

FLUID COOLING | Shell & Tube C Series

COPPER/STEEL OR STAINLESS STEEL CONSTRUCTION

Features

- API/BASCO Interchange
- ASME Code Option
- Preferred for New Oil-Water Applications
- C-Series / SSC Series
- Rugged Steel Construction
- Low Cost
- Type 316 Stainless Steel Construction Optional
- Custom Designs Available
- Competitively Priced
- Optional Material Construction on C-Series: Tubes, Tubesheets, End Bonnets
- 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)



Ratings Standard

Maximum Shell Pressure 300 psi

Maximum Tube Side Pressure 150 psi

Maximum Temperature 300°F

Ratings ASME Code

Maximum Shell Pressure 300 psi

Maximum Tube Side Pressure 150 psi

ASME Code SSC-1700 200 psi

Maximum Temperature 300°F

Materials C Series

Tubes Copper

Headers Steel

Shell Steel

Shell Connections Steel

Baffles Brass

End Bonnets Cast Iron

Mounting Brackets Steel

Gaskets Nitrile Rubber/Cellulose Fiber

Nameplate Aluminum Foil

Materials SSC Series

Tubes 316 Stainless Steel

Tubesheets 316 L Stainless Steel

Shell 316 L Stainless Steel

Shell Connections 316 L Stainless Steel

Baffles 316 Stainless Steel

End Bonnets 316 Stainless Steel

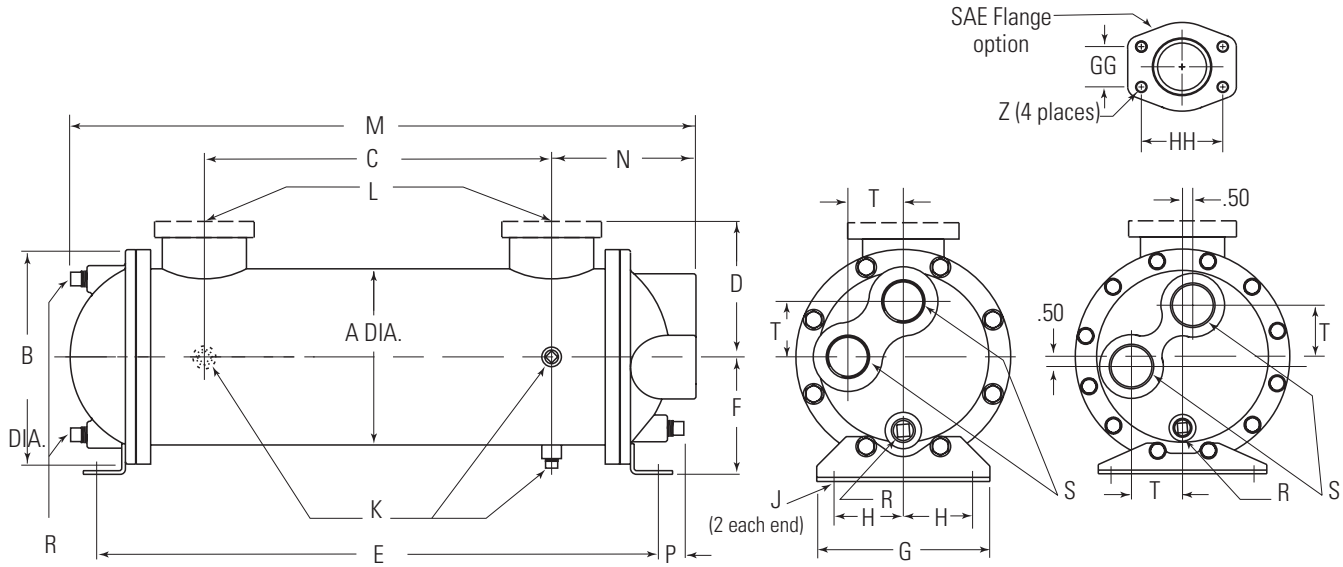
Mounting Brackets Mild Steel

Gaskets Nitrile Rubber/Cellulose Fiber

Nameplate Aluminum Foil

Dimensions

Four Pass



All Models except C-1700 Series

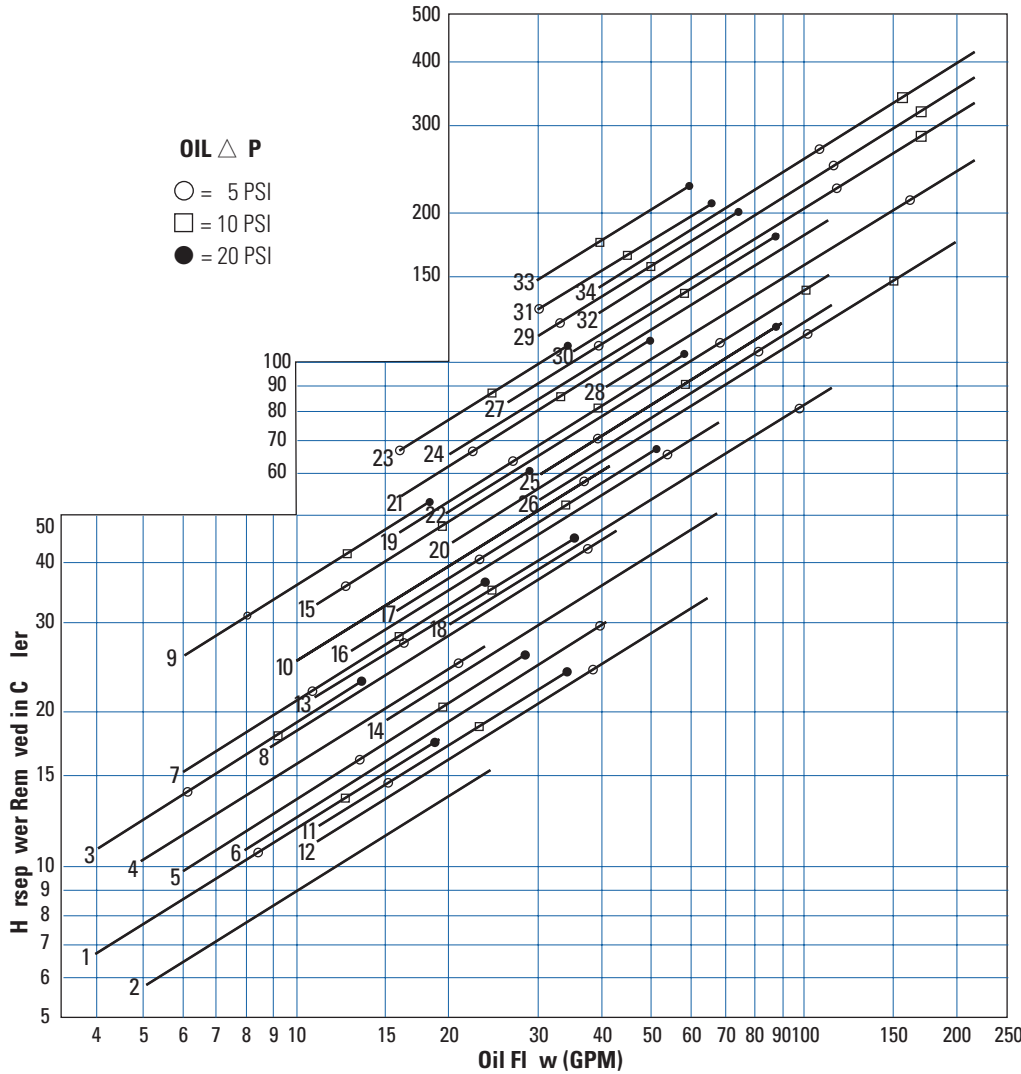
C-1700 Series

| 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 | | |
| 3 | 2.44 | 4.19 | 5/8-11 UNC | M-16 |

| MODEL SIZE | A | B | C | D | | E | F | G | H | J | K NPT | L | | M | N | P | R NPT | S NPT/BSPP | T | |
|------------|------|-------|-------|---------------------|------------|-------|------|------|------|-----|-------|-----------------|----------------------------|-------|------|------|-------|------------|------|------|
| | | | | NPT/BSPP SAE O-RING | SAE FLANGE | | | | | | | NPT/BSPP FLANGE | SAE O-RING | | | | | | | |
| 614 | 3.25 | 4.50 | 10.00 | 2.62 | 2.88 | 16.38 | 2.75 | 4.18 | 1.62 | .44 | (3) | 1.00 | #16 1 9/16-12 UNF-2B | 17.12 | 3.56 | .38 | (2) | .38 | 1.00 | |
| 624 | | | 20.00 | | | 26.38 | | | | | | | | 27.12 | | | | | | |
| 814 | 4.25 | 6.00 | 9.00 | 3.25 | 3.50 | 16.62 | 3.50 | 4.25 | 1.75 | .44 | (3) | 1.50 | #24 1 7/8-12 UN-2B | 17.88 | 4.44 | .63 | (3) | .75 | 1.25 | |
| 824 | | | 19.00 | | | 26.62 | | | | | | | | 27.88 | | | | | | |
| 836 | | | 31.00 | | | 38.62 | | | | | | | | 39.88 | | | | | | |
| 1014 | 5.25 | 6.75 | 9.00 | 3.75 | 4.00 | 17.12 | 4.00 | 5.25 | 2.00 | .50 | (3) | 2.00 | #32 2 1/2-12 UN-2B | 18.81 | 4.81 | .75 | (3) | 1.00 | 1.69 | |
| 1024 | | | 19.00 | | | 27.12 | | | | | | | | 28.81 | | | | | | |
| 1036 | | | 31.00 | | | 39.12 | | | | | | | | 40.81 | | | | | | |
| 1224 | 6.25 | 7.75 | 18.25 | 4.25 | 4.88 | 27.13 | 4.50 | 6.25 | 2.50 | .75 | (3) | 2.00 | #32 2 1/2-12 UN-2B | 29.13 | 5.44 | 1.00 | (3) | .38 | 1.50 | 2.00 |
| 1236 | | | 30.25 | | | 39.13 | | | | | | | | 41.13 | | | | | | |
| 1248 | | | 42.25 | | | 51.13 | | | | | | | | 53.13 | | | | | | |
| 1260 | | | 54.25 | | | 63.13 | | | | | | | | 65.13 | | | | | | |
| 1724 | 8.62 | 10.50 | 17.00 | 5.84 | 6.81 | 27.50 | 5.75 | 8.25 | 3.50 | .62 | (3) | 3.00 | - | 29.86 | 7.06 | 1.81 | (3) | 2.00 | 2.50 | |
| 1736 | | | 29.00 | | | 39.50 | | | | | | | | 41.86 | | | | | | |
| 1748 | | | 41.00 | | | 51.50 | | | | | | | | 53.86 | | | | | | |
| 1760 | | | 53.00 | | | 63.50 | | | | | | | | 65.86 | | | | | | |
| 1772 | | | 65.00 | | | 75.50 | | | | | | | | 77.86 | | | | | | |

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

Performance Curves



| Model | Ship Wt. (lbs) |
|------------------------|----------------|
| 1. C/SSC-614-1.3-4-F | 17 |
| 2. C/SSC-614-3-4-F | 17 |
| 3. C/SSC-624-1.3-4-F | 24 |
| 4. C/SSC-624-3-4-F | 24 |
| 5. C/SSC-814-1.7-4-F | 32 |
| 6. C/SSC-814-4-4-F | 32 |
| 7. C/SSC-824-1.7-4-F | 41 |
| 8. C/SSC-824-4-4-F | 41 |
| 9. C/SSC-836-1.7-4-F | 53 |
| 10. C/SSC-836-4-4-F | 53 |
| 11. C/SSC-1014-2-6-F | 43 |
| 12. C/SSC-1014-5-6-F | 43 |
| 13. C/SSC-1024-2-6-F | 57 |
| 14. C/SSC-1024-5-6-F | 57 |
| 15. C/SSC-1036-2-6-F | 72 |
| 16. C/SSC-1036-5-6-F | 72 |
| 17. C/SSC-1224-2.5-6-F | 85 |
| 18. C/SSC-1224-6-6-F | 85 |
| 19. C/SSC-1236-2.5-6-F | 110 |
| 20. C/SSC-1236-6-6-F | 110 |
| 21. C/SSC-1248-2.5-6-F | 135 |
| 22. C/SSC-1248-6-6-F | 135 |
| 23. C/SSC-1260-2.5-6-F | 160 |
| 24. C/SSC-1260-6-6-F | 160 |
| 25. C/SSC-1724-3.5-6-F | 140 |
| 26. C/SSC-1724-8.4-6-F | 140 |
| 27. C/SSC-1736-3.5-6-F | 180 |
| 28. C/SSC-1736-8.4-6-F | 180 |
| 29. C/SSC-1748-3.5-6-F | 220 |
| 30. C/SSC-1748-8.4-6-F | 220 |
| 31. C/SSC-1760-3.5-6-F | 260 |
| 32. C/SSC-1760-8.4-6-F | 260 |
| 33. C/SSC-1772-3.5-6-F | 300 |
| 34. C/SSC-1772-8.4-6-F | 300 |

*Shipping Weights are approximate

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.

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

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:

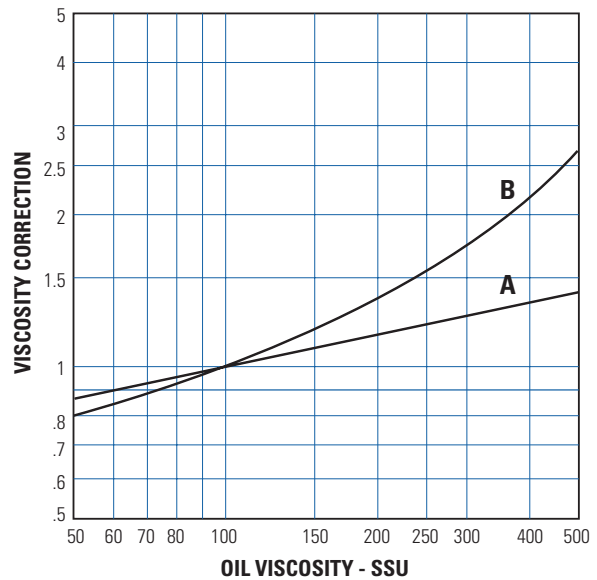
$$\text{Oil } \Delta T = (\text{BTU's/Hr.}) / (\text{GPM Oil Flow} \times 210)$$

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.



Maximum Flow Rates

Example Model No.

C/SSC - 1024 - 2 - 6 - F

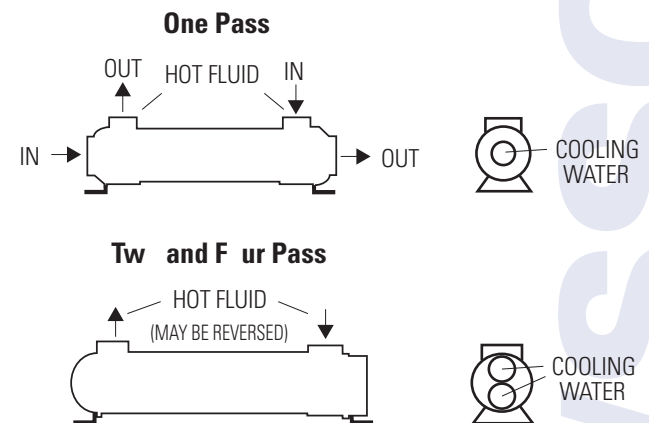
| Unit Size | Baffle Spacing | Shell Side (GPM) | Tube Side (GPM) | | |
|-----------|----------------|------------------|-----------------|-----|-----|
| | | | O | T | F |
| 600 | 1.3, 3 | 19, 29 | 48 | 24 | 12 |
| 800 | 1.7, 4 | 32, 69 | 84 | 42 | 21 |
| 1000 | 2, 5 | 41, 69 | 146 | 73 | 37 |
| 1200 | 2.5, 6 | 60, 115 | 224 | 112 | 56 |
| 1700 | 3.5, 8.4 | 125, 253 | 465 | 232 | 116 |

Exceptions to Maximum Shell Side Flows

| | |
|--------------------|--------------|
| C/SSC-814-4-4-* | 63 GPM Max. |
| C/SSC-1014-2-6-* | 33 GPM Max. |
| C/SSC-1014-5-6-* | 66 GPM Max. |
| C/SSC-1724-3.5-6-* | 105 GPM Max. |
| C/SSC-1724-8.4-6-* | 200 GPM Max. |

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

Piping Hook-up



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