

CA Series - High Capacity Bare Tube Shell & Tube Water Cooled Oil Cooler

0223

The CA Series bare bundle shell & tube style offers the widest variety of options for utilizing multiple cooling water requirements for hydraulic oil applications. It remains the industry standard in ultimate value and long-term reliability. The proven fixed tubesheet design shell and tube heat exchanger offers the cost effectiveness that comes with having a highly standard design, while easily providing for various options to meet specific application requirements. Multiple material options are available as well.

The CA-2000 Series is the largest standard shell and tube heat exchanger in the TTP product line. It features rugged steel construction and is capable of handling very high flow rates and heat transfer capabilities at a competitive price. Custom designs are also available.

TTP's XSelector sizing program can be used to help optimize the sizing of the cooler for better performance and value.



Options
Optional construction on tubes, tubesheets and end bonnets

How to Order

Model Series

- CA** - One Pass - ANSI/ASME flanges on shell and tube side
Two/Four Pass - ANSI/ASME shell side flanges X NPT tube side
- CAM** - One Pass - ANSI/ASME metric flanges on tube side
Two/Four Pass - ANSI/ASME shell side metric threaded flanges X BSPP tube side

Model Size Selected

- 2036, 2048, 2060, 2072, 2084, 2096**
20108, 20120, 20132, 20144
(See Performance Curve Chart on page 3 for sizes)

Baffle Spacing

- 6, 9**
(See Performance Curve Chart on page 3 for sizes)

Tube Diameter Code

- 6** - 3/8"
10 - 5/8"

Tubeside

- O** - One Pass
T - Two Pass
F - Four Pass

Cooling Tube Material

- Blank** - Copper
CN - Copper Nickel
SS - Stainless Steel
AD - Admiralty Brass

End Bonnet Material

- Blank** - Cast Iron
NP - Electroless Nickel Plated

Tubesheet Material

- Blank** - Cast Iron
W - CuNi
S - Stainless Steel

Zinc Anodes

- Blank** - None
Z - Zinc

Maximum Flow Rates

Shell Side (GPM)		Tube Side (GPM)		
6" Baffle	9" Baffle	One Pass	Two Pass	Four Pass
210	320	652	326	163

Features

High heat rejection and high flows

Largest flow rates & heat transfer available

Cooling Tube Material Options

- Standard Copper
- Copper Nickel
- Stainless Steel

Connection

- 150# ASME RF Flanges x ANSI/ASME tube side on one pass models
- 150# ASME RF Flanges x NPT on two and four pass models
- BSPP and metric threads on flanges also available

Product Options

Optional construction

- Tubes** Copper/Copper Nickel/Stainless

Ratings

Maximum Operating Pressure Shell Side 150 PSI

Maximum Operating Pressure Tube Side 150 PSI

Maximum Operating Temperature 300°F

Materials

Shell Steel

Cooling Tube Copper/Copper Nickel/Stainless Steel

Tubesheet Cast Iron/Copper Nickel/Stainless Steel

Shell Connections Steel

Rugged steel construction

Custom designs available

Competitively priced

3/8" and 5/8" tubes available

Maximum 10" diameter, 12' long

End bonnets removable for servicing

Saddle brackets for incremental mounting

Sea water applications, end model code with CN-NP-W-Z

Special ASME/TEMAC/CRN ratings available consult factory

End Bonnets Cast Iron/Electroless/Nickel Plate

Tubesheet Cast Iron/Copper Nickel/Stainless Steel

Heat Rejection from 120-910 HP (155kW to 680 kW)

Oil Flow from 40-290 GPM (88 LPM to 640 LPM)

Baffles Brass

End Bonnets Cast Iron/Electroless Nickel Plate

Mounting Brackets Steel/Cast Iron

Gaskets Nitrile Rubber/Cellulose Fiber

Nameplate Aluminum Foil

*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.

** For Salt Water applications a Zinc Anode needs to be plumbed in the water inlet of the cooler to prevent corrosion.

Selection Procedure

Performance Curves are based on 100SSU oil leaving the cooler 40°F higher than the incoming water temperature (40°F approach temperature). Curves are based on a 2:1 oil to water 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.)

$$\text{If BTU/HR is known: } \text{HP} = \frac{\text{BTU/HR}}{2545}$$

STEP 2 Determine Approach Temperature.

$$\text{Desired oil leaving cooler } ^\circ\text{F} - \text{Water Inlet temp. } ^\circ\text{F} = \text{Actual Approach}$$

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

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

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 + = 40 PSI

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
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 ΔT) with this formula:

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

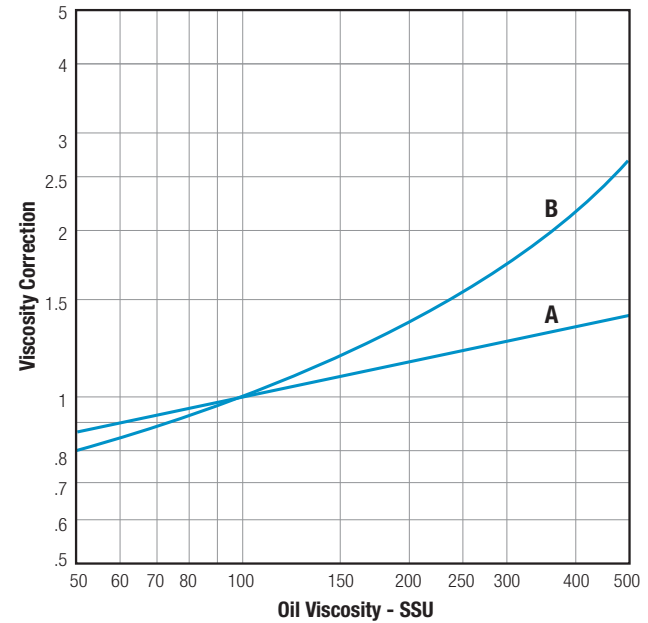
To calculate the oil leaving temperature from the cooler, use this formula:

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

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.

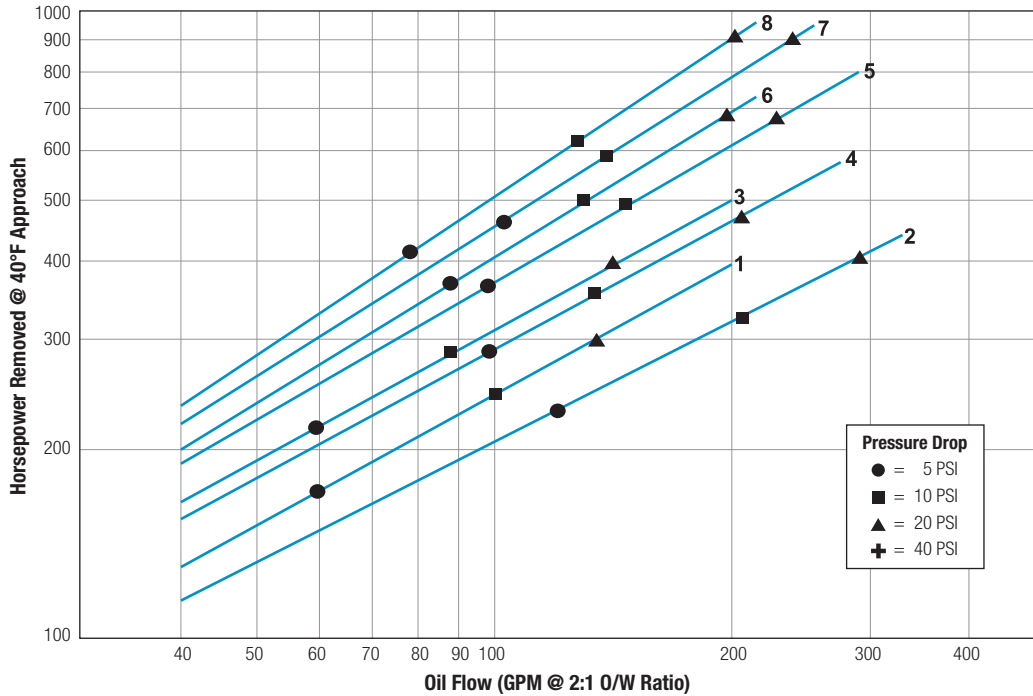
Viscosity Correction



Performance Curves

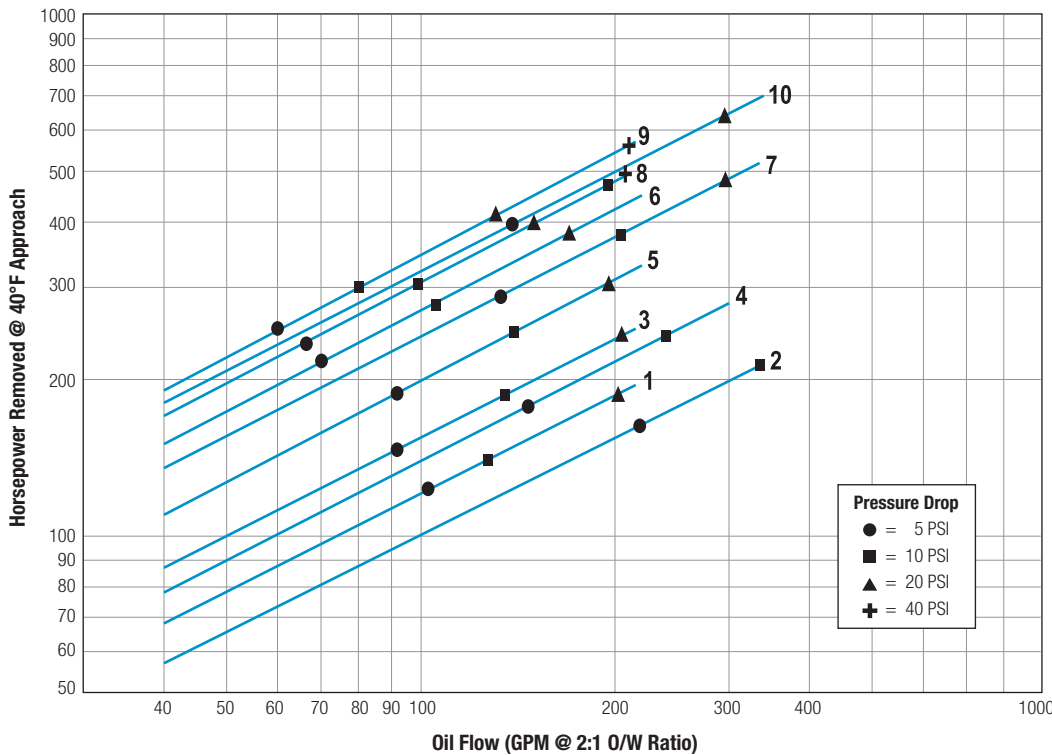
For additional sizing information consider using TTP's **XSelector** online sizing Program.*

3/8" Tubes



Curve Number	Model
1	CA-2036-6-6-F
2	CA-2036-9-6-F
3	CA-2048-6-6-F
4	CA-2048-9-6-F
5	CA-2072-9-6-F
6	CA-2084-9-6-F
7	CA-20108-9-6-F
8	CA-20132-9-6-F

5/8" Tubes



Curve Number	Model
1	CA-2036-6-10-F
2	CA-2036-9-10-F
3	CA-2048-6-10-F
4	CA-2048-9-10-F
5	CA-2060-6-10-F
6	CA-2084-6-10-F
7	CA-2084-9-10-F
8	CA-2096-6-10-F
9	CA-20120-6-10-F
10	CA-20132-9-10-F

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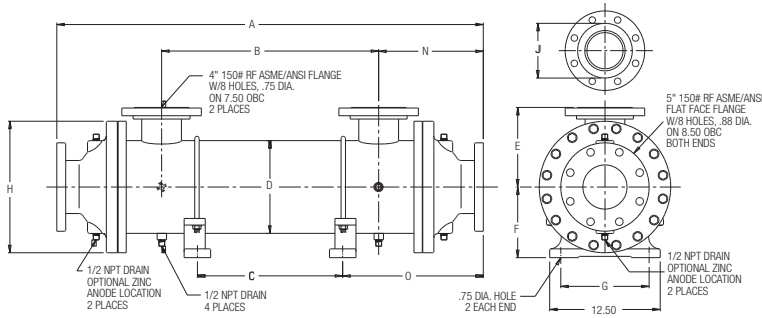
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Dimensions

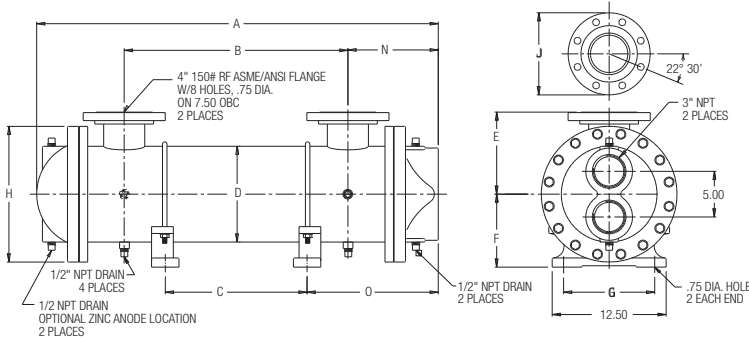
For 3D models and spec sheets visit the CA product page on our website.
<https://www.thermaltransfer.com/product/ca-series>

One Pass



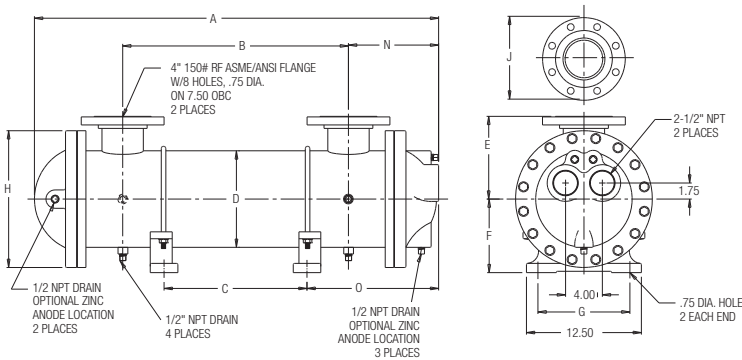
Model	A	N	O
CA-2036	49.64	11.82	15.92
CA-2048	61.64	11.82	15.92
CA-2060	73.64	11.82	15.92
CA-2072	85.64	11.82	15.92
CA-2084	97.64	11.82	15.92
CA-2096	109.64	11.82	15.92
CA-20108	121.64	11.82	15.92
CA-20120	133.64	11.82	15.92
CA-20132	145.64	11.82	15.92
CA-20144	157.64	11.82	15.92

Two Pass



Model	A	N	O
CA-2036	45.55	9.90	14.38
CA-2048	57.55	9.90	14.38
CA-2060	69.55	9.90	14.38
CA-2072	81.55	9.90	14.38
CA-2084	93.55	9.90	14.38
CA-2096	105.55	9.90	14.38
CA-20108	117.55	9.90	14.38
CA-20120	129.55	9.90	14.38
CA-20132	141.55	9.90	14.38
CA-20144	153.55	9.90	14.38

Four Pass



Model	A	N	O
CA-2036	45.34	9.78	13.78
CA-2048	57.34	9.78	13.78
CA-2060	69.34	9.78	13.78
CA-2072	81.34	9.78	13.78
CA-2084	93.34	9.78	13.78
CA-2096	105.34	9.78	13.78
CA-20108	117.34	9.78	13.78
CA-20120	129.34	9.78	13.78
CA-20132	141.34	9.78	13.78
CA-20144	153.34	9.78	13.78

Model	B	C	D Diameter	E	F	G	H Diameter	J
CA-2036	26	18	10.5	9	8	10	14.88	6.19 Diameter Raised Face 2 Places
CA-2048	38	30	10.5	9	8	10	14.88	
CA-2060	50	42	10.5	9	8	10	14.88	
CA-2072	62	54	10.5	9	8	10	14.88	
CA-2084	74	66	10.5	9	8	10	14.88	
CA-2096	86	78	10.5	9	8	10	14.88	
CA-20108	98	90	10.5	9	8	10	14.88	
CA-20120	110	102	10.5	9	8	10	14.88	
CA-20132	122	114	10.5	9	8	10	14.88	
CA-20144	134	126	10.5	9	8	10	14.88	

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