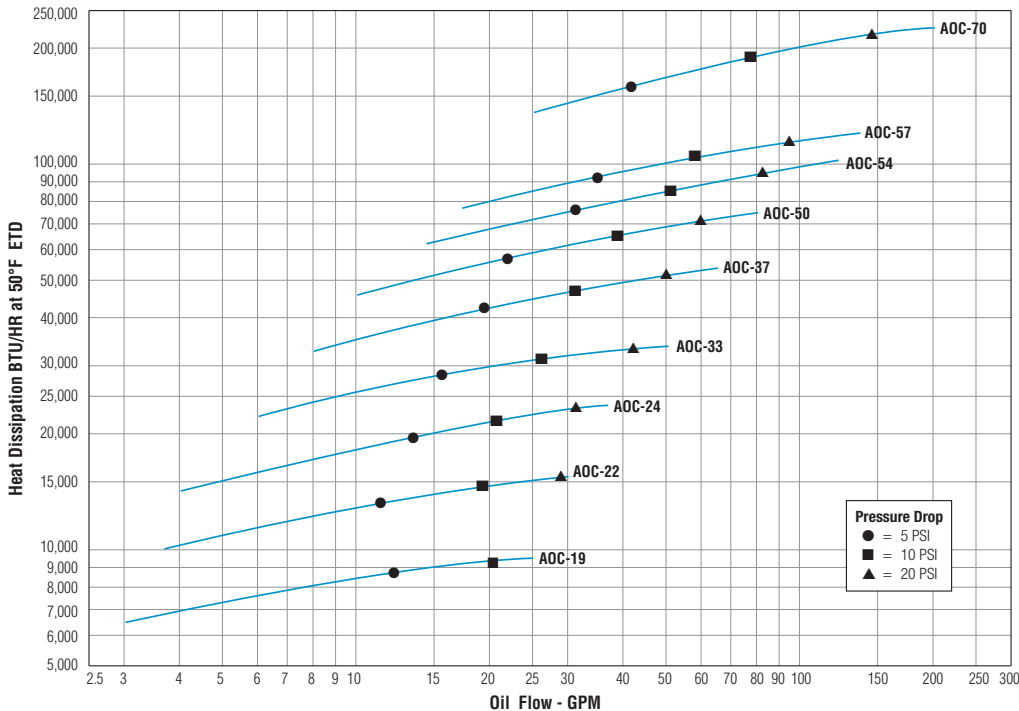
# Performance Curves

For additional sizing information consider using TTP's **XSelector** online sizing Program.\*

## AOC with DC Motor



## AOC with Hydraulic Motor



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## 12 and 24 Volt DC Motor Data

Model	Number of Fans	Full Load AMPs per Motor		HP per Motor	Fan Speed (RPM)	Fan Diameter (Inches)
		12 Volt	24 Volt			
AOC-19	1	12.5	6.3	1/5	1800	10
AOC-22	1	12.5	6.3	1/5	1800	12
AOC-24, AOC-33	1	12.5	6.3	1/5	1800	14
AOC-37	2	12.5	6.3	1/5	1800	12
AOC-50, AOC-54, AOC-57	2	12.5	6.3	1/5	1800	14
AOC-70	2	80	39	1	1800	20

## Hydraulic Motor Data

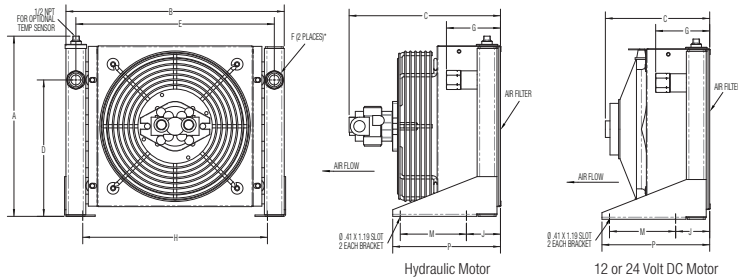
Model	Number of Fans	Maximum Fan Speed (RPM)	Oil Flow Required per Fan (GPM)	Minimum Operating Pressure (PSI)	Motor (IN <sup>3</sup> /REV.) Displacement
AOC-19 through AOC-33	1	1725	1.6	300	.22
AOC-37 through AOC-57	2	1725	1.6	300	.22
AOC-70	2	1725	3.4	500	.45

Notes: Maximum pressure is 2000 PSI. Stated Minimum Operating Pressure is at Inlet Port of Motor. 1000 PSI Allowable Back Pressure.

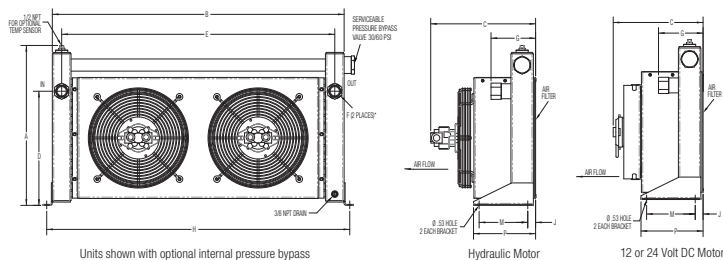
## Dimensions

For 3D models and spec sheets visit the AOC - Mobile product page on our website. <https://www.thermaltransfer.com/product/aoc-series>

### AOC-19 through AOC-33



### AOC-37 through AOC-70



Model	A		B		C		D	E	F		G		H	J	M	P	Weight LBS	HYD Motor CFM	12/24 V Motor CFM
	No Bypass	Bypass	No Bypass	Bypass	HYD Motor	DC Motor			SAE	NPT & BSPP	SAE	NPT & BSPP							
AOC-19	13.62	16.00	16.50	18.16	10.40	7.92	10.31	15.00	#12	.75	3.05	4.12	13.96	2.61	5.00	8.18	30	750	800
AOC-22	15.62	18.00	22.00	23.66	10.40	7.92	12.31	20.50	#12	.75	3.05	4.12	19.46	2.61	5.00	8.18	33	1150	1050
AOC-24	19.62	22.00	24.75	26.41	11.58	9.69	16.31	23.25	#12	.75	3.05	4.12	22.21	2.61	5.00	8.18	46	1900	1300
AOC-33	25.62	28.00	30.25	31.91	11.58	9.31	22.31	28.75	#16	1.00	3.05	4.34	27.71	2.61	5.00	8.18	65	2150	1500
AOC-37	18.50	21.38	39.00	40.38	14.06	10.84	15.25	36.50	#20	1.25	4.62	5.97	40.50	1.09	6.50	8.31	95	2150	1850
AOC-50	22.50	25.38	41.00	42.38	14.06	10.84	19.25	38.50	#20	1.25	4.68	6.03	42.50	1.12	6.50	8.37	120	3200	2300
AOC-54	30.50	33.28	42.00	43.38	14.93	15.08	27.25	39.50	#24	1.50	4.89	6.30	43.75	1.87	9.00	12.37	154	3800	2600
AOC-57	36.50	39.38	48.00	49.38	14.93	15.08	32.75	45.50	#32	2.00	6.68	8.15	49.75	1.87	9.00	12.37	190	4200	2900
AOC-70	38.38	41.25	51.00	52.38	17.79	24.62	34.00	48.50	#32	2.00	8.44	9.91	52.75	1.62	9.00	12.12	304	7500	7050

NOTE: All dimensions in inches. We reserve the right to make reasonable design changes without notice. Inlet and outlet oil ports reversible if bypass option is not used.