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

0124

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

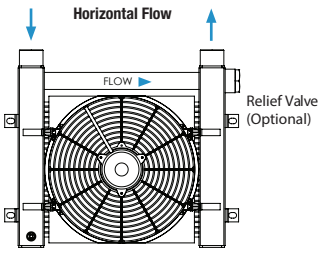
**Cabinet** Steel with powder coat

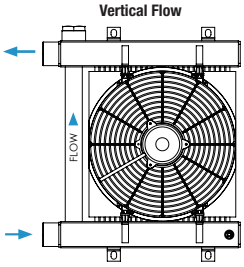
**Filter** Stainless frame with washable media

**Nameplate** Aluminum

**3/4" External, all steel valve**
**AOC-37 through AOC-70**
**1½" 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**
1½" external, all steel valve.

* To register for XSelector® please go to **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

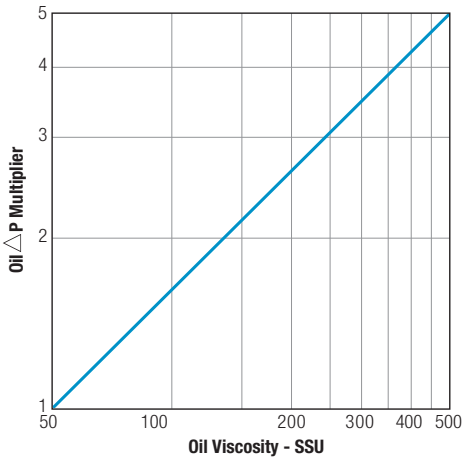
**STEP 3** **Determine Curve BTU/HR Heat Load.** Enter the information from above:

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

**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 △P correction curve.

## Oil Pressure Correction




## 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 △T) with this formula:
Oil △T = (BTU's/HR) / (GPM Oil Flow x 210).
To calculate the oil leaving temperature from the cooler, use this formula:
Oil Leaving Temp. = Oil Entering Temp – Oil △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 |

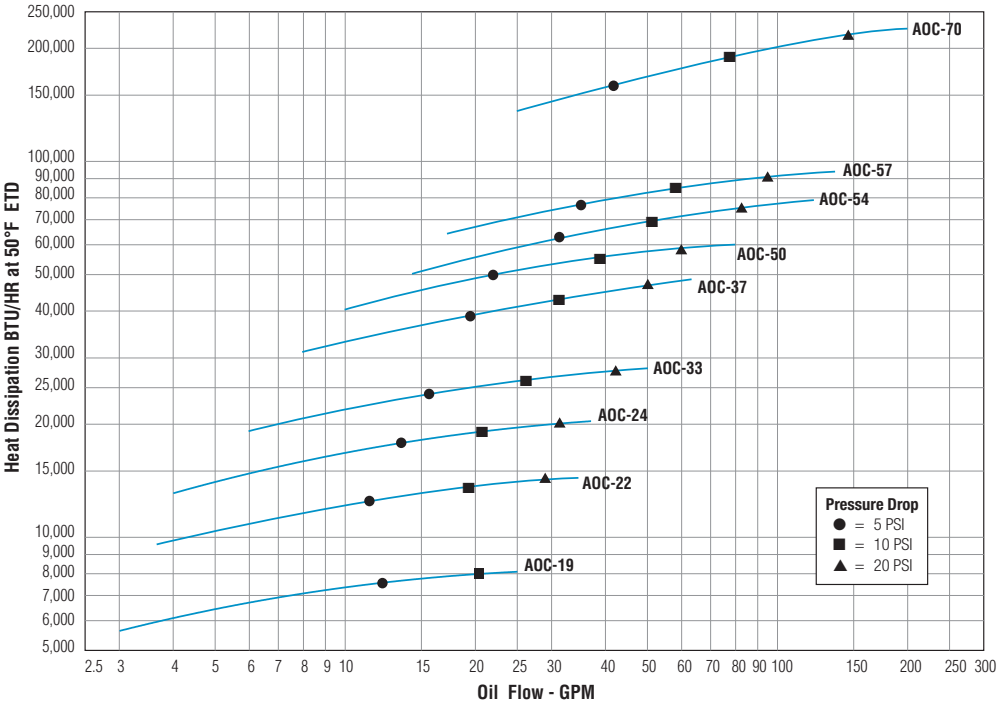
## $C_V$ Viscosity Correction

| | OIL | | | | |
|---|---|---|---|---|---|
| **Average Oil Temp °F** | **SAE 5**<br>110 SSU at 100°F<br>40 SSU at 210°F | **SAE 10**<br>150 SSU at 100°F<br>43 SSU at 210°F | **SAE 20**<br>275 SSU at 100°F<br>50 SSU at 210°F | **SAE 30**<br>500 SSU at 100°F<br>65 SSU at 210°F | **SAE 40**<br>750 SSU at 100°F<br>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 |

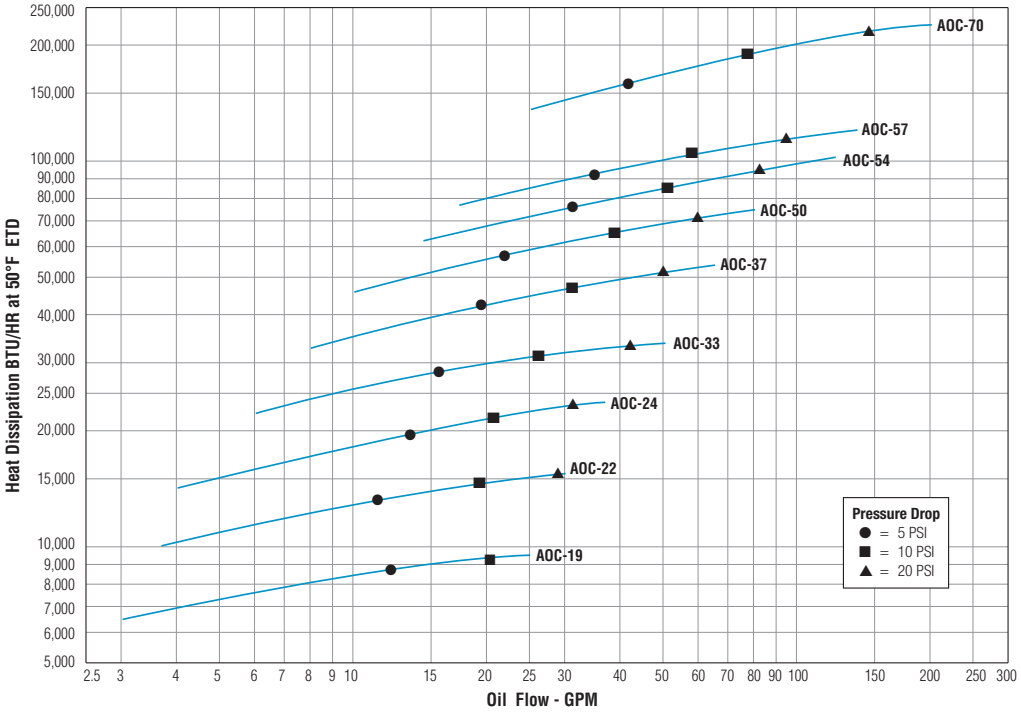
# Performance Curves

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

### AOC with DC Motor




### AOC with Hydraulic Motor




* To register for XSelector® please go to **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.

## 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

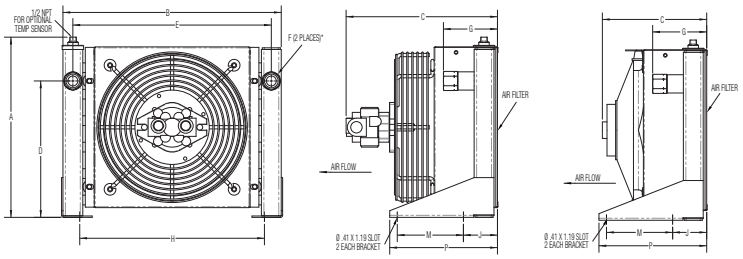
| Model | Number of Fans | Maximum Fan Speed (RPM) | Oil Flow Required per Fan (GPM) | Minimum Operating Pressure (PSI) | Motor ($IN^3$/REV.) Displacement |
|---|---|---|---|---|---|
| AOC-19 through AOC-33 | 1 | 1725 | 1.6 | 300 | .22 |
| AOC-37 through AOC-57 | 2 | 1725 | 1.6 | 300 | .22 |
| AOC-70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

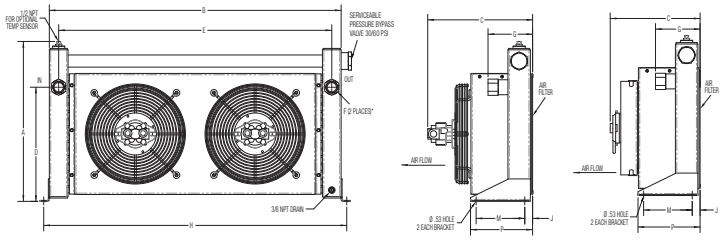
**For 3D models and spec sheets visit the AOC - Mobile product page on our website. https://www.thermaltransfer.com/product/aoc-series**

### AOC-19 through AOC-33




Hydraulic Motor | 12 or 24 Volt DC Motor

### AOC-37 through AOC-70




Units shown with optional internal pressure bypass | Hydraulic Motor | 12 or 24 Volt DC Motor

| 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.