API HEAT TRANSFER

PERFORMANCE IS EVERYTHING

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This package of information about API Heat Transfer products and solutions was made especially for you based on your unique heat transfer needs. **If there's anything you'd like to add, visit apiheattransfer.com or call your API Heat Transfer contact today.**

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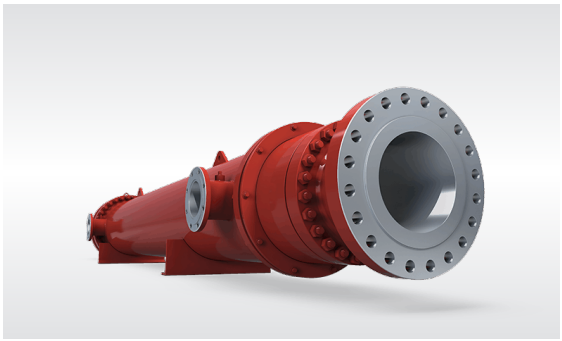
TEMA Custom Shell & Tube Heat Exchangers

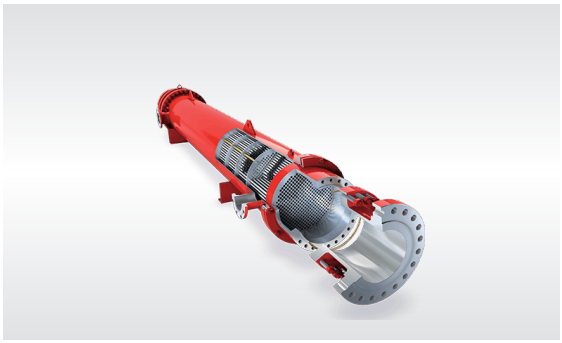
Basco® Custom Engineered Shell & Tube Heat Exchangers

Before there were standard products, there were engineered products, with each heat exchanger designed for the application. Our Basco shell and tube heat exchangers have filled virtually every heat transfer need for over sixty years. Our experienced design and engineering staff stand ready to bring the best team with the best tools in the industry to bear on your heat transfer challenge. Please contact us to discuss your application.

PERFORMANCE NOTES.

- We build all TEMA type heat exchangers
- Shell sizes from 6" (150mm) to 144" (3658mm) normal, with occasional smaller or larger shells
- Maximum tube length of 50 ft (15.2 meters)
- Tubes are available in tri pitch or square, lofin or bare, BASCOR, and plate fin configurations
- Heads are constructed with cast iron, bronze, or 316 S/S; fabricated heads are available in steel, 304 S/S, or 90/10 CuNi
- Available in 1-pass, 2-pass, and 4-pass designs





CODES.

- EU Pressure Equipment Directive (PED) (97/23/EC)
- Chinese Safety Quality License for Boiler and Pressure Vessel
- Australian AS1210
- Singapore Code
- DOSH Malaysian Code
- Canadian CRN, all provinces
- Indian Boiler Regulations (IBR)
- Polish Code
- API 614, 660, 618

Extended Surface Plate Fin Heat Exchangers

Basco® Type ES Extended Surface Plate Fin Heat Exchangers

Our Type ES extended surface plate fin heat exchanger is the industry leader for intercooler and aftercooler performance. Its unique patented compact plate fin design provides superior cooling of large air volumes at low pressure drops which means less energy consumption.

PERFORMANCE NOTES.

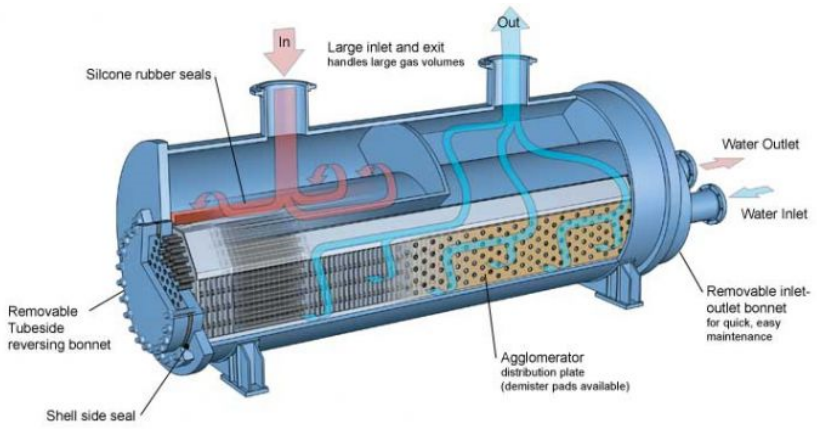
- Compact package delivers max heat transfer in a minimum space
- Tubes are continuously supported over the entire length by the plate fins, providing a vibration-free design
- Continuous silicone rubber seals at the top and bottom of the tube bundle prevent any mixing of inlet and outlet gas
- Integrated moisture separation removes need for an external device
- Tubes are easily accessed for inspection and cleaning
- Type HF heat exchangers are also available and feature high fin tubes, more tube diameter and material options, and higher shell-side operating pressures

SPECIFICATIONS.

Sizes:	20" to 120" diameter; 3' to 35' length
Shells:	Carbon Steel or 304 Stainless Steel
Tubes:	3/8" or 5/8" diameter tubes available Carbon Steel, 304 Stainless Steel, Admiralty, 90/10 copper-nickel. 70/30 copper nickel, or per customer specification.
Fins:	Aluminum, Coated Aluminum, or Copper. Variations in fin spacing from 8 to 20 fins per inch
Flow:	Available in 2 or 4 pass designs typically, or any even number of passes.

Codes:

ASME, TEMA-C, B and R
PED.Chinese CML
Korean KFR



Gland Steam Condenser Packages

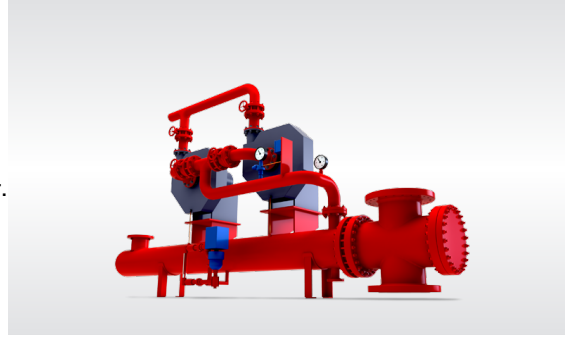
Basco® Gland Steam Condenser Packages

Gland steam condensers are essential for improved efficiency in steam turbine systems. Our gland steam condenser packages come in almost every possible configuration, allowing us to supply complete systems to major steam turbine OEMs around the world.

PERFORMANCE NOTES.

Our gland steam condenser packages pull a slight vacuum on the turbine shaft seals by means of vacuum pumps, centrifugal blowers, or steam ejectors. This captures the leaked steam and air mixture. Once collected, the steam is separated from the air and condensed in a shell and tube condenser. The condensate drains out of the bottom while the air is pulled out of the top. The condensed steam is then sent back to the steam cycle with the other condensate.

We offer instruments to help monitor process conditions, including the amount of vacuum, outlet air temperature, and condensate drainage. And while many manufacturers can only supply the condenser, API Heat Transfer can provide the complete system – saving you time and ensuring maximum efficiency.



APPLICATIONS.

- Steam turbines: steam extraction and condensing

TECHNICAL SPECIFICATIONS.

Sizes	Diameter 3 to 42 in. (75 to 1050 mm); length 12 to 360 in. (305 to 9150 mm) [available in 6 in. (150 mm) increments]
Shells	Carbon steel, 304 stainless steel, or 316 stainless steel
Tubes Sizes	3/8 in. (10 mm), 5/8 in. (16 mm), or 3/4 in. (19 mm) diameter
Tube Materials	Carbon steel, copper, Admiralty, 90/10 or 70/30 CuNi, 304 stainless steel, 316 stainless steel, 2205 stainless steel, titanium, and other high-alloy materials
Tube Configurations	Straight tube, U-tube

Baffles	Precision-punched carbon steel, brass, stainless steel
Heads	Channels and bonnets in steel and stainless steel
Flow	1-pass, 2-pass, 4-pass designs for fixed bundles
Codes	ASME, PED, ABS, TEMA, USCG, API611, API612, others

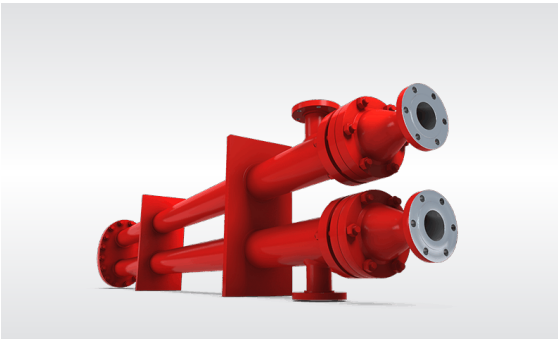
Basco Hairpin Heat Exchangers

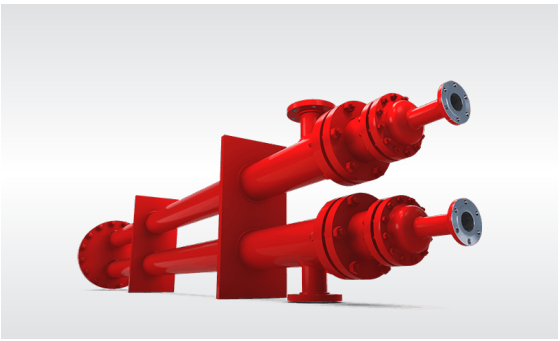
Basco® Hairpin Heat Exchangers

A hairpin design is often more thermally efficient than a traditional shell and tube, which results in a lower up-front cost and lower overall weight. Our experienced designers and engineers can meet any custom cooling requirement.

PERFORMANCE NOTES.

- Ideal for applications that require high thermal performance and a compact footprint
- True countercurrent flow allows for a close temperature approach between the shell side and tube side fluids, as well as a temperature cross
- Removable bundles are available in two closure options, separated or common, for required cleaning on both the shell and tube sides
- Non-removable bundles are the cost-effective option when a fixed tubesheet design is feasible
- Wide temperature differentials are handled without an expansion joint
- Ease of maintenance with a long radius U-bend
- All connections are at one end of the heat exchanger
- Sizes up to 60 in. (150 cm) in diameter and 480 in. (1200 cm) in length
- Materials include carbon steel, 300 series stainless steel, Duplex stainless steel, copper alloy, chrome-moly alloys, Hastelloy, Inconel, Monel, 254 SMO, alloy clad/weld overlay
- Designed and fabricated per ASME, TEMA, CRN, PED, CML





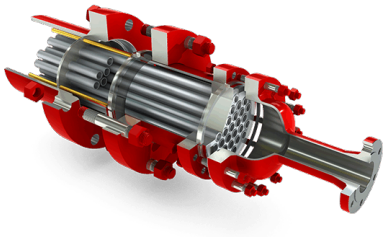
APPLICATIONS.

- Oil and gas processing
- Chemical processing
- Petrochemical processing

REMOVABLE BUNDLE TYPES.

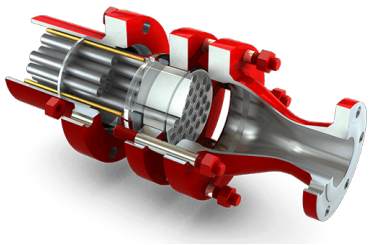
Separated Closure Double Pipe: Type SCDP

- Employs the industry's most widely used separated head features
- Shell side and tube side closures are separately bolted through, ideal for applications involving wide temperature or pressure differences between the shell and tube side fluids
- In cyclic service, separately gasketed closures are more leak resistant compared to shell and tube designs
- Separate shell and tube side seal configuration. This makes the tube bundle easy to remove, clean and replace.
- Well suited for large imbalance of flow on shellside
- Long fins are used to achieve high thermal performance with minimal pressure drop



Common Closure Hairpin: Type CC

- Single bolted closure design. Ideal for applications involving low design temperature or pressure differences between the shell and tube side fluids
- Enjoys the maintenance advantages of a Separated Closure Hairpin (Type SC)
- The center ring keeps the shell gasket seated during the removal of the tube head for inspection or service



NON-REMOVABLE BUNDLE TYPES.

All-Welded Hairpin: Type AW

- More cost effective design when removable bundle is not required
- Fixed tubesheet design

Jacketed Pipe: Type JP

- Most economical solution for any heat transfer application
- Fixed tubesheet design

Pipeline Aftercoolers (PLAC)

Basco® PLAC for Compressed Air Cooling

Our Basco PLAC (Pipeline Aftercooler) and its companion separator provide an ideal combination to remove troublesome moisture and oil from compressed air streams. Our aftercoolers/separators offer proven performance and trouble-free operation of air powered tools and equipment worldwide.

PERFORMANCE NOTES.

- PLAC tubes are effectively arranged to maximize heat transfer and reduce cooling water usage
- Removable tube bundle simplifies cleaning of both tube and shell sides, and reduces future maintenance costs
- Double packed floating tubesheet with "O" ring seal protection permits tube bundles to expand and contract without harmful strain or intermixing of shell and tube side fluids
- Tell-tale holes allow easy visual detection of leaks
- Cast iron moisture separator provides maximum efficiency in removing virtually all particulate matter over the entire operating range
- Separators are designed to bolt directly to the aftercooler without the need for spools, minimizing pressure drop and overall length
- Standard operating pressures are 75 to 150 PSI to meet most material and code requirements; units for use up to 300 PSI are available for specialized applications

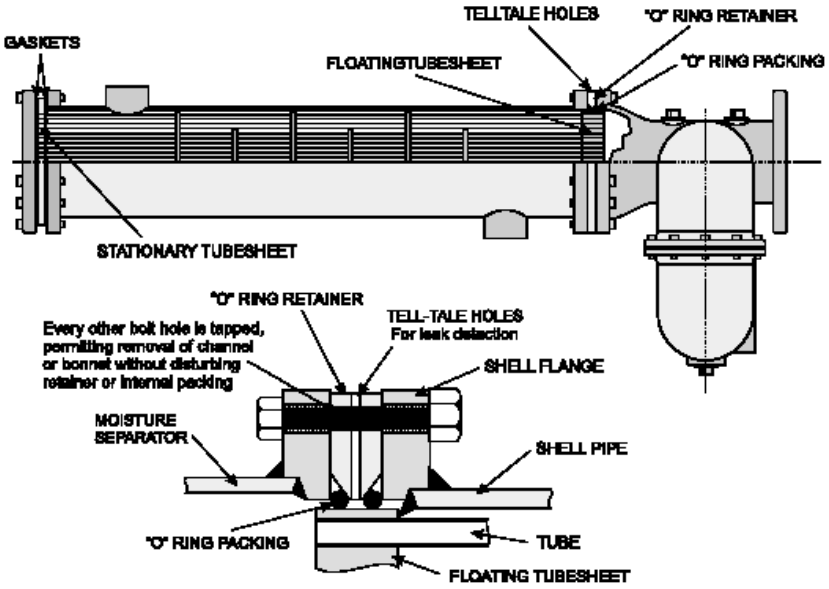
APPLICATIONS.

- Compressed air cooling

SPECIFICATIONS:

Sizes:	3" to 16" diameter; 6' to 10' 10-1/4" length
Shells:	Carbon Steel
Tubes:	3/8" or 5/8" diameter available Copper and Admiralty Straight tube configuration
Baffles:	Precision punched Carbon Steel or Brass

Heads:	Not applicable.
Flow:	Available in 1-pass designs only
Codes:	ASME



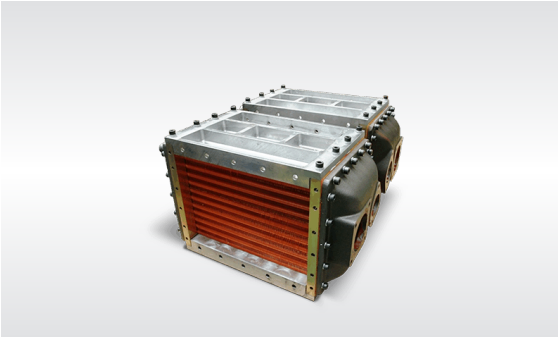
Water Cooled Charge Air Coolers

Water Cooled Charge Air Coolers

Custom designed in round shell and tube, or square engine and remote mounted fin designs, our high performance water cooled charge air coolers utilize extended surface cooling fins in either aluminium, copper, or stainless steel to ensure greater thermal effectiveness and durability. This means our customers receive superior performance at a practical price. For over 100 years, our heat exchangers have been trusted among equipment manufacturers in the transportation, power generation, construction, military and process industries.

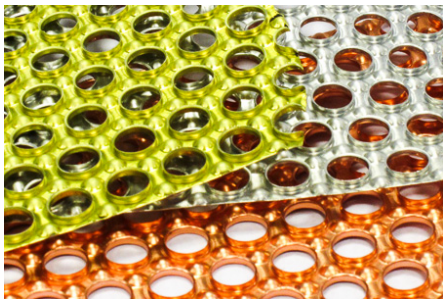
PERFORMANCE NOTES.

- High thermal efficiency of copper fin design enables us to supply a reduced overall package size for advanced performance in all conditions and environments
- Design and material flexibility
- High performance: compact and cost-effective
- Custom designed to suit individual application and performance requirements



SPECIFICATIONS.

Technology:	Single Shot Expansion or Manual/Multi Blow Expansion for tube to fin bond
Maximum Length:	Single shot expansion: up to 2 meters Manual/Multi Blow Expansion: 53.1 in (1350 mm)
FPI:	14,16,18,20,24,26,28,30
Fins:	Plain, Dimpled, or Winglet Copper, Aluminum, Epoxy Coated Aluminum, or Stainless Steel



Tubes:	Copper Nickel 90/10 or 70/30, Stainless Steel
Design Codes:	If required, designed to CE/Ped category I, II or III, ASME VIII Div. 1

Type 500 Shell & Tube Heat Exchangers

Basco® Type 500 Shell & Tube Heat Exchangers

Our Basco Type 500 remains the industry standard in ultimate value and long-term reliability. This proven fixed tubesheet shell and tube heat exchanger offers the cost effectiveness that comes with having a highly standardized design, while easily providing various options to meet specific customer requirements.

PERFORMANCE NOTES.

- Pre-engineered components
- Many readily available designs
- Available in straight tube or u-tube bundles; removable and non-removable

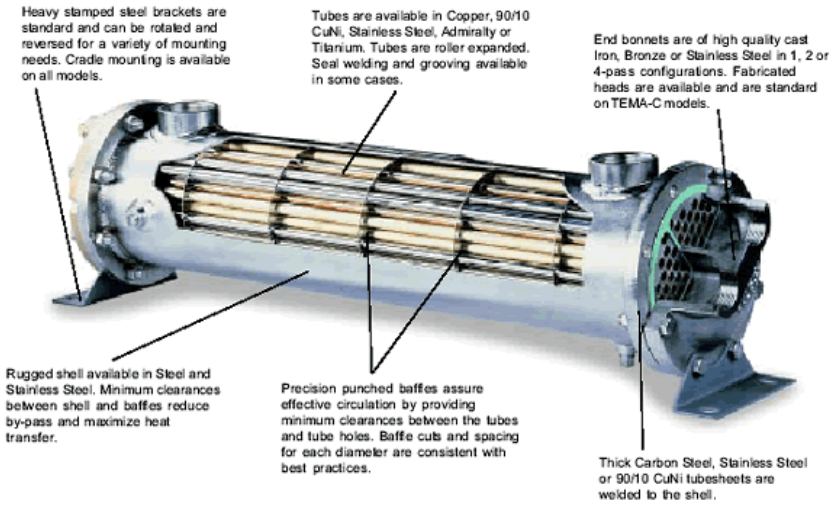
SPECIFICATIONS.

Sizes	3" to 12" diameter; 14" to 120" length
Shells	Carbon Steel or 304 Stainless Steel
Tubes	1/4", 3/8" or 5/8" diameter tubes available in Copper, Admiralty, 90/10 CuNi, or 304 S/S. Straight tube or U-Tube configurations
Baffles	Precision punched Carbon Steel, Brass or 304 S/S
Heads	Cast heads available in iron, 304 S/S, or bronze; Fabricated heads available in Steel, 304 S/S, or 90/10 CuNi.
Flow	Available in 1-pass, 2-pass, and 4-pass designs
Codes	Commercial Standard (non-code) ASME

APPLICATIONS.

- Compressor systems
- Lube oil consoles
- Hydraulic systems
- Stationary engines
- Turbines
- Marine applications
- Paint systems
- Air dryers
- Vapor recovery systems

TEMA-C



Our Basco Type 500 heat exchangers are manufactured in our ISO 9001 certified Buffalo, NY facility and our Suzhou, China facility. We employ Demand Flow Technology (DFT) manufacturing processes where finished goods are made "on-demand" from components and in-line support machining centers. We've invested heavily in DFT and embrace the superior quality, improved workflow, and cost controls inherent in DFT manufacturing.

Type 500 ES Shell & Tube Heat Exchanger

Basco® Type 500 ES (Extended Surface) Shell & Tube Heat Exchangers

Introduced as an extension to our industry standard Type 500, our Basco Type 500 ES offers an extended surface on the shell side to provide a higher heat transfer rate in a smaller overall unit for more demanding applications. The Type 500 ES offers the cost effectiveness that comes with a pre-engineered design while easily providing for various options to meet customer specific requirements.

PERFORMANCE NOTES.

- Increased shell side surface provides a higher heat transfer rate in a smaller unit
- Units are readily available
- Many pre-engineered designs
- Available in straight tube or u-tube bundles; removable and non-removable

APPLICATIONS.

- Compressor systems
- Lube oil consoles
- Hydraulic systems
- Stationary engines
- Turbines
- Marine applications
- Paint systems
- Air dryers
- Vapor recovery systems

SPECIFICATIONS:

Sizes:	3" to 12" diameter; 14" to 120" length
Shells:	Carbon Steel or 304 Stainless Steel
Tubes:	1/4", 3/8" or 5/8" diameter tubes available in Copper, Admiralty, 90/10 CuNi, or 304 S/S. Straight tube or U-Tube configurations
Baffles:	Precision punched Carbon Steel, Brass or 304 S/S
Heads:	Cast heads available in iron, 304 S/S, or bronze; Fabricated heads available in Steel, 304 S/S, or 90/10 CuNi.
Flow:	Available in 1-pass, 2-pass, and 4-pass designs

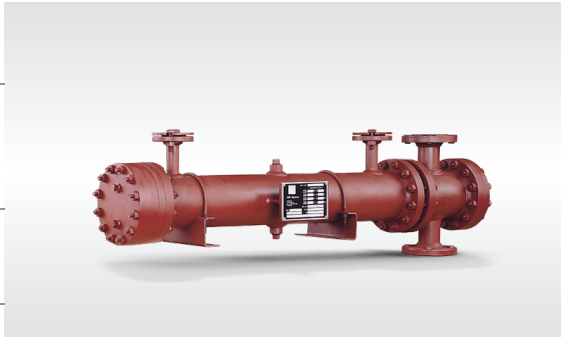
Type OP Shell & Tube Heat Exchanger

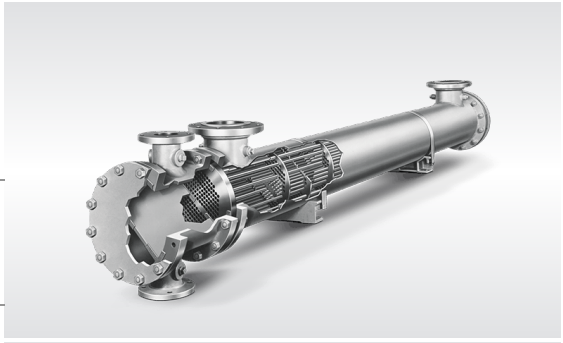
Basco® Type OP Shell & Tube Heat Exchangers

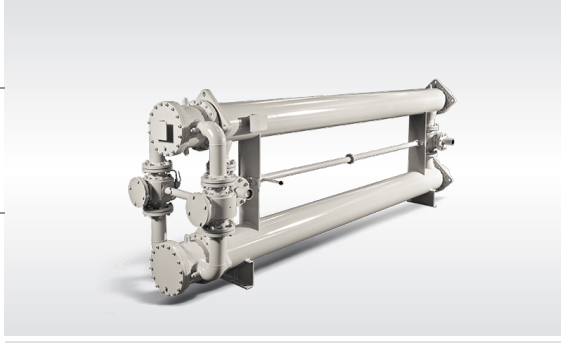
First introduced in 1962, our Basco OP design has proven to be the preferred TEMA Type AEW shell and tube heat exchanger in the market. The "OP", or "O-Ring Protected" design features removable tube bundle, nozzle location flexibility, and a unique threaded O-ring retainer that permits removal of the reversing bonnet without disturbing the piping or draining the shellside fluid. Removal of the channel cover permits full inspection and cleaning of the tube side.

SPECIFICATIONS.

Sizes:	3" to 42" diameter; 12" to 360" length (available in 12" increments)
Shells:	Carbon Steel or 304 Stainless Steel
Tubes:	3/8", 5/8", or 3/4" diameter tubes available Carbon Steel, Copper, Admiralty, 90/10 or 70/30 CuNi, 304 S/S or Titanium. Straight tube configurations
Baffles:	Precision punched Carbon Steel, Brass or Stainless Steel
Heads:	Channels and bonnets available in Steel
Flow:	Available in 1-pass and 2-pass designs
Codes:	ASME ABS TEMA USCG API614 Others

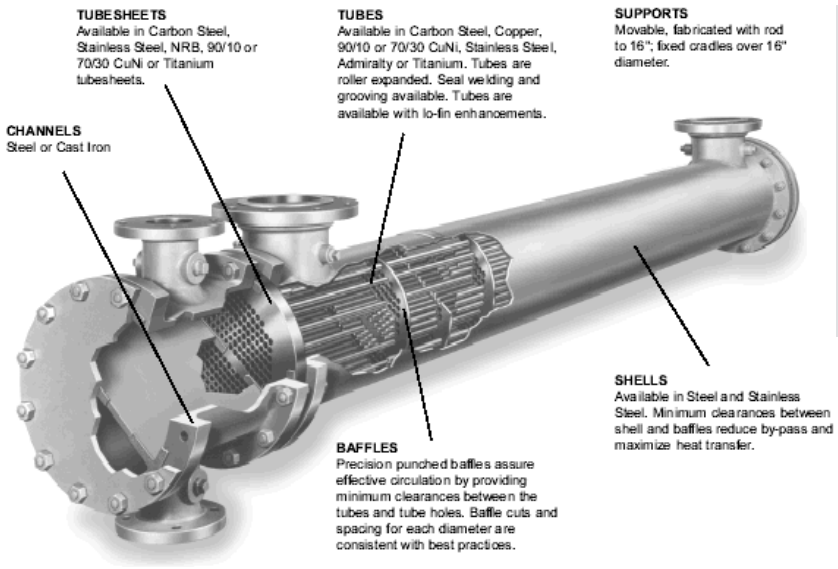






APPLICATIONS.

- Compressed air
- Steam or gas turbine oil
- Hydraulic oil



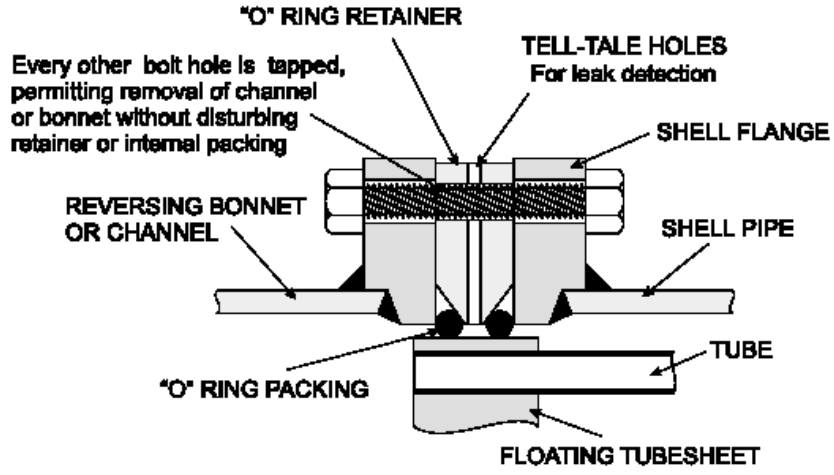
- Lube oil
- Bearing water
- Jacket water
- Gland seal condensers
- Condensate cooling
- Ship board and marine engines

OUR BASCO DOUBLE "O" RING SEAL PROTECTION

Permits the bundle to expand and contract without strain or intermixing of shell and tubeside fluids. O-Rings retain compression and are unaffected by vibration and temperature changes. Telltale holes reveal any leakage.

SPECIAL FEATURE

The unique construction of the Basco OP permits inspection and maintenance of the tubeside without draining the shellside or disturbing the piping.



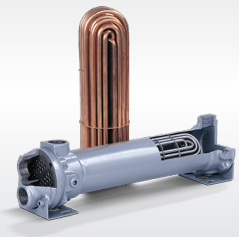
Type ST U-Tube Shell & Tube Heat Exchangers

Basco® U-Tube Shell & Tube Heat Exchangers

API Heat Transfer manufactures several variations of U-Tube heat exchangers. Both the Type 500 and Hub-Design are available in U-Tube configurations. However, to address the very basic of needs for industrial heating and cooling applications, the Model BWS and BW U-Tube heat exchangers offer highly standardized construction at a very attractive price. The BWS is designed for water-to-steam, while the BW is built for water-to-water service. Units are also available as immersion tank heat exchangers.

SPECIFICATIONS.

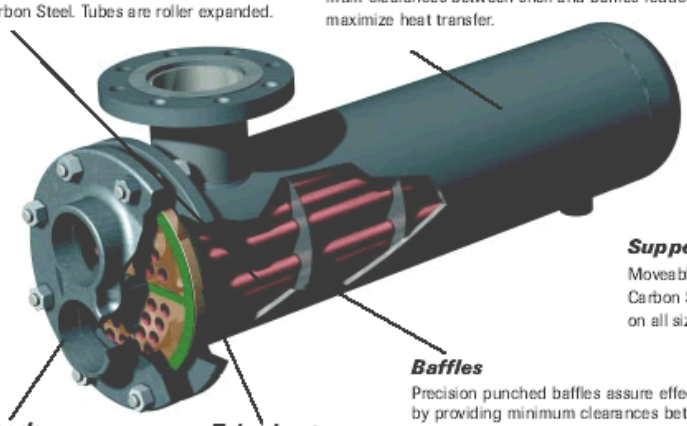
Sizes:	4" to 20" diameter; 28" to 130" length
Shells:	Carbon Steel or 304 Stainless Steel



U-TUBE SHELL & TUBE HEAT EXCHANGER

Tubes
Available in Copper, 90/10 CuNi, 316 Stainless Steel, Admiralty or Carbon Steel. Tubes are roller expanded.

Shells
Rugged shell available in Steel and 316 Stainless Steel. Minimum clearances between shell and baffles reduce by-pass and maximize heat transfer.



Supports
Moveable, fabricated Carbon Steel available on all sizes.

Baffles
Precision punched baffles assure effective circulation by providing minimum clearances between the tubes and tube holes. Baffle cuts and spacing for each diameter are consistent with best practices. Standard available material includes Carbon Steel, Brass and 316 Stainless Steel.

Heads
Heads available in Cast Iron, Brass, 316 Stainless Steel or Fabricated Carbon Steel.

Tubesheets
Thick Carbon Steel, 316 Stainless Steel or 90/10 CuNi tubesheets.

Constructed in accordance with ASME Code, Section VIII, Division 1, these heavy duty U-Tube heat exchangers have built-in protection against damage caused by the inherent forces which occur during heating and cooling as the vessel thermally expands and contracts. As the one end of the bundle is free to float, the unit is safe even under exteme thermal cycling. This makes them

APPLICATIONS.

- Water heating with steam
- Condensate cooling
- Boiler feedwater preheating
- Cooling tower trim cooling
- Glycol cooling
- Oil cooling

ideal for use with steam as the heating medium.

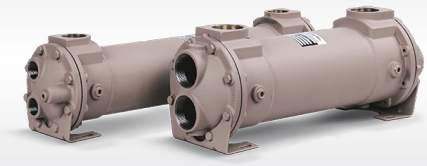
Basco Type HT & AHT Hub-Design Shell & Tube Heat Exchangers

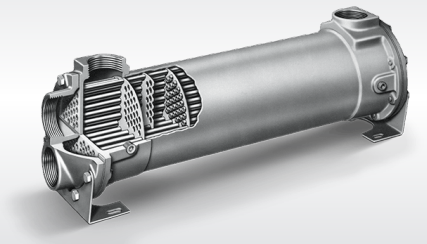
Basco® Type HT and AHT Hub-Design Heat Exchangers

Our extensive line of Basco Type HT and AHT heat exchangers offer the benefits of non-ferrous construction in a highly standardized design for maximum flexibility at minimum cost. Hub-design advantages include increased corrosion resistance, maximum obtainment of tube quantity in a given diameter for better efficiency, and lower entrance velocity and pressure drop as a result of the dome shell nozzle.

SPECIFICATIONS.

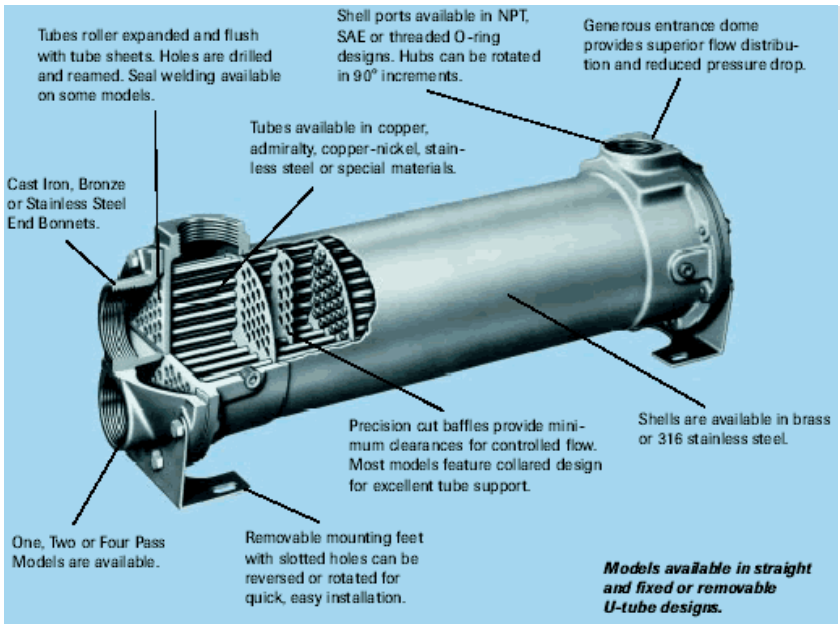
Sizes:	2" to 8" diameter; 8" to 96" length
Shells:	HT - Brass AHT - 316 Stainless Steel
Tubes:	1/4", 3/8" or 5/8" diameter tubes available Copper, Admiralty, or 316 S/S Straight tube or U-Tube configurations
Baffles:	Precision punched Brass or 316 S/S
Heads:	Cast iron, Bronze, 316 S/S; Fabricated heads available in Steel, 304 S/S, or 90/10 CuNi
Flow:	Available in 1-pass, 2-pass, and 4-pass designs
Codes:	Commercial Standard (non-code) ASME (available above 4" diameter)





APPLICATIONS.

- Lube oil cooling
- Engine jacket water cooling
- Hydraulic systems
- Molding machines
- Vegetable oil cooling
- Marine applications
- Refrigerant evaporating
- Refrigerant condensing
- Paints and coatings



- Vapor recovery systems

Our Type HT heat exchangers have been in production since 1965. Standard HT models feature low-cost, non-ferrous construction with brass shell, brass tubesheet and straight copper tubes. End bonnets are cast iron. Numerous options including special materials and nozzle orientation are available.

The Type AHT heat exchangers feature all 316 Stainless Steel construction in a wide variety of configurations. Modified units are suitable for critical service where ultra-clean conditions are paramount. Options include seal welding of tube to tube sheet joints and polished surfaces for pharmaceutical and food processing applications.

Type HTR and AHTR feature a removable tube bundle design allowing shellside cleaning and bundle replacement, rare in a low cost small diameter design where tubesheets are typically fixed. Available in non-ferrous or stainless designs.

AB Series - Compressed Air

Thermal Transfer Products Compressed Air Aftercoolers

API Heat Transfer's line of Thermal Transfer Products compressed air aftercoolers is a complete series of standard catalog air-to-air and water-to-air aftercoolers for compressed air and lube oil cooling. All Thermal Transfer Products aftercoolers are available with a wide variety of standard options to best suit each application.

Water-Cooled

In-Line shell and tube

Up to 5000-cfm capacity

Large range of standard sizes

Low approach temperatures

Copper, copper-nickel, or stainless steel tubing

Air-Cooled

Belt Guard or fan-cooled units

Up to 5000-cfm capacity

Large range of standard sizes

AC, hydraulic, or air-motor fan drives

Copper tube aluminum fin

Brazed aluminum (P-BAR)

Heresite coating for offshore or corrosive environment operation

Customer Focused and Driven

All catalog products are available with short lead-times

Expert application engineers available to select and size the right product for your application

Custom designs are available

For application help and quoting, visit our Full TTP site or contact ttpsales@apiheattransfer.com.

UC Series - Process Cooling

Thermal Transfer Products Process Coolers

Our Thermal Transfer Products brand offers a full line of process cooling heat exchangers.

Water-Cooled

Fixed bundle shell and tube

U-Tube Removable Bundle

Stainless Steel brazed plate

Large range of standard sizes

Air-Cooled

Copper-tube and fin

Brazed aluminum

Large range of standard sizes

Standard Product Options

Thermal Transfer process coolers are available with a wide variety of standard options to best suit each application.

Water-Cooled

Copper, copper-nickel, or stainless steel tubing

Nickel-braze plate coolers

Air-Cooled

AC, hydraulic, or air-motor fan drives

Copper tube aluminum fin

Brazed aluminum (P-BAR)

Heresite coating for offshore or corrosive environment operation

Customer Focused and Driven

All catalog product is available with short lead-times

Expert application engineers available to select and size the right product for your application

Custom designs are available

For application help and quoting, visit our Full TTP site or contact ttpsales@apiheattransfer.com.

COPPER & STEEL CONSTRUCTION

Features

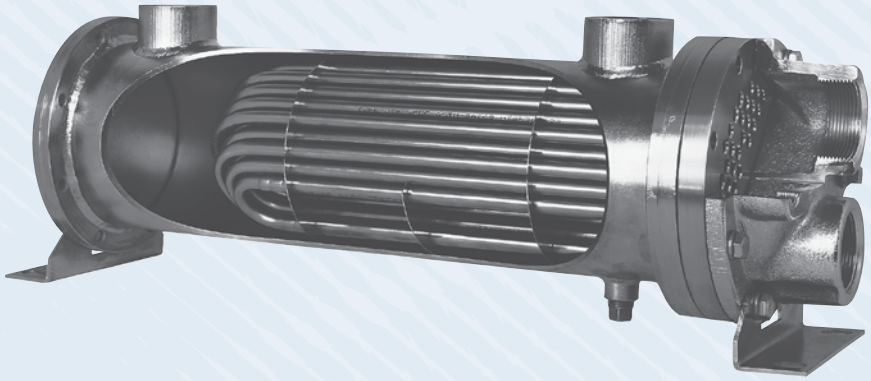
- **Steam & Large Temperature Differentials**
- **Removable Tube Bundle for Servicing**
- **Reduces Thermal Expansion Stresses**
- **3/8" Tubes**
- Built-In Expansion Chamber
- Threaded or Flanged Connections
- Mounting Brackets Included
- Steel Shell Assembly

OPTIONS

Wide Variety of Materials Available

Custom Sizes/Designs

Stainless Steel Hardware and Mounting



Ratings

UC SERIES

Maximum Shell Pressure 250 psi

Maximum Tube Side Pressure 150 psi

Maximum Temperature 400° F

UCV SERIES

Maximum Shell Pressure
600, 800, 1000 250 psi
1200, 1700 150 psi

Maximum Tube Side Pressure 150 psi

Maximum Temperature 400° F

Materials UC/UCV Series

Tubes Copper

Tube Sheets Steel

Shell Steel/316L Stainless Steel (UCV)

Shell Connections Steel

Baffles Stainless Steel

End Bonnets Cast Iron

Mounting Brackets Steel

Gaskets Non-Asbestos Fiber/Nitrile Rubber

Nameplate Aluminum Foil

Materials USSC/USSCV Series

Tubes 316L Stainless Steel

Tube Sheets 316L Stainless Steel

Shell 316L Stainless Steel

Shell Connections 316L Stainless Steel

Baffles 316L Stainless Steel

End Bonnets 316L Stainless Steel

Mounting Brackets Steel

Gaskets Non-Asbestos Fiber/Nitrile Rubber

Nameplate Aluminum Foil

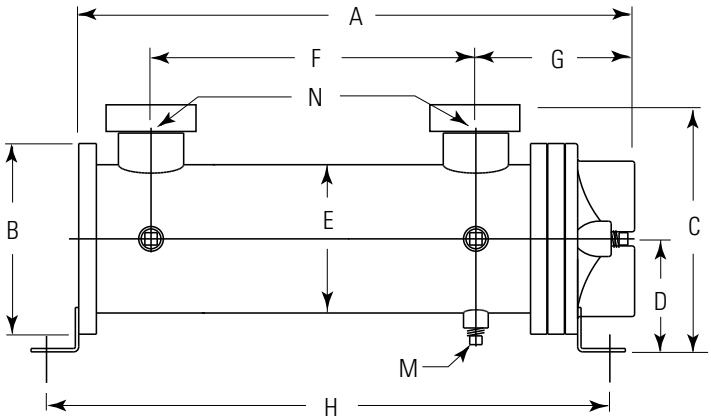
How to Order

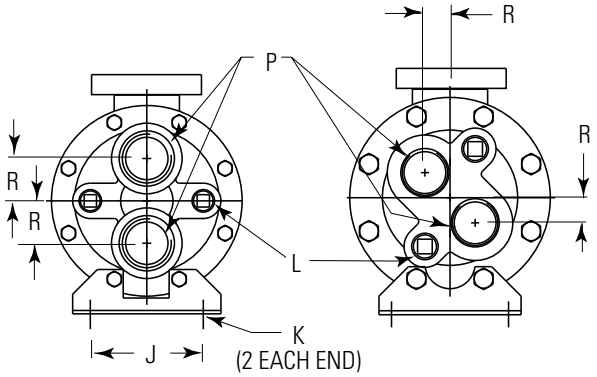
Model Series	Model Size Selected	Baffle Spacing	Tube Diameter	Tubeside Passes	Cooling Tube Material	End Bonnet Material	Tube Sheet Material	Zinc Anodes
UC/USSC **UCA/USSCA** **UCV/USSCV**				**T** - Two Pass **F** - Four Pass	**Blank** - Copper **CN** - CuNi **SS** - Stainless Steel	**Blank** - Cast Iron **B** - Bronze **SB** - Stainless Steel	**Blank** - Steel **W** - CuNi **S** - Stainless Steel	**Blank** - None **Z** - Zinc

UC/USSC = NPT Shell Connections; NPT Tube Connections
UCA/USSCA = ASME/ANSI Flange Shell Connections, NPT Tube Connections
UCV/USSCV = 1000 and Smaller: Inlet and Outlet NPT Shell Connections Rotated 180°, NPT Tube Side Connections
UCV/USSCV = 1200 and Larger: ASME/ANSI Flange Inlet and NPT Outlet Shell Connections Rotated 180°, NPT Tube Side Connections

Dimensions

UC Two Pass





All models except UC-800 & UC-1200 Series

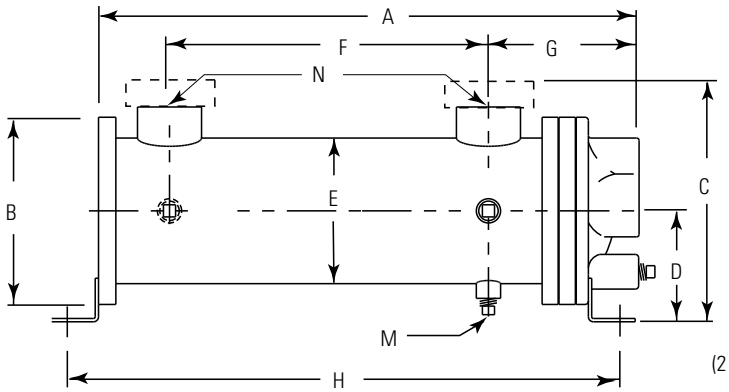
UC-800 & UC-1200 Series

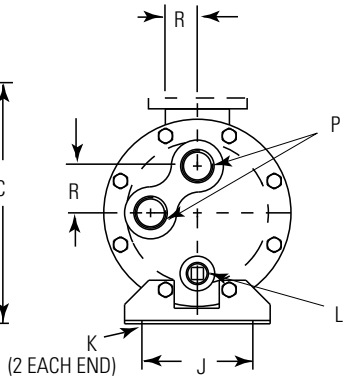
MODEL	A	B DIA	C NPT	C ASME* FLANGE	D	E DIA	F	G	H	J	K	L NPT	M NPT	N NPT	P NPT	R	FT² SURFACE AREA
612	17.22	4.50	5.38	6.75	2.75	3.25	11.25	4.03	17.66	3.25	.44 DIA	(2) .38	(3) .25	1.00	1.00	—	2.4
624	29.22						23.25		29.66							—	4.7
812	19.47	6.00	6.75	8.25	3.50	4.25	12.38	4.97	19.65	3.50	.44 DIA	(2) .38	(3) .25	1.50	1.25	0.75	4.0
824	31.47						24.38		31.65								7.9
836	43.47						36.38		43.65								11.9
1012	19.68	6.75	7.75	9.25	4.00	5.25	11.50	5.62	19.94	4.00	.50 x .75 SLOT	(2) .38	(3) .38	1.50	1.50	1.50	7.4
1024	31.68						23.50		31.94								14.5
1036	43.68						35.50		43.94								21.5
1218	26.22	7.75	8.75	10.38	4.50	6.25	17.38	5.89	26.12	5.00	.50 x .75 SLOT	(2) .50	(3) .38	2.00	2.00	1.10	15.3
1224	32.22						23.38		32.12								21.1
1236	44.22						35.38		44.12								31.3
1248	56.22						47.38		56.12								41.6
1724	34.69	10.50	11.58	13.00	5.75	8.62	23.50	7.81	34.27	7.00	.62 x .88 SLOT	(2) .50	(3) .38	3.00	2.50	2.25	47.7
1736	46.69						35.50		46.27								70.1
1748	58.69						47.50		58.27								92.5
1760	70.69						59.50		70.27								114.8

**150# ASME/ANSI Flange (Optional). NOTE: We reserve the right to make reasonable design changes without notice. Consult factory. All dimensions are inches.*

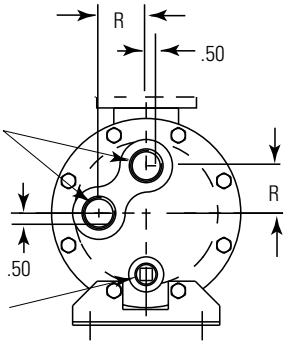
Dimensions

UC Four Pass





All models except UC-1700 Series



UC-1700 Series

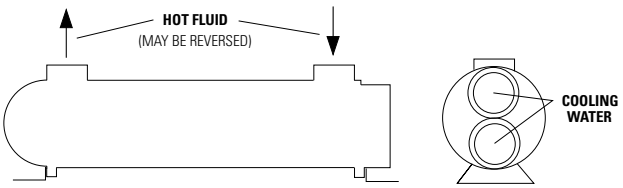
MODEL	A	B DIA	C NPT	C ASME* FLANGE	D	E DIA	F	G	H	J	K	L NPT	M NPT	N NPT	P NPT	R	FT² SURFACE AREA
612	17.20	4.50	5.38	6.75	2.75	3.25	11.25	4.01	17.66	3.25	.44 DIA	—	(3) .25	1.00	.75	1.00	2.4
624	29.20						23.25		29.66			—					4.7
812	19.47	6.00	6.75	8.25	3.50	4.25	12.00	4.97	19.65	3.50	.44 DIA	(2) .38	(3) .25	1.50	.75	1.25	4.0
824	31.47						24.00		31.65								7.9
836	43.47						36.00		43.65								11.9
1012	19.50	6.75	7.75	9.25	4.00	5.25	11.50	5.43	19.95	4.00	.50 x .75 SLOT	(2) .38	(3) .38	1.50	1.00	1.69	7.4
1024	31.50						23.50		31.95								14.5
1036	43.50						35.50		43.95								21.5
1218	26.22	7.75	8.75	10.38	4.50	6.25	17.38	5.89	26.12	5.00	.50 x .75 SLOT	(2) .38	(3) .38	2.00	1.50	2.00	15.3
1224	32.22						23.38		32.12								21.1
1236	44.22						35.38		44.12								31.3
1248	56.22						47.38		56.12								41.6
1724	34.69	10.50	11.58	13.00	5.75	8.62	23.50	7.81	34.27	7.00	.62 x .88 SLOT	(2) .38	(3) .38	3.00	2.00	2.50	47.7
1736	46.69						35.50		46.27								70.1
1748	58.69						47.50		58.27								92.5
1760	70.69						59.50		70.27								114.8

**150# ASME/ANSI Flange (Optional). NOTE: We reserve the right to make reasonable design changes without notice. Consult factory. All dimensions are inches.*

UC Applications

U-Tube Heat Exchangers allow the shell and tube bundle to expand and contract independently with temperature fluctuation. This reduces temperature dependent stresses so they are ideal in applications with large temperature differentials. Some typical examples for **UC** units include quench oil coolers, liquid to liquid heaters, and barrel oil coolers for plastic extrusion machines. The removable bundle design allows for easier cleaning of the shell side cavity when the bundle is removed.

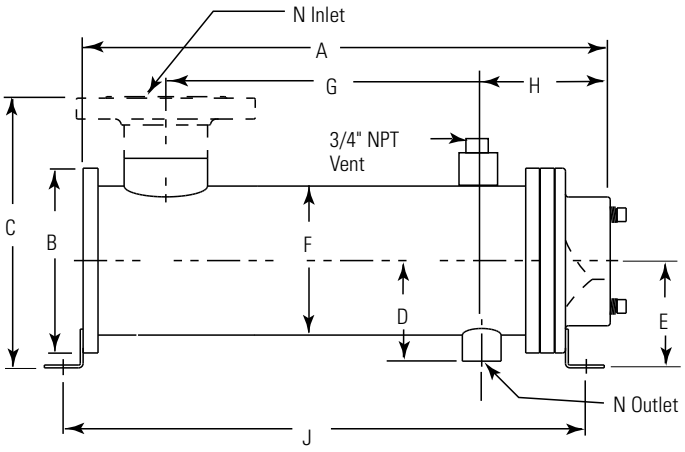
Piping Hook-up

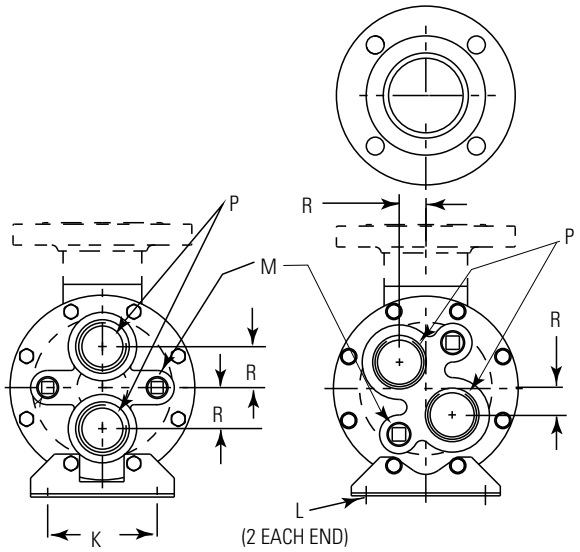


Specific applications may have different piping arrangements. Consult factory for assistance.

Dimensions

UCV Two Pass





All models except UCV-800 & UCV-1200 Series

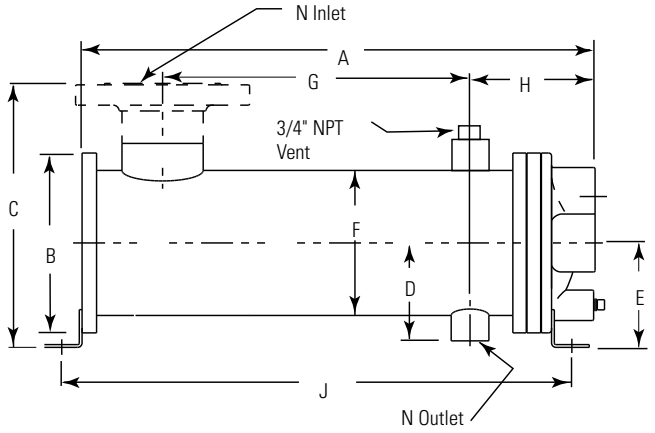
UCV-800 & UC-1200 Series

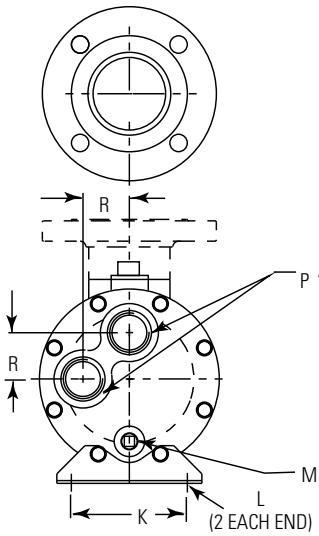
MODEL	A	B DIA	C	D	E	F DIA	G	H	J	K	L	M NPT	N INLET	N OUTLET	P NPT	R	FT^2 SURFACE AREA
612	17.22	4.50	5.25	2.62	2.75	3.25	11.00	4.00	17.66	3.25	.44 DIA	(2) .38	1.25	.75	1.00	—	2.4
624	29.22						23.00		29.66							—	4.7
812	19.47	6.00	6.75	3.15	3.50	4.25	12.00	4.60	19.65	3.50	.44 DIA	(2) .38	1.50	.75	1.25	0.75	4.0
824	31.47						24.00		31.65								7.9
836	43.47						36.00		43.65								11.9
1012	19.68	6.75	7.77	3.70	4.00	5.25	11.50	5.37	19.94	4.00	.50 x .75 SLOT	(2) .38	2.00	1.00	1.50	1.50	7.4
1024	31.68						23.50		31.94								14.5
1036	43.68						35.50		43.94								21.5
1218	26.22	7.75	11.38	4.22	4.50	6.25	17.38	5.38	26.12	5.00	.50 x .75 SLOT	(2) .50	3.00*	1.00	2.00	1.10	15.3
1224	32.22						23.38		32.12								21.1
1236	44.22						35.38		44.12								31.3
1248	56.22						47.38		56.12								41.6
1724	34.69	10.50	14.00	5.58	5.75	8.62	23.00	7.31	34.27	7.00	.62 x .88 SLOT	(2) .50	4.00*	1.50	2.50	2.25	47.7
1736	46.69						35.00		46.27								70.1
1748	58.69						47.00		58.27								92.5
1760	70.69						59.00		70.27								114.8

**150# ASME/ANSI Flange. NOTE: We reserve the right to make reasonable design changes without notice. Consult factory. All dimensions are inches.*

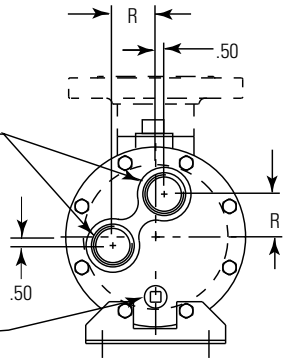
Dimensions

UCV Four Pass





All models except UCV-1700 Series



UCV-1700 Series

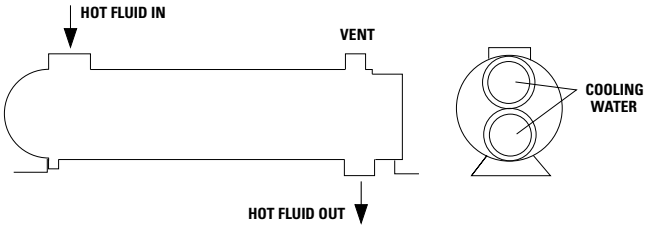
MODEL	A	B DIA	C	D	E	F DIA	G	H	J	K	L	M NPT	N INLET	N OUTLET	P NPT	R	FT² SURFACE AREA
612	17.20	4.50	5.25	2.62	2.75	3.25	11.00	3.98	17.66	3.25	.44 DIA	(2) .38	1.25	.75	.75	1.00	2.4
624	29.20						23.00		29.66								4.7
812	19.47	6.00	6.75	3.15	3.50	4.25	12.38	4.60	19.65	3.50	.44 DIA	(2) .38	1.50	.75	.75	1.25	4.0
824	31.47						24.38		31.65								7.9
836	43.47						36.38		43.65								11.9
1012	19.50	6.75	7.77	3.70	4.00	5.25	11.50	5.18	19.95	4.00	.50 x .75 SLOT	(2) .38	2.00	1.00	1.00	1.69	7.4
1024	31.50						23.50		31.95								14.5
1036	43.50						35.50		43.95								21.5
1218	26.22	7.75	10.38	4.22	4.50	6.25	17.38	5.38	26.12	5.00	.50 x .75 SLOT	(2) .38	3.00*	1.00	1.50	2.00	15.3
1224	32.22						23.38		32.12								21.1
1236	44.22						35.38		44.12								31.3
1248	56.22						47.38		56.12								41.6
1724	34.69	10.50	13.00	5.58	5.75	8.62	23.00	7.31	34.27	7.00	.62 x .88 SLOT	(2) .38	4.00*	1.50	2.00	2.50	47.7
1736	46.69						35.00		46.27								70.1
1748	58.69						47.00		58.27								92.5
1760	70.69						59.00		70.27								114.8

**150# ASME/ANSI Flange. NOTE: We reserve the right to make reasonable design changes without notice. Consult factory. All dimensions are inches.*

UCV Applications

U-Tube Heat Exchangers allow the shell and tube bundle to expand and contract independently with temperature fluctuation. This reduces temperature dependent stresses so they are ideal in applications with large temperature differentials. A typical example for **UCV** units is steam to liquid heaters. The removable bundle design allows for easier cleaning of the shell side cavity when the bundle is removed.

Piping Hook-up



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

CA Series

Industrial Hydraulic Oil Coolers

Thermal Transfer Products offers a full line of standard catalog hydraulic oil coolers for all industrial machine hydraulics for system cooling.

Air to Oil Cooling

Up to +500 HP of heat removal from hydraulic oil

Round tube copper, brass or steel

Brazed aluminum plate & bar (P-BAR™)

Extruded aluminum tube (T-BAR™)

Aluminum/steel fin construction

All aluminum brazed

Water to Oil Cooling

Steel, copper, copper/nickel, or stainless steel construction

Brazed plate construction

Internal fins

Diameters up to 10 inches

Lengths up to 12 feet

Product Options

Thermal Transfer industrial hydraulic oil coolers are available with a host of options to meet the demands of your application.

Brass construction

Steel construction

Internal finned construction

Brazed plate construction

Internal bypass

Seawater service

Applications

Our hydraulic oil coolers are used worldwide in a broad range of industrial applications, including:

Hydraulic presses

Plastic injection molding

Lube oil coolers

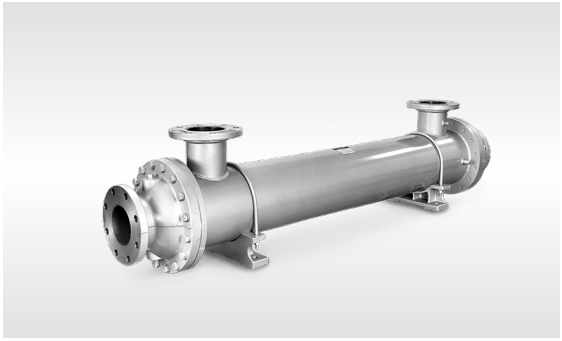
Extrusion machinery

Gear boxes

Hydraulic power units

And more.

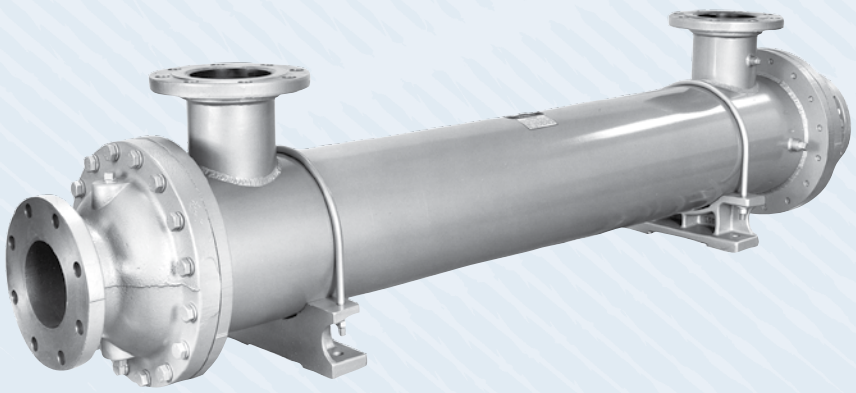
For application help and quoting, visit our Full TTP site or contact ttpsales@apiheattransfer.com.



COPPER & STEEL CONSTRUCTION

Features

- **Super High Flow**
- **Largest Flow Rates & Heat Transfer Available**
- **Rugged Steel Construction**
- **Custom Designs Available**
- **Competitively Priced**
- **3/8" & 5/8" Tubes Available**
- **Max. 10" Diameter, 12' Long**
- **150# ANSI/ASME Flanged Shell Connections (Metric Available)**
- Optional Construction on CA-2000 Series: Tubes, Tubesheets, and End Bonnets
- End Bonnets Removable For Servicing
- Saddle Brackets For Incremental Mounting



Ratings

Maximum Shell Pressure 150 psi
Maximum Tube Side Pressure 150 psi
Maximum Temperature 300° F

Materials

Headers Steel
Shell Steel
Shell Connections Steel
Baffles Brass
End Bonnets Cast Iron
Mounting Brackets Steel/Cast Iron
Gaskets Nitrile Rubber/Cellulose Fiber
Nameplate Aluminum Foil

Maximum Flow Rates

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

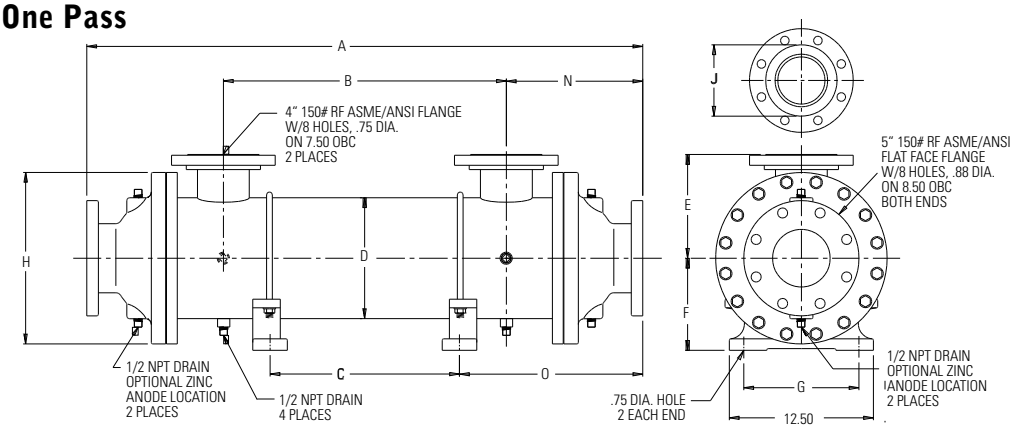
How to Order

	–		–		–		–		–	
Model Series **CA** **CAM**		Model Size Selected		Baffle Spacing	Tube Diameter Code **6** - 3/8" **10** - 5/8"	Tubeside Passes **0** - One Pass **T** - Two Pass **F** - Four Pass	Cooling Tube Material **Blank** - Copper **CN** - CuNi **SS** - Stainless Steel **AD** - Admiralty Brass	End Bonnet Material **Blank** - Cast Iron **NP** - Electroless Nickel Plate	Tubesheet Material **Blank** - Cast Iron **W** - CuNi **S** - Stainless Steel	Zinc Anodes **Blank** - None **Z** - Zinc

CA = NPT tubeside bottom connections; ASME/ANSI flange shell top connections.
CAM = BSPP shellside connections; BSPP tubeside connections.

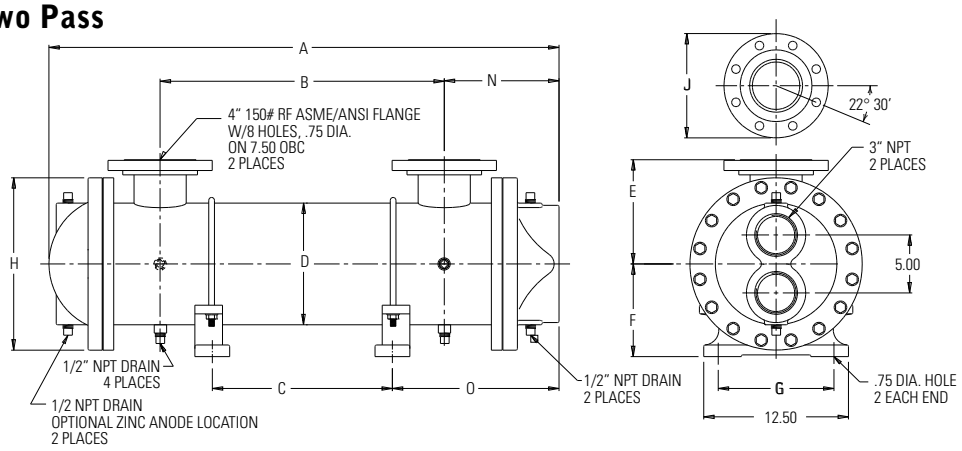
Dimensions

One Pass



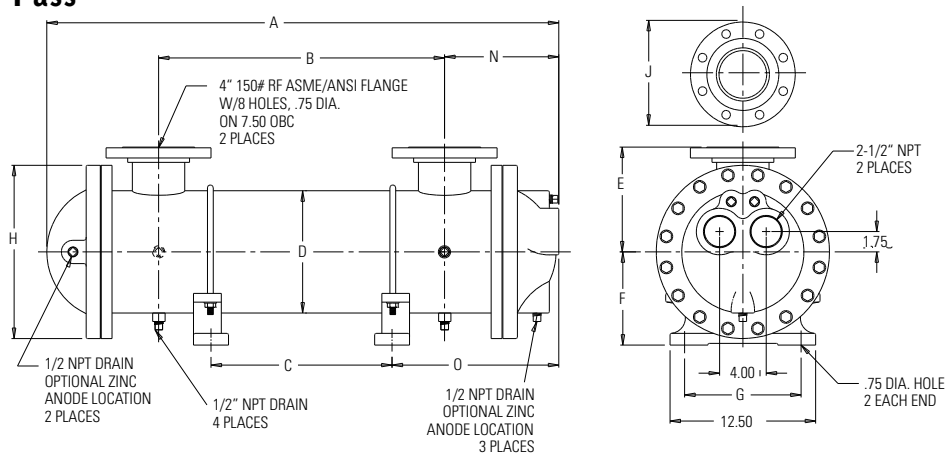
Model	A	N	O
CA-2036	49.64		
CA-2048	61.64		
CA-2060	73.64		
CA-2072	85.64		
CA-2084	97.64	11.82	15.92
CA-2096	109.64		
CA-20108	121.64		
CA-20120	133.64		
CA-20132	145.64		
CA-20144	157.64		

Two Pass



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

Four Pass



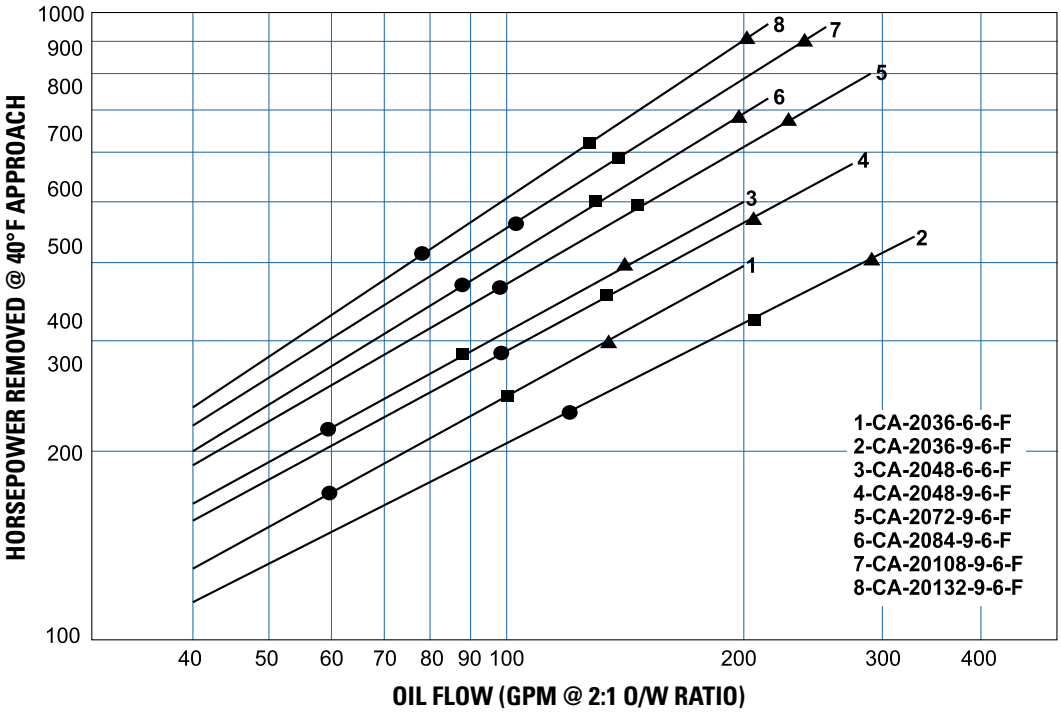
Model	A	N	O
CA-2036	45.34		
CA-2048	57.34		
CA-2060	69.34		
CA-2072	81.34		
CA-2084	93.34	9.78	13.78
CA-2096	105.34		
CA-20108	117.34		
CA-20120	129.34		
CA-20132	141.34		
CA-20144	153.34		

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

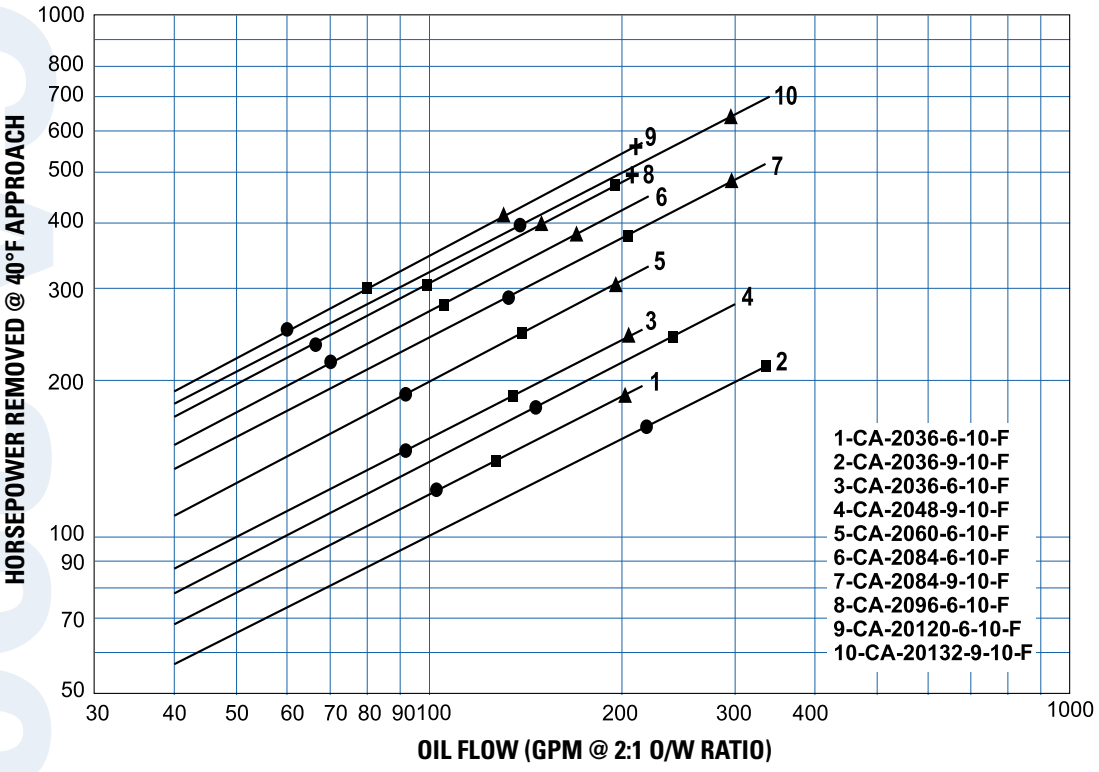
NOTE: We reserve the right to make reasonable design changes without notice. Dimensions are in inches.

Performance Curves

3/8" Tubes



5/8" Tubes



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.

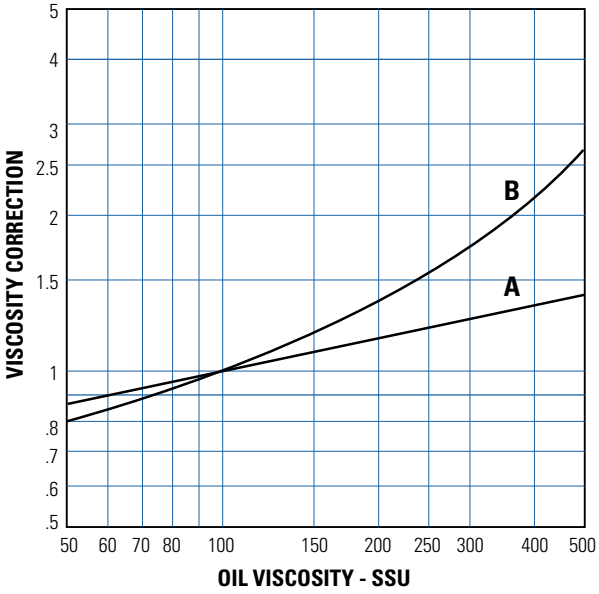
Step 1 **Determine the Heat Load.** This will vary with different systems, but typically coolers are sized to remove 25 to 50% of the input nameplate horsepower. (Example: 100 HP Power Unit x .33 = 33 HP Heat load.)
If BTU/Hr. is known: $HP = \frac{BTU/Hr}{2545}$

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:
HP heat load x $\frac{40}{\text{Actual Approach}}$ x Viscosity Correction A = 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 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 △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 Temperature = Oil Entering Temperature - 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.

A Series

Industrial Hydraulic Oil Coolers

Thermal Transfer Products offers a full line of standard catalog hydraulic oil coolers for all industrial machine hydraulics for system cooling.

Air to Oil Cooling

Up to +500 HP of heat removal from hydraulic oil

Round tube copper, brass or steel

Brazed aluminum plate & bar (P-BAR™)

Extruded aluminum tube (T-BAR™)

Aluminum/steel fin construction

All aluminum brazed

Water to Oil Cooling

Steel, copper, copper/nickel, or stainless steel construction

Brazed plate construction

Internal fins

Diameters up to 10 inches

Lengths up to 12 feet

Product Options

Thermal Transfer industrial hydraulic oil coolers are available with a host of options to meet the demands of your application.

Brass construction

Steel construction

Internal finned construction

Brazed plate construction

Internal bypass

Seawater service

Applications

Our hydraulic oil coolers are used worldwide in a broad range of industrial applications, including:

Hydraulic presses

Plastic injection molding

Lube oil coolers

Extrusion machinery

Gear boxes

Hydraulic power units

And more.

For application help and quoting, visit our **Full TTP site** or contact **ttpsales@apiheattransfer.com**.

EC Series

Industrial Hydraulic Oil Coolers

Thermal Transfer Products offers a full line of standard catalog hydraulic oil coolers for all industrial machine hydraulics for system cooling.

Air to Oil Cooling

Up to +500 HP of heat removal from hydraulic oil

Round tube copper, brass or steel

Brazed aluminum plate & bar (P-BAR™)

Extruded aluminum tube (T-BAR™)

Aluminum/steel fin construction

All aluminum brazed

Water to Oil Cooling

Steel, copper, copper/nickel, or stainless steel construction

Brazed plate construction

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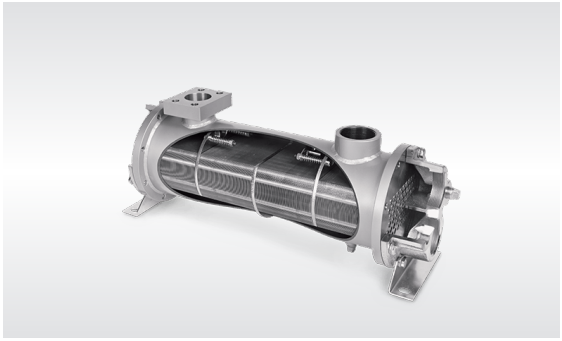
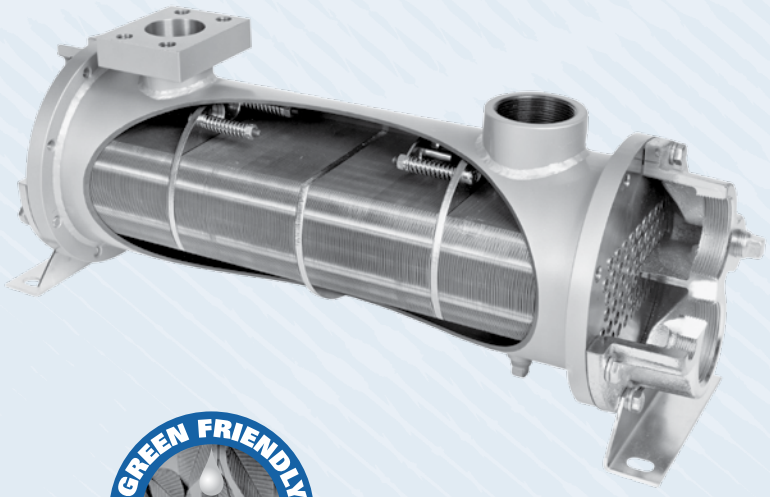


COPPER & STEEL CONSTRUCTION

Features

- **Rugged Steel Shell Construction**
- **3/8" Tube Size**
- **Larger Shell Diameter than EK, 8.50" Dia Max**
- **High Flow Capacity & Performance**
- **High Efficiency Finned Bundle Design**
- **Optional Patented Built-in Surge-Cushion® Bypass**
- End bonnets removable for easy tube cleaning
- Mounting brackets included – may be rotated for simple installation
- NPT, SAE, BSPP, BSPT or flange connections
- Optional type 316 stainless steel or 90/10 copper-nickel components available



Cutaway view shows high performance copper tube/aluminum fin cooling chamber with patented SURGE-CUSHION® relief bypass valve, and optional flange connections.

Ratings

Operating Pressure 300 psi

Test Pressure 150 psi

Operating Temperature 300° F

Materials

Shell Steel

Tubesheets Steel

Tubes Copper

Baffles Steel

Mounting Brackets Steel

Gaskets Nitrile Rubber/Cellulose Fiber

Nameplate Aluminum Foil

Fins Aluminum

End Caps Grey Iron

Surge-Cushion (Option)

The SURGE-CUSHION® is a protective device (patented) designed to internally bypass a portion of the oil flow during cold start conditions, or when sudden flow surges temporarily exceed the maximum flow allowed for a given cooler. This device may replace an external bypass valve, but it is not intended to bypass the total oil flow.

How to Order

	–		–		–		–		–	

Model Series
EC
ECS
ECM
ECF
ECFM

Model Size Selected

Baffle Spacing

Tubeside Passes
0 - One Pass
T - 2 Pass
F - 4 Pass

Surge Cushion
Blank - No Valve
R - Value Included

Cooling Tube Material
Blank - Copper
CN - CuNi
SS - 316 Stainless Steel

End Bonnet Material
Blank - Cast Iron
B - Bronze
SB - 316 Stainless Steel

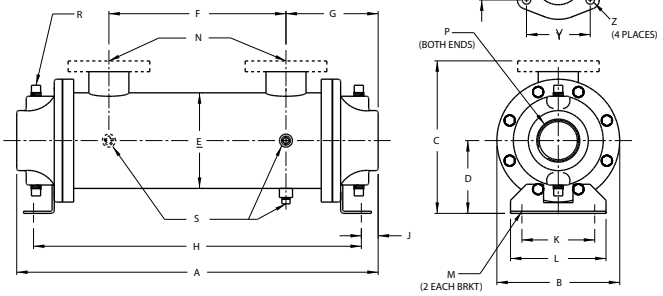
Tubesheet Material
Blank - Steel
W - CuNi
S - 316 Stainless Steel

Zinc Anodes
Blank - None
Z - Zinc Anodes

EC = NPT Oil connections; NPT Water connections.
ECS = SAE O-Ring Oil connections; NPT Water connections.
ECM = BSPP Oil connections; BSPP Water connections.
ECF = SAE 4 Bolt Flange (Tapped SAE) Oil connections; NPT Water connections.
ECFM = SAE 4 Bolt Flange (Tapped Metric) Oil connections; BSPP Water connections.

Dimensions

One Pass

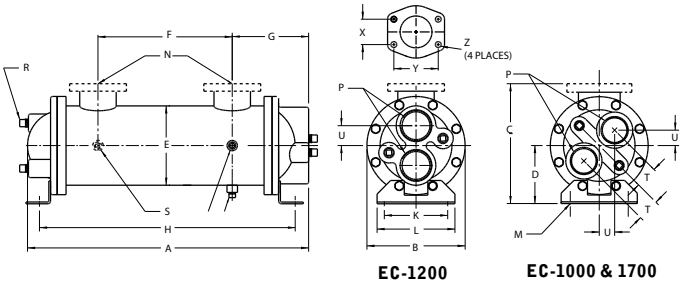


SAE Flange Size	X	Y	Z
1-1/2	1.41	2.75	1/2 - 13
2	1.69	3.06	UNC-2B
3	2.44	4.19	5/8 - 11 UNC 2B

MODEL	A	B	C		D	E	F	G	H	J	K	L	M	N		P	R	S
			NPT / BSPP SAE O-RING	SAE FLANGE										NPT/BSPP FLANGE	SAE O-RING	NPT BSPP	NPT BSPP	NPT BSPP
EC-1014	20.22	6.75 DIA.	7.75	8.00	4.00	5.25 DIA.	10.12	5.05	18.38	.92	4.00	5.25	.50 x .75 SLOT	1-1/2	#24 SAE	2	(4) 3/8	(3) 3/8
EC-1024	30.22						20.12		28.38									
EC-1036	42.22						32.12		40.38									
EC-1054	60.22						50.12		58.32									
EC-1224	30.72	7.75 DIA.	8.75	9.38	4.50	6.25 DIA.	18.97	5.87	27.84	1.43	5.00	6.25		2	#32 SAE	3	(4) 3/8	
EC-1236	42.72						30.97		39.84									
EC-1254	60.72						48.97		57.84									
EC-1272	78.72						66.97		75.84									
EC-1724	32.22	10.50 DIA.	11.50	12.50	5.75	8.50 DIA.	18.75	7.23	29.25	1.99	7.00	8.25	.62 x .88 SLOT	3	N/A	4		
EC-1736	45.22						30.75		41.25									
EC-1754	63.22						48.75		59.25									
EC-1772	81.22						66.75		77.25									
EC-1784	43.22						78.75		89.25									

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

Two Pass



EC-1200 EC-1000 & 1700

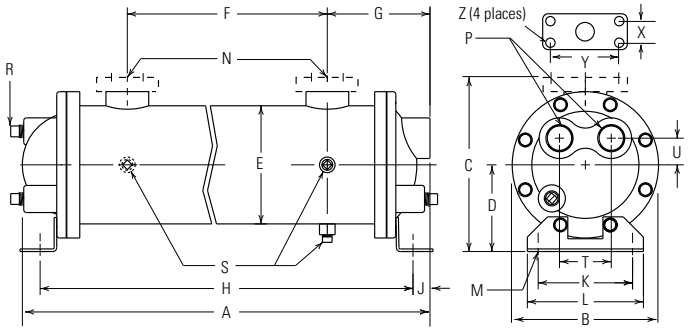
SAE Flange Size	X	Y	Z
1-1/2	1.41	2.75	1/2 - 13
2	1.69	3.06	UNC-2B
3	2.44	4.19	5/8 - 11 UNC 2B

MODEL	A	B	C		D	E	F	G	H	J	K	L	M	N		P	R	S	T	U
			NPT / BSPP SAE O-RING	SAE FLANGE										NPT/BSPP FLANGE	SAE O-RING	NPT BSPP	NPT BSPP	NPT BSPP		
EC-1014	19.75	6.75 DIA.	7.75	8.00	4.00	5.25 DIA.	10.12	5.05	18.38	.92	4.00	5.25	.50 x .75 SLOT	1-1/2	#24 SAE	1-1/2	(4) 3/8	3/8	1.50	1.06
EC-1024	29.75						20.12		28.38											
EC-1036	41.75						32.12		40.38											
EC-1054	59.75						50.12		58.32											
EC-1224	29.75	7.75 DIA.	8.75	9.38	4.50	6.25 DIA.	18.97	5.44	27.84	1.00	5.00	6.25		2	#32 SAE	2	(4) 3/8		—	1.56
EC-1236	41.75						30.97		39.84											
EC-1254	59.75						48.97		57.84											
EC-1272	77.75						66.97		75.84											
EC-1724	32.37	10.50 DIA.	11.50	12.50	5.75	8.50 DIA.	18.75	7.06	29.25	1.81	7.00	8.25	.62 x .88 SLOT	3	N/A				2.25	1.59
EC-1736	44.37						30.75		41.25											
EC-1754	62.37						48.75		59.25											
EC-1772	80.37						66.75		77.25											
EC-1784	92.37						78.75		89.25											

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

Dimensions

Four Pass



SAE Flange Size	X	Y	Z
1-1/2	1.41	2.75	1/2 - 13
2	1.69	3.06	UNC-2B
3	2.44	4.19	5/8 - 11 UNC 2B

MODEL	A	B	C NPT BSPP SAE O-RING	C SAE FLANGE	D	E	F	G	H	J	K	L	M	N NPT BSPP FLANGE	N SAE O-RING	P NPT BSPP	R NPT BSPP	S NPT BSPP	T	U
EC-1014	19.87	6.75 DIA.	7.75	8.00	4.00	5.25 DIA.	10.12	4.82	18.38	.75	4.00	5.25	.50 x .75 SLOT	1 1/2	#24 SAE	1	(3) 3/8	(3) 3/8	2.40	1.20
EC-1024	29.87						20.12		28.38											
EC-1036	41.87						32.12		40.38											
EC-1054	59.87						50.12		58.38											
EC-1224	29.78	7.75 DIA.	8.75	9.38	4.50	6.25 DIA.	18.97	5.44	27.84	1.00	5.00	6.25		2	#32 SAE	1 1/2			2.82	1.41
EC-1236	41.78						30.97		39.84											
EC-1254	59.78						48.97		57.84											
EC-1272	77.78						66.97		75.84											
EC-1724	31.61	10.50 DIA.	11.50	12.50	5.75	8.50 DIA.	18.75	7.06	29.25	1.81	7.00	8.25	.62 x .88 SLOT	3	N/A	2			4.25	1.41
EC-1736	43.61						30.75		41.25											
EC-1754	61.61						48.75		59.25											
EC-1772	79.61						66.75		77.25											
EC-1784	91.61						78.75		89.25											

NOTE: We reserve the right to make reasonable design changes without notice. All 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:
HP heat load x $\frac{40}{\text{Actual Approach}}$ x Viscosity Correction A = 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 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 △T) with this formula:

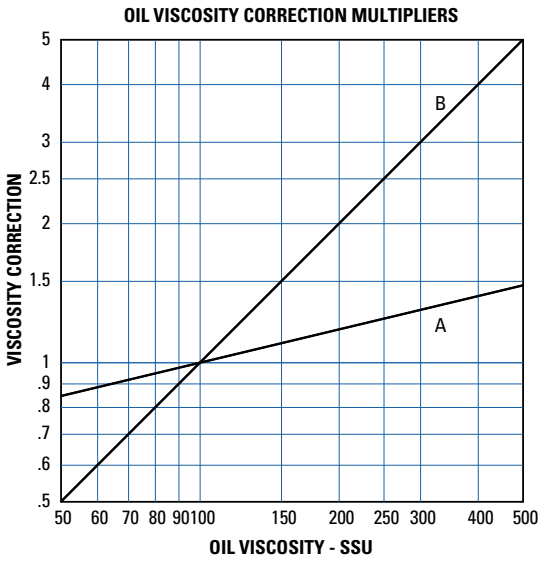
Oil △T=(BTU's/Hr.)/GPM Oil Flow x 210).

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

Oil Leaving Temperature = Oil Entering Temperature - 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.



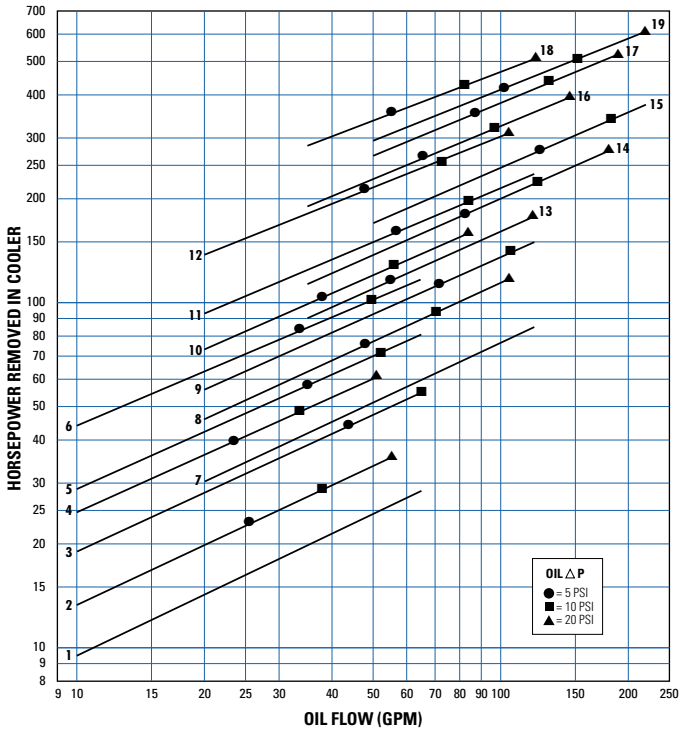
Maximum Flow Rates

Unit Size	Shell Side GPM	Tube Side GPM		
		One Pass	Two Pass	Four Pass
1000	70	65	32	16
1200	120	120	60	30
1700	250	220	110	65

Incorrect installation can cause premature failure.

Performance Curves

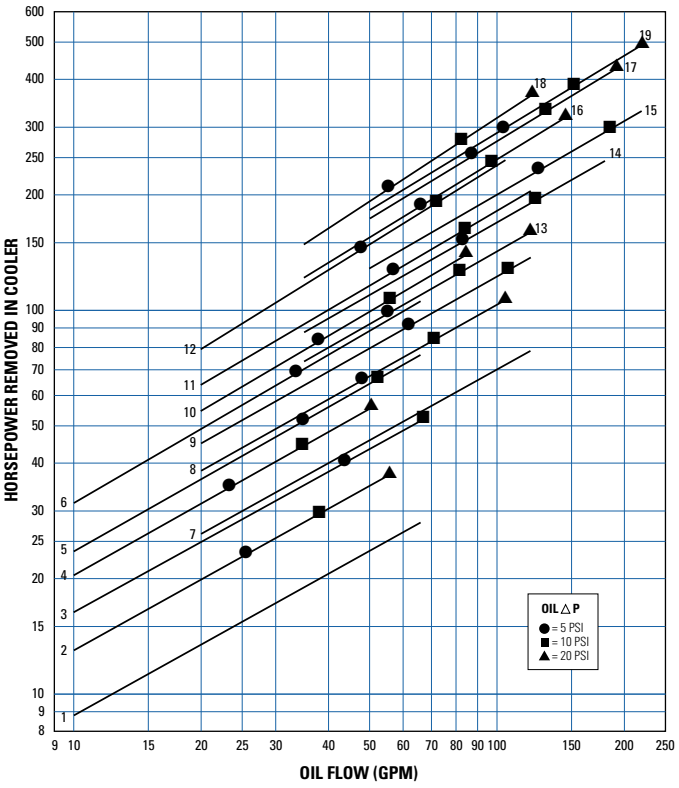
1:1 Oil to Water Ratio – High Water Usage



Curve Number	Model	Approx. Weights (lbs) Net	Shipping
1	EC-1014-7-0	28	32
2	EC-1014-4-0	28	32
3	EC-1024-6-0	45	50
4	EC-1024-4-0	45	50
5	EC-1036-6-0	66	70
6	EC-1054-7-0	105	140
7	EC-1224-12-0	98	105
8	EC-1224-6-0	98	105
9	EC-1236-9-0	125	145
10	EC-1236-6-0	125	145
11	EC-1254-9-0	155	180
12	EC-1272-9-0	210	250
13	EC-1724-6-0	145	175
14	EC-1736-9-0	201	235
15	EC-1754-14-0	275	305
16	EC-1754-9-0	275	305
17	EC-1772-12-0	330	380
18	EC-1772-9-0	330	380
19	EC-1784-14-0	390	450

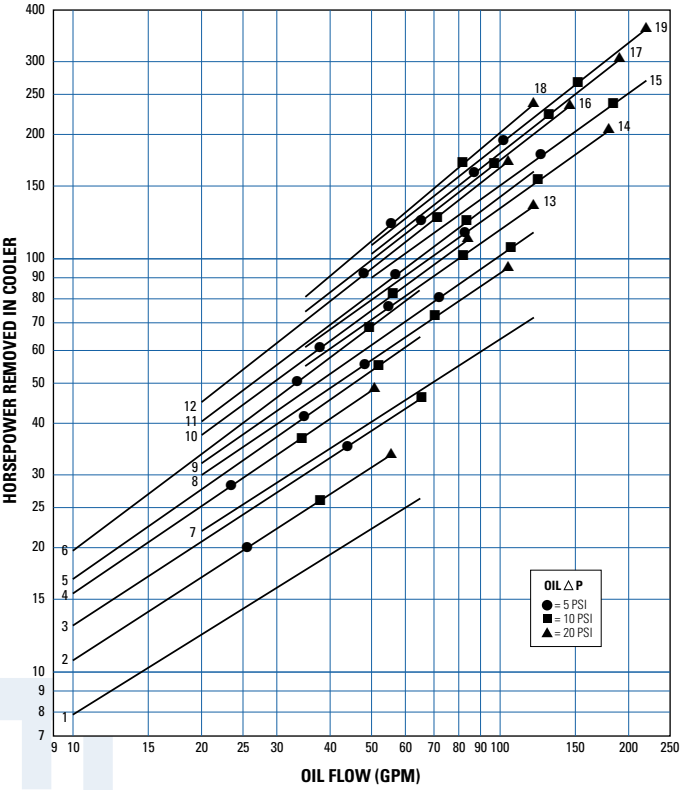
Performance Curves

2:1 Oil to Water Ratio – Medium Water Usage



Curve Number	Model	Approx. Weights (lbs) Net	Shipping
1	EC-1014-7-T	28	32
2	EC-1014-4-T	28	32
3	EC-1024-6-T	45	50
4	EC-1024-4-T	45	50
5	EC-1036-6-T	66	70
6	EC-1054-7-T	105	140
7	EC-1224-12-T	98	105
8	EC-1224-6-T	98	105
9	EC-1236-9-T	125	145
10	EC-1236-6-T	125	145
11	EC-1254-9-T	155	185
12	EC-1272-9-T	210	250
13	EC-1724-6-T	145	175
14	EC-1736-9-T	201	235
15	EC-1754-14-T	275	305
16	EC-1754-9-T	275	305
17	EC-1772-12-T	330	380
18	EC-1772-9-T	330	380
19	EC-1784-14-T	390	450

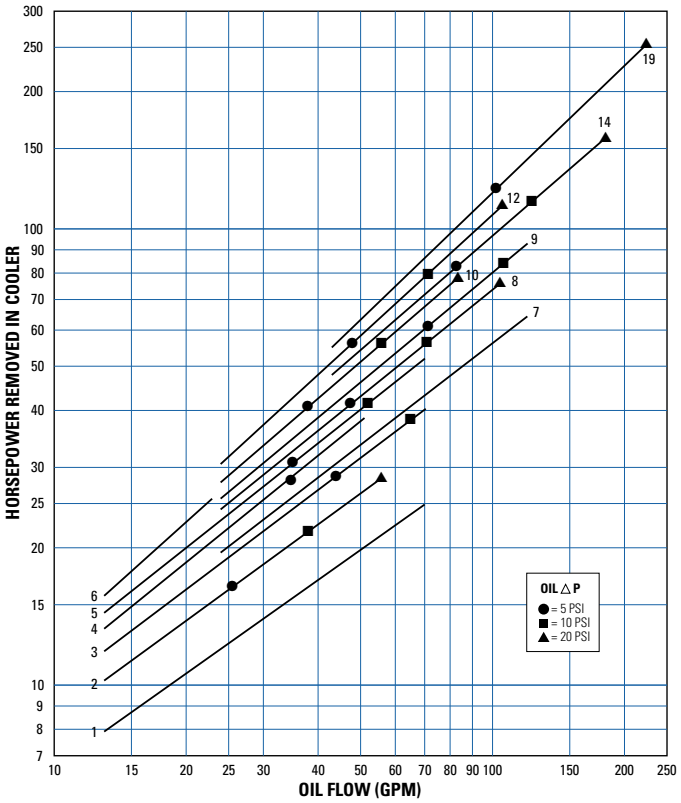
4:1 Oil to Water Ratio – Low Water Usage



Curve Number	Model	Approx. Weights (lbs) Net	Shipping
1	EC-1014-7-F	28	32
2	EC-1014-4-F	28	32
3	EC-1024-6-F	45	50
4	EC-1024-4-F	45	50
5	EC-1036-6-F	66	70
6	EC-1054-7-F	105	140
7	EC-1224-12-F	98	105
8	EC-1224-6-F	98	105
9	EC-1236-9-F	125	145
10	EC-1236-6-F	125	145
11	EC-1254-9-F	155	180
12	EC-1272-9-F	210	250
13	EC-1724-6-F	145	175
14	EC-1736-9-F	201	235
15	EC-1754-14-F	275	305
16	EC-1754-9-F	275	305
17	EC-1772-12-F	330	380
18	EC-1772-9-F	330	380
19	EC-1784-14-F	390	450

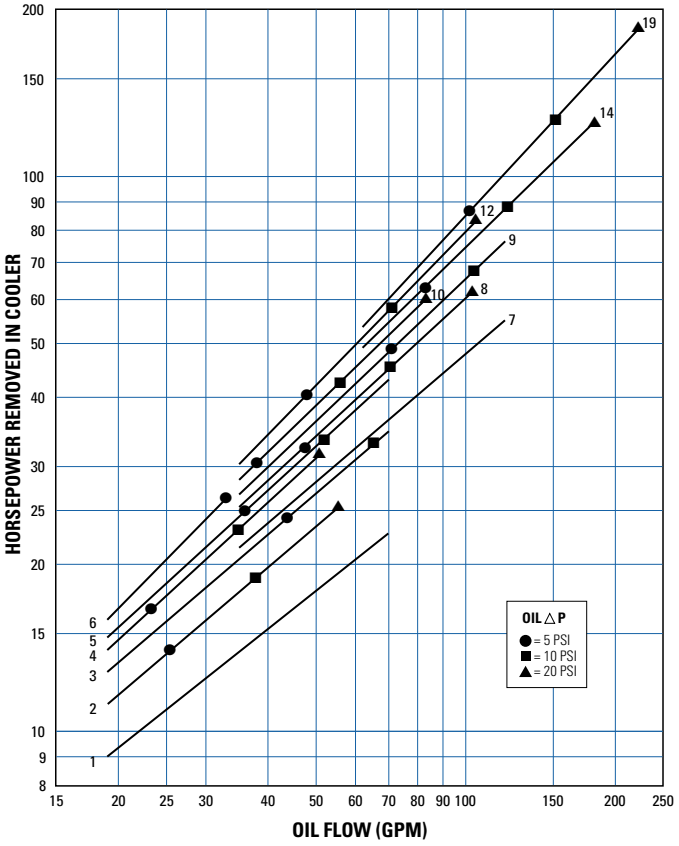
Performance Curves

7:1 Oil to Water Ratio – Lower Water Usage



Curve Number	Model	Approx. Weights (lbs) Net	Shipping
1	EC-1014-7-F	28	32
2	EC-1014-4-F	28	32
3	EC-1024-6-F	45	50
4	EC-1024-4-F	45	50
5	EC-1036-6-F	66	70
6	EC-1054-7-F	105	140
7	EC-1224-12-F	98	105
8	EC-1224-6-F	98	105
9	EC-1236-9-F	125	145
10	EC-1236-6-F	125	145
12	EC-1254-9-F	210	250
14	EC-1736-9-F	201	235
19	EC-1784-14-F	390	450

10:1 Oil to Water Ratio – Low Water Usage



Curve Number	Model	Approx. Weights (lbs) Net	Shipping
1	EC-1014-7-F	28	32
2	EC-1014-4-F	28	32
3	EC-1024-6-F	45	50
4	EC-1024-4-F	45	50
5	EC-1036-6-F	66	70
6	EC-1054-7-F	105	140
7	EC-1224-12-F	98	105
8	EC-1224-6-F	98	105
9	EC-1236-9-F	125	145
10	EC-1236-6-F	125	145
12	EC-1254-9-F	210	250
14	EC-1736-9-F	201	235
19	EC-1784-14-F	390	450

EK Series

Industrial Hydraulic Oil Coolers

Thermal Transfer Products offers a full line of standard catalog hydraulic oil coolers for all industrial machine hydraulics for system cooling.

Air to Oil Cooling

Up to +500 HP of heat removal from hydraulic oil

Round tube copper, brass or steel

Brazed aluminum plate & bar (P-BAR™)

Extruded aluminum tube (T-BAR™)

Aluminum/steel fin construction

All aluminum brazed

Water to Oil Cooling

Steel, copper, copper/nickel, or stainless steel construction

Brazed plate construction

Internal fins

Diameters up to 10 inches

Lengths up to 12 feet

Product Options

Thermal Transfer industrial hydraulic oil coolers are available with a host of options to meet the demands of your application.

Brass construction

Steel construction

Internal finned construction

Brazed plate construction

Internal bypass

Seawater service

Applications

Our hydraulic oil coolers are used worldwide in a broad range of industrial applications, including:

Hydraulic presses

Plastic injection molding

Lube oil coolers

Extrusion machinery

Gear boxes

Hydraulic power units

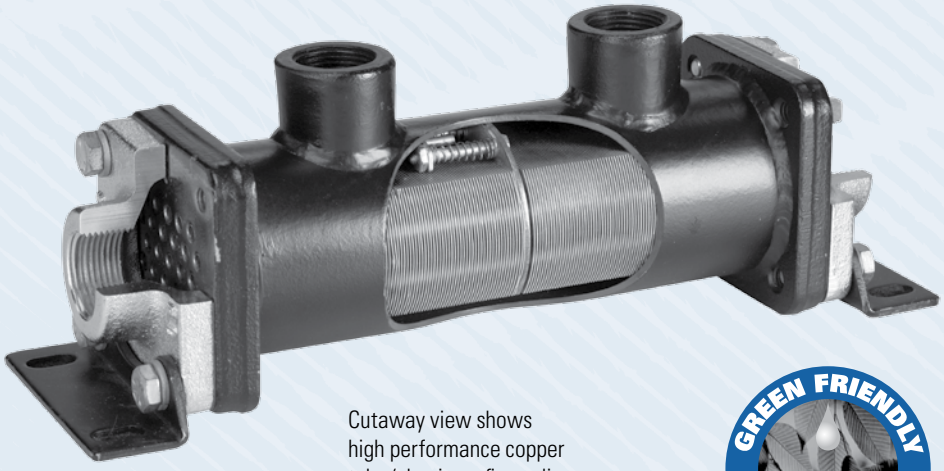
And more.

For application help and quoting, visit our **Full TTP site** or contact **ttpsales@apiheattransfer.com**.

COPPER & STEEL CONSTRUCTION

Features

- **Compact Size**
- **High Efficiency Finned Bundle Design**
- **Low Cost**
- **Optional Patented Built-in Surge-Cushion® Relief Bypass**
- **3/16" Tube Size**
- Heat Removal up to 400 Horsepower (300 kW)
- Oil Flow rates up to 80 U.S. GPM (300 Liters/min.)
- Large Oil Connections for Minimum Entering and Exiting Flow Restriction
- Removable End Bonnets for easy tube cleaning
- Mounting Brackets Designed so that Cooler can be Rotated in 90° Increments
- High Pressure Ratings
- Complete Line of Accessories Available



Cutaway view shows high performance copper tube/aluminum fin cooling chamber with patented SURGE-CUSHION® relief bypass valve.

Ratings

Maximum Pressure/Shell side 500 psi
Maximum Pressure/Tubeshell side 150 psi
Maximum Temperature 250° F

Materials

Shell Steel
Tube Sheets Steel
Baffles Steel
Mounting Brackets Steel
Gaskets Nitrile Rubber/Cellulose Fiber
Nameplate Aluminum Foil
Tubes Copper
Fins Aluminum
End Caps Grey Iron

Surge-Cushion (Option)

The SURGE-CUSHION® is a protective device (patented) designed to internally bypass a portion of the oil flow during cold start conditions, or when sudden flow surges temporarily exceed the maximum flow allowed for a given cooler. This device may replace an external bypass valve, but it is not intended to bypass the total oil flow.

Maximum Flow Rates

Unit Size	Shell Side GPM	Tube Side GPM		
		One Pass	Two Pass	Four Pass
500	20	13	6	N/A
700	60	24	12	6
1000	80	56	28	14

Incorrect installation can cause premature failure.

How to Order

[ ] – [ ][ ][ ][ ] – [ ] – [ ] – [ ] – [ ] – [ ]

Model Series
EK
EKS
EKM
EKF
EKFM

Model Size Selected

Baffle Spacing
EK-1036 & EK-1048 Models Only

Tubeside Passes
0 - One Pass
T - Two Pass
F - Four Pass

Surge Cushion
Blank - No Relief Bypass
R - Relief Bypass

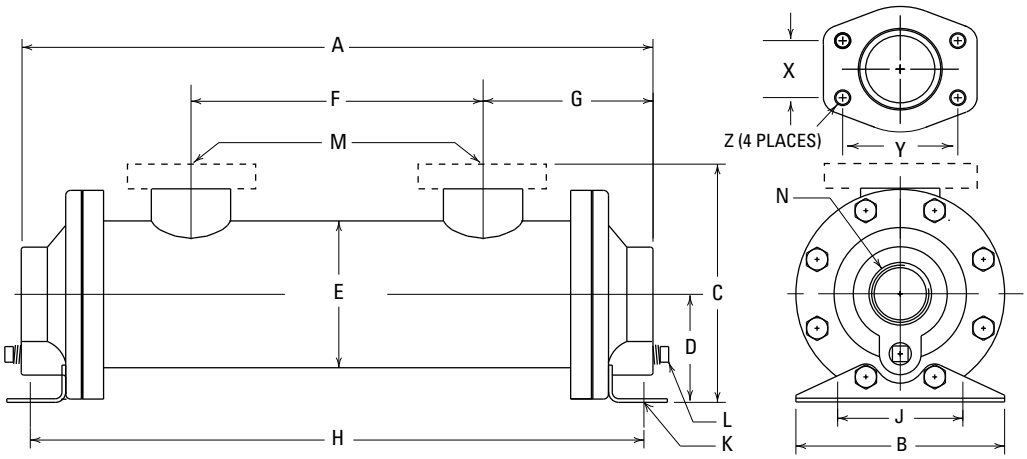
Cooling Tube Material
Blank - Copper
CN - CuNi

End Bonnet Material
Blank - Cast Iron
NP - Electroless Nickel Plate

EK = NPT Oil connections; NPT Water connections.
EKS = SAE O-Ring Oil connections; NPT Water connections.
EKM = BSPP Oil connections; BSPP Water connections.
EKF = SAE 4 Bolt Flange (Tapped SAE) Oil connections; NPT Water connections.
EKFM = SAE 4 Bolt Flange (Tapped Metric) Oil connections; BSPP Water connections.

Dimensions

One Pass



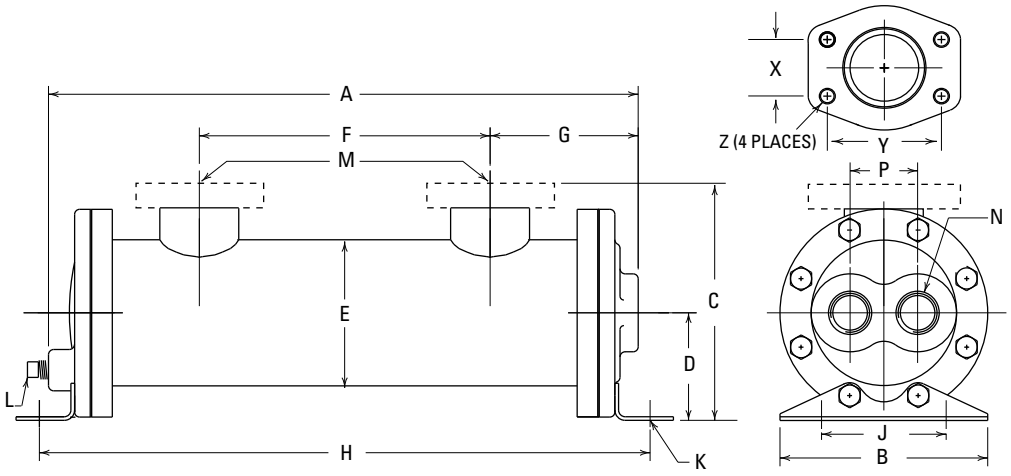
Flange Size	1-1/2	2
X	1.41	1.69
Y	2.75	3.06
EKF Z	1/2 - 13 UNC-28	
EKFM Z	M-12	

MODEL	A	B	C		D	E	F	G	H	J	K	L	M				N
			NPT / BSPP SAE O-RING	SAE FLANGE								NPT BSPP	NPT	SAE O-RING	SAE FLANGE	BSPP	NPT BSPP
EK-505	7.38	3.5 MAX. WIDTH	3.74	N/A	1.62	2.55 DIA.	2.19	2.59	7.44	2.50	.34 x .62 SLOT	N/A	1/2	#8 3/4-16 UNF-2B	N/A	1/2	3/4
EK-508	10.38		3.90				3.85	3.26	10.44				3/4	#12 $1^{1}/_{16}$-12 UN-2B		3/4	
EK-510	12.38						5.85		12.44								
EK-512	14.38						7.85		14.44								
EK-514	16.38						9.85		16.44								
EK-518	20.38						13.85		20.44								
EK-524	26.38						19.85		26.44								
EK-536	38.38						31.85		38.44								
EK-708	11.12	5.0 MAX. WIDTH	5.47	5.71	2.59	3.52 DIA.	3.00	4.07	10.71	3.00	.44 x .75 SLOT	1/4	$1^{1}/2$	#24 $1^{7}/_{8}$-12 UN-2B	$1^{1}/2$	$1^{1}/2$	$1^{1}/4$
EK-712	15.12						7.00		14.71								
EK-714	17.12						9.00		16.71								
EK-718	21.12						13.00		20.71								
EK-724	27.12						19.00		26.71								
EK-736	39.12						31.00		38.71								
EK-1012	15.33	6.5 MAX. WIDTH	7.64	8.28	4.00	5.05 DIA.	6.18	4.57	15.45	4.00	.44 x 1.00 SLOT		2		2		$1^{1}/2$
EK-1014	17.33						8.18		17.45								
EK-1018	21.33						12.18		21.45								
EK-1024	27.33						18.18		27.45								
EK-1036	39.33						30.18		39.45								
EK-1048	51.33						42.18		51.45								

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

Dimensions

Two Pass



Flange Size	1-1/2	2
X	1.41	1.69
Y	2.75	3.06
EKF Z	1/2 - 13 UNC-28	
EKFM Z	M-12	

MODEL	A	B	C		D	E	F	G	H	J	K	L	M				N	P
			NPT / BSPP SAE O-RING	SAE FLANGE								NPT BSPP	NPT	SAE O-RING	SAE FLANGE	BSPP	NPT BSPP	
EK-505	7.38	3.5 MAX. WIDTH	3.74	N/A	1.62	2.55 DIA.	2.19	2.59	7.44	2.50	.34 x .62 SLOT	N/A	1/2	#8 3/4-16 UNF-2B	N/A	1/2	3/8	1.12
EK-508	10.38		3.90				3.85	3.26	10.44				3/4	#12 1 1/16-12 UN-2B		3/4		
EK-510	12.38						5.85		12.44									
EK-512	14.38						7.85		14.44									
EK-514	16.38						9.85		16.44									
EK-518	20.38						13.85		20.44									
EK-524	26.38						19.85		26.44									
EK-536	38.38						31.85		38.44									
EK-708	10.19	5.0 MAX. WIDTH	5.47	5.71	2.59	3.52 DIA.	3.00	3.57	10.71	3.00	.44 x .75 SLOT	1/4	1 1/2	#24 1 7/8-12 UN-2B	1 1/2	1 1/2	3/4	1.62
EK-712	14.19						7.00		14.71									
EK-714	16.19						9.00		16.71									
EK-718	20.19						13.00		20.71									
EK-724	26.19						19.00		26.71									
EK-736	39.19						31.00		38.71									
EK-1012	14.58	6.5 MAX. WIDTH	7.64	8.28	4.00	5.05 DIA.	6.18	4.45	15.45	4.00	.44 x 1.00 SLOT		2		2		1.0	2.38
EK-1014	16.58						8.18		17.45									
EK-1018	20.58						12.18		21.45									
EK-1024	26.58						18.18		27.45									
EK-1036	38.58						30.18		39.45									
EK-1048	50.58						42.18		51.45									

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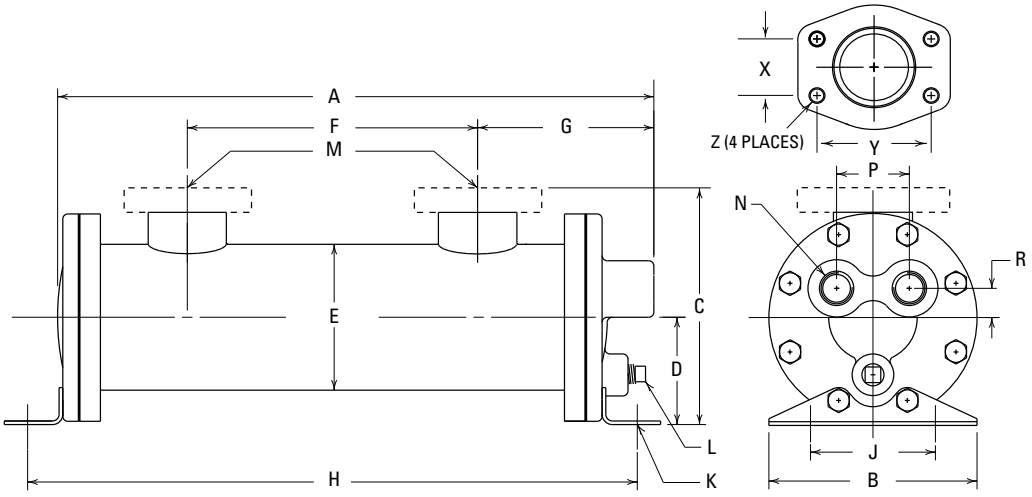
Dimensions

Four Pass



Flange Size	1-1/2	2
X	1.41	1.69
Y	2.75	3.06
EKF Z	1/2 - 13 UNC-28	
EKFM Z	M-12	

MODEL	A	B	C		D	E	F	G	H	J	K	L	M				N	P	R
			NPT / BSPP SAE O-RING	SAE FLANGE								NPT BSPP	NPT	SAE O-RING	SAE FLANGE	BSPP	NPT BSPP		
EK-708	10.37	5.0 MAX. WIDTH	5.47	5.71	2.59	3.52 DIA.	3.00	4.25	10.71	3.00	.44 x .75 SLOT	1/4	1 1/2	#24 17/8-12 UN-2B	1 1/2	1 1/2	1/2	1.75	.70
EK-712	14.37						7.00		14.71										
EK-714	16.37						9.00		16.71										
EK-718	20.37						13.00		20.71										
EK-724	26.37						19.00		26.71										
EK-736	38.37						31.00		38.71										
EK-1012	14.33	6.5 MAX. WIDTH	7.64	8.28	4.00	5.05 DIA.	6.18	4.45	15.45	4.00	.44 x 1.00 SLOT		2		2		3/4	2.50	.89
EK-1014	16.33						8.18		17.45										
EK-1018	20.33						12.18		21.45										
EK-1024	26.33						18.18		27.45										
EK-1036	38.33						30.18		39.45										
EK-1048	50.33						42.18		51.45										

NOTE: We reserve the right to make reasonable design changes without notice. All 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:
HP heat load x $\frac{40}{\text{Actual Approach}}$ x Viscosity Correction A = 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 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 △T) with this formula:

Oil △T=(BTU's/Hr.)/GPM Oil Flow x 210).

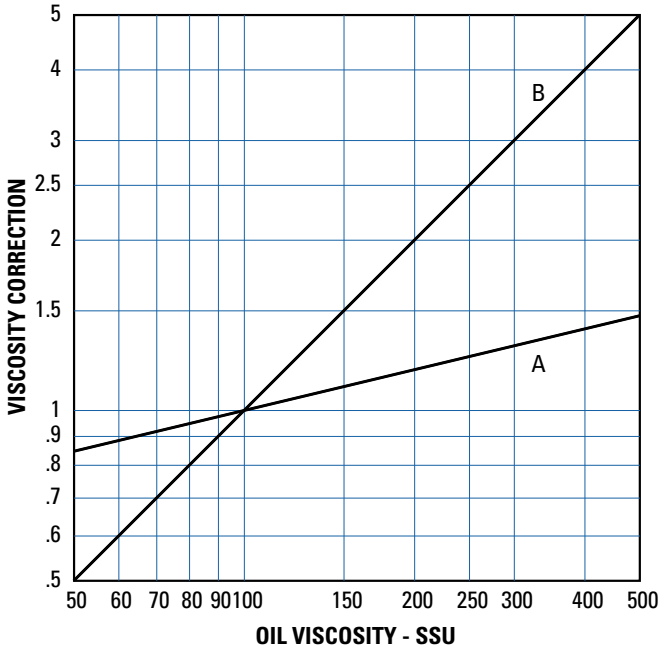
To calculate the oil leaving temperature from the cooler, use this formula:

Oil Leaving Temperature = Oil Entering Temperature - 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 VISCOSITY CORRECTION MULTIPLIERS



Recirculation Loop

Water Cooled Hydraulic Oil Coolers

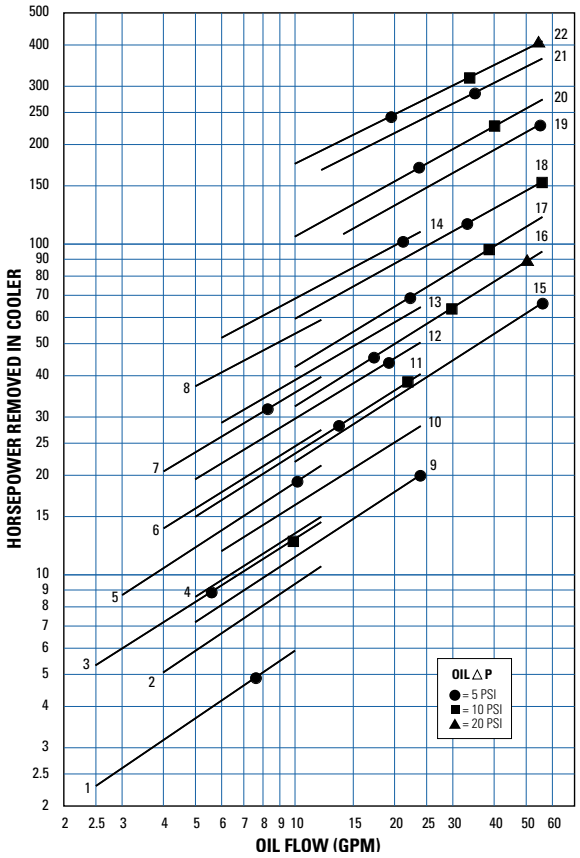
BASIS:

- 40°F Entering temperature difference (Maintain reservoir 40°F above the incoming water temperature)
- Heat removal 30% of input horsepower
- Hydraulic system flow (GPM) x 3 = Gallons; reservoir size
- 1 GPM cooler flow per HP heat to be removed
- Turn-over reservoir 3-4 times per hour
- Maximum flows

System Horsepower	HP Heat Load	Minimum Required GPM Oil Flow	Minimum Required GPM Water Flow	Heat Exchanger Model Number
3	.9	1	1	EK-505-T
5	1.5	2		
7.5	2.25			EK-512-T
10	3	3	1.5	
15	4.5	4.5	2	
20	6	6	3	
25	7.5	7.5	4	EK-712-T
30	9	9	4.5	
40	12	12	6	
50	15	15	7.5	EK-1012-T
60	18	18	9	
75	22.5	23	12	
100	30	30	15	

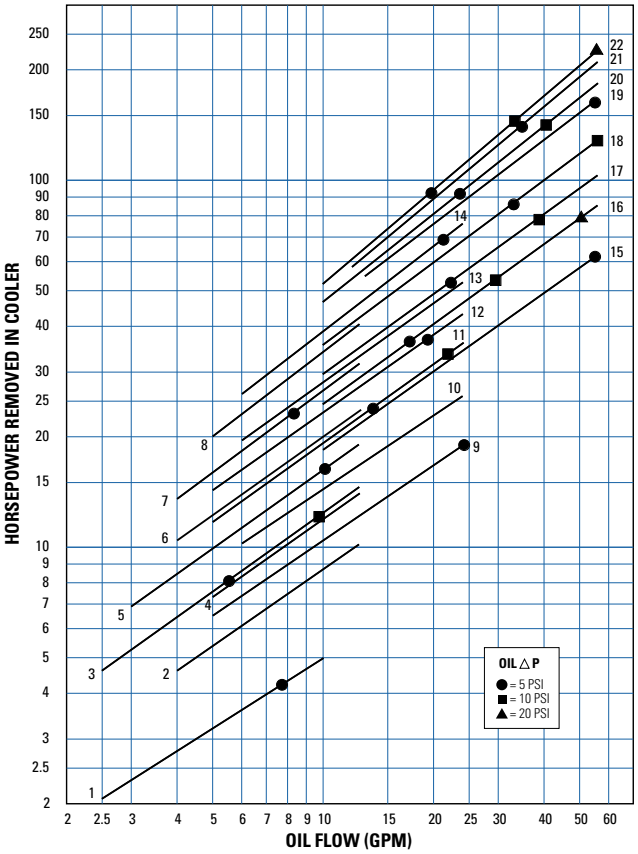
Performance Curves

1:1 Oil to Water Ratio – High Water Usage



Curve Number	Model	Approx. Weights (lbs) Net	Shipping
1	EK-505-0	6	7
2	EK-508-0	7	8
3	EK-510-0	8	9
4	EK-512-0	9	10
5	EK-514-0	10	11
6	EK-518-0	11	12
7	EK-524-0	13	14
8	EK-536-0	17	18
9	EK-708-0	15	16
10	EK-712-0	18	19
11	EK-714-0	19	20
12	EK-718-0	22	23
13	EK-724-0	26	28
14	EK-736-0	34	36
15	EK-1012-0	35	37
16	EK-1014-0	38	40
17	EK-1018-0	42	45
18	EK-1024-0	50	55
19	EK-1036-9-0	67	85
20	EK-1036-6-0	67	85
21	EK-1048-8-0	78	95
22	EK-1048-6-0	78	95

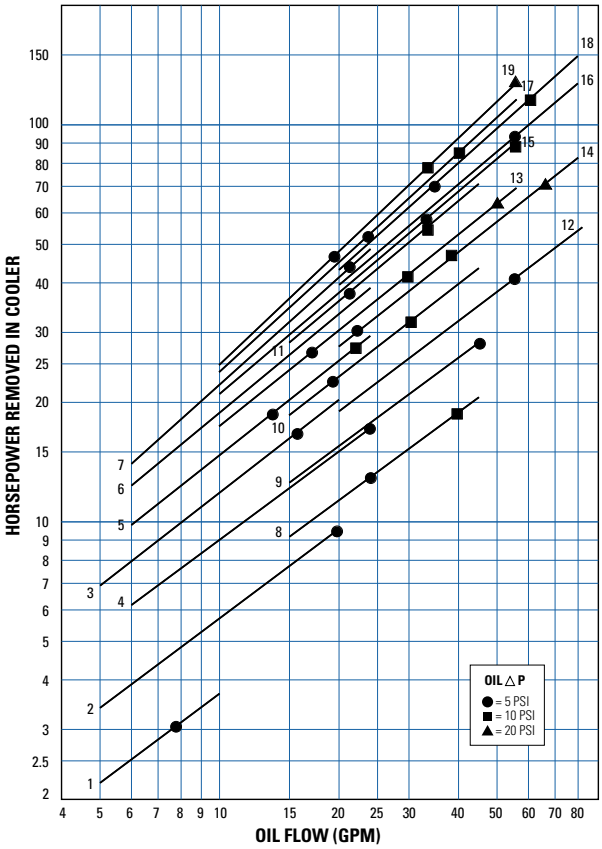
2:1 Oil to Water Ratio – Medium Water Usage



Curve Number	Model	Approx. Weights (lbs) Net	Shipping
1	EK-505-T	6	7
2	EK-508-T	7	8
3	EK-510-T	8	9
4	EK-512-T	9	10
5	EK-514-T	10	11
6	EK-518-T	11	12
7	EK-524-T	13	14
8	EK-536-T	17	18
9	EK-708-T	15	16
10	EK-712-T	18	19
11	EK-714-T	19	20
12	EK-718-T	22	23
13	EK-724-T	26	28
14	EK-736-T	34	36
15	EK-1012-T	35	37
16	EK-1014-T	38	40
17	EK-1018-T	42	45
18	EK-1024-T	50	55
19	EK-1036-9-T	67	85
20	EK-1036-6-T	67	85
21	EK-1048-8-T	78	95
22	EK-1048-6-T	78	95

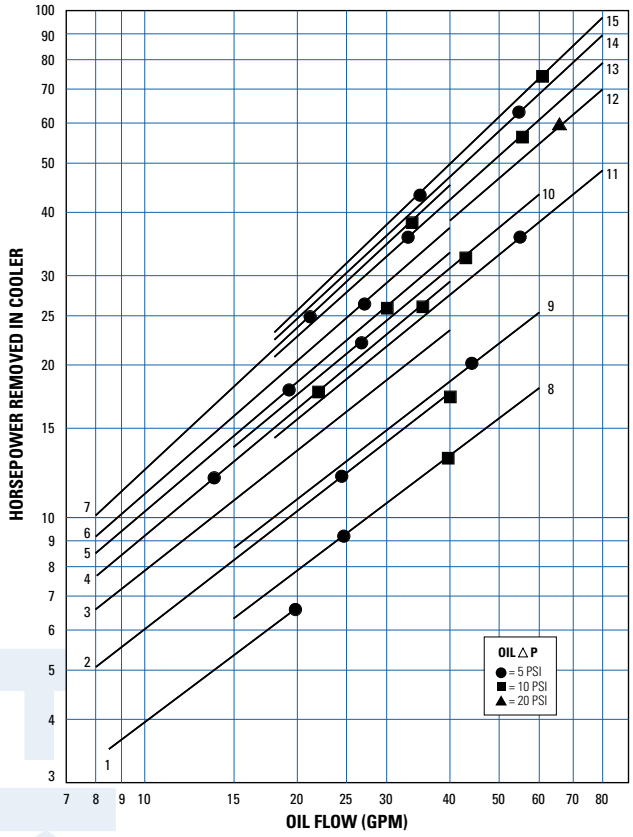
Performance Curves

4:1 Oil to Water Ratio – Low Water Usage



Curve Number	Model	Approx. Weights (lbs) Net	Shipping
1	EK-505-T	6	7
2	EK-508-T	7	8
3	EK-518-T	11	12
4	EK-708-F	15	16
5	EK-714-F	19	20
6	EK-724-F	26	28
7	EK-736-F	34	36
8	EK-708-T	15	16
9	EK-712-T	18	19
10	EK-718-T	22	23
11	EK-736-T	34	36
12	EK-1012-T	35	37
13	EK-1014-T	38	40
14	EK-1018-T	42	45
15	EK-1024-T	50	55
16	EK-1036-9-T	67	85
17	EK-1036-6-T	67	85
18	EK-1048-8-T	78	95
19	EK-1048-6-T	78	95

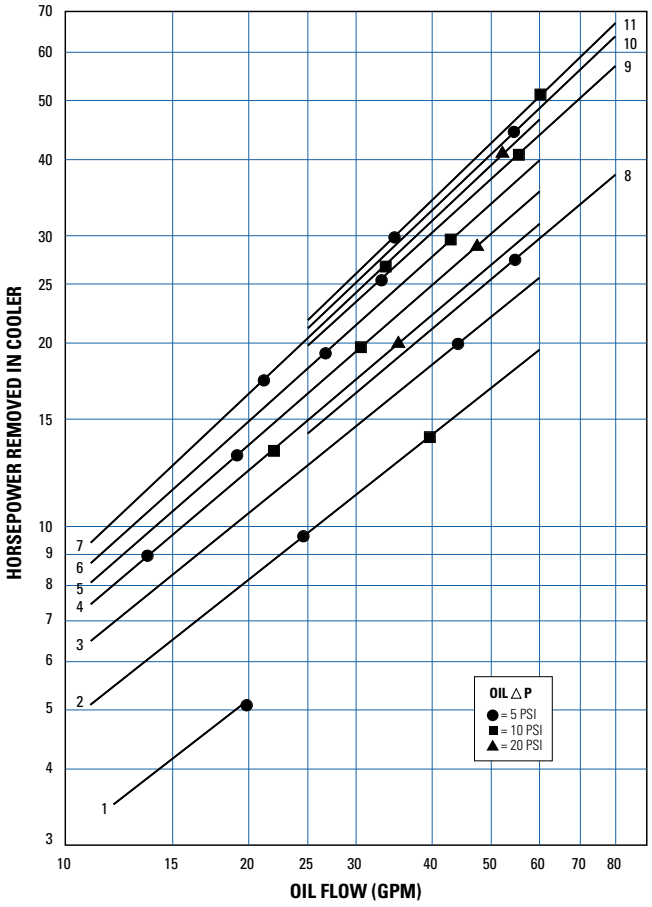
7:1 Oil to Water Ratio – Lower Water Usage



Curve Number	Model	Approx. Weights (lbs) Net	Shipping
1	EK-508-T	7	8
2	EK-708-F	15	16
3	EK-712-F	18	19
4	EK-714-F	19	20
5	EK-718-F	22	23
6	EK-124-F	26	28
7	EK-736-F	34	36
8	EK-708-T	15	16
9	EK-712-T	18	19
10	EK-724-T	26	28
11	EK-1012-T	35	37
12	EK-1018-T	42	45
13	EK-1024-T	50	55
14	EK-1036-9-T	67	85
15	EK-1048-8-T	78	95

Performance Curves

10:1 Oil to Water Ratio – Lowest Water Usage



Curve Number	Model	Approx. Weights (lbs) Net	Shipping
1	EK-508-T	7	8
2	EK-708-F	15	16
3	EK-712-F	18	19
4	EK-714-F	19	20
5	EK-718-F	22	23
6	EK-724-F	26	28
7	EK-736-F	34	36
8	EK-1012-F	35	37
9	EK-1014-F	50	55
10	EK-1036-9-F	67	85
11	EK-1048-8-F	78	95

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- Maximum flows

System Horsepower	HP Heat Load	Minimum Required GPM Oil Flow	Minimum Required GPM Water Flow	Heat Exchanger Model Number
3	.9	1	1	EK-505-T
5	1.5	2		
7.5	2.25			EK-512-T
10	3	3	1.5	
15	4.5	4.5	2	
20	6	6	3	
25	7.5	7.5	4	EK-712-T
30	9	9	4.5	
40	12	12	6	
50	15	15	7.5	EK-1012-T
60	18	18	9	
75	22.5	23	12	
100	30	30	15	

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Brazed aluminum plate & bar (P-BAR™)

Extruded aluminum tube (T-BAR™)

Aluminum/steel fin construction

All aluminum brazed

Water to Oil Cooling

Steel, copper, copper/nickel, or stainless steel construction

Brazed plate construction

Internal fins

Diameters up to 10 inches

Lengths up to 12 feet

Product Options

Thermal Transfer industrial hydraulic oil coolers are available with a host of options to meet the demands of your application.

Brass construction

Steel construction

Internal finned construction

Brazed plate construction

Internal bypass

Seawater service

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Plastic injection molding

Lube oil coolers

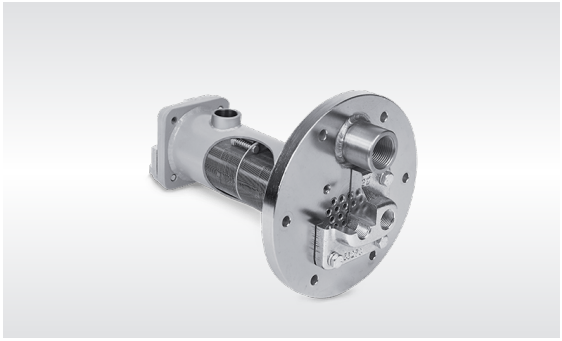
Extrusion machinery

Gear boxes

Hydraulic power units

And more.

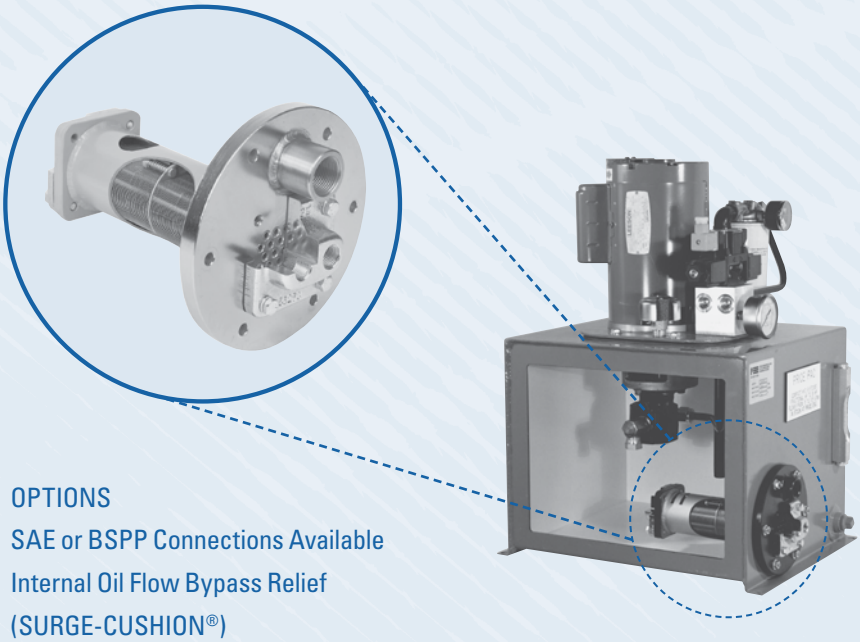
For application help and quoting, visit our Full TTP site or contact ttpsales@apiheattransfer.com.



COPPER & STEEL CONSTRUCTION

Features

- **HPU, In-tank Cooler**
- **Compact Size**
- **EK Style & Size**
- **High Efficiency Finned Bundle Design**
- **Serviceable**
- **Removable**
- In-tank Design Minimizes Space Requirements and Reduces Plumbing
- Internal Aluminum Fins Dramatically Increase Performance
- Removable End Bonnets Allow Water Passage Servicing
- High Strength Steel Shell



OPTIONS

SAE or BSPP Connections Available

Internal Oil Flow Bypass Relief (SURGE-CUSHION®)

Ratings

Operating Pressure:

Shellside 75 psi – **Tubeside** 150 psi

Test Pressure:

Shellside 75 psi – **Tubeside** 150 psi

Maximum Temperature 250° F

Materials

Shell Steel

Tubes Copper

Fins Aluminum

Tubesheets Steel

Baffles Steel

End Bonnets Cast Iron

Gaskets Nitrile Rubber/Cellulose Fiber

Surge-Cushion (Option)

The SURGE-CUSHION® is a protective device (patented) designed to internally bypass a portion of the oil flow during cold start conditions, or when sudden flow surges temporarily exceed the maximum flow allowed for a given cooler. This device may replace an external bypass valve, but it is not intended to bypass the total oil flow.

How to Order

	–		–	

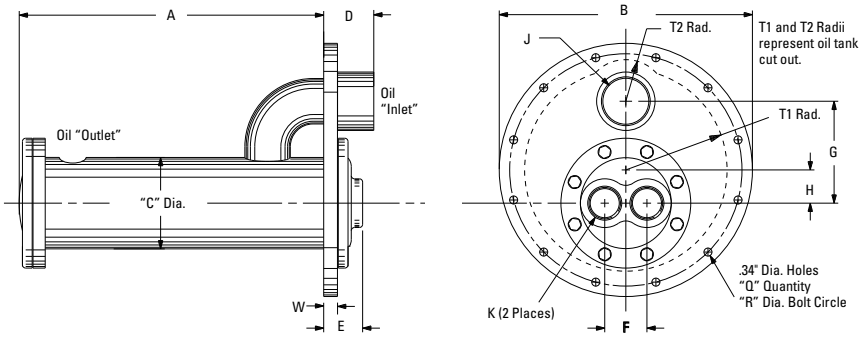
Model Series
EKT
EKTS
EKTM

Model Size Selected

SURGE-CUSHION®
Blank - No SURGE-CUSHION®
R - SURGE-CUSHION®

EKT = NPT Connections.
EKTS = SAE Oil Connections.
EKTM = All Metric Connections.

Dimensions



MODEL	A	B	C	D	E	F	G	H	J NPT or BSPF	J SAE	K NPT or BSPF	Q	R	T1	T2	W	Net. Wt.	Approx. Ship Wt.
EKT-508	8.87	6.79	2.55	1.84	1.68	1.12	2.44	.50	3/4"	#12	3/8"	6	5.60	2.25	.79	.62	11	14
EKT-518	18.87																14	16
EKT-708	8.72	9.75	3.52	2.22	1.67	1.62	3.94	1.25	1-1/2"	#24	3/4"	12	8.94	4.00	—	.70	23	27
EKT-718	18.72																30	34
EKT-1012	12.55	10.38	5.05		2.23	2.38	4.69	1.19			1"		9.62	4.38	1.12		42	46
EKT-1024	24.55																58	63

NOTE: We reserve the right to make reasonable design changes without notice. Certified drawings are available upon request. All dimensions in inches. Tank gasket is included. BSPP threads are 55° full form whitworth.

Selection Procedure

Performance Curves are based on a 40°F approach temperature, a 2:1 oil to water ratio and an average oil viscosity of 100 SSU. Example: oil leaving cooler at 125°F with 85°F cooling water (125°F - 85°F = 40°F). The 2:1 oil to water ratio means that for every GPM of oil circulated, a minimum of 1/2 GPM of water must must be circulated to obtain the curve results.

Step 1 **Corrections for approach temperature and oil viscosity.**

$$HP_{Heat\ Removed}\ in\ Cooler\ = HP_{Actual} \times \left[\frac{40°F}{Oil\ out\ and\ °F - Water\ in\ °F}\right] \times Correction\ A$$

Step 2 **Oil Pressure Drop Coding:** ● = 5 PSI; ■ = 10 PSI. Curves having no pressure drop symbol indicate that the oil pressure drop is less than 5 PSI to the highest oil flow rate for that curve. Multiply curve oil pressure drop by Correction B.

Viscosity Corrections

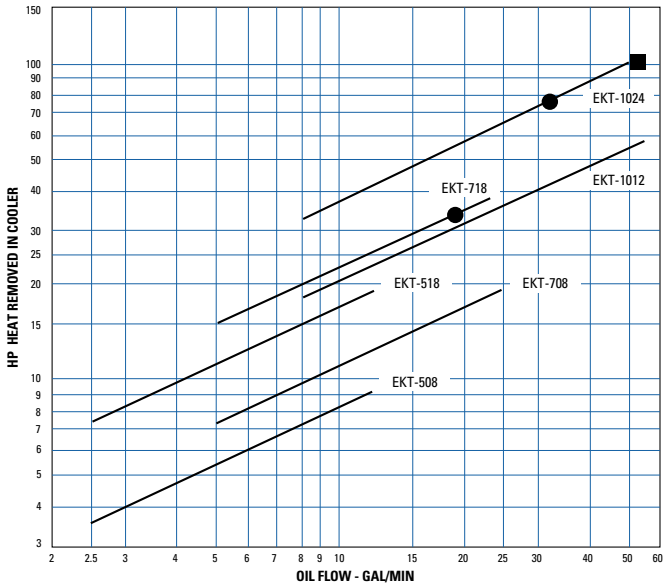
Average Oil SSU	A	B
50	0.84	0.6
100	1.0	1.0
200	1.14	2.0
300	1.24	3.1
400	1.31	4.1
500	1.37	5.1

Maximum Flow Rates

Unit Size	Shell Side GPM)	Tube Side(GPM)
500	20	6
700	60	12
1000	80	28

If maximum allowable flow rates are exceeded, premature failure may occur.

Performance Curves



AB Series - Hydraulic Cooling

Industrial Hydraulic Oil Coolers

Thermal Transfer Products offers a full line of standard catalog hydraulic oil coolers for all industrial machine hydraulics for system cooling.

Air to Oil Cooling

Up to +500 HP of heat removal from hydraulic oil

Round tube copper, brass or steel

Brazed aluminum plate & bar (P-BAR™)

Extruded aluminum tube (T-BAR™)

Aluminum/steel fin construction

All aluminum brazed

Water to Oil Cooling

Steel, copper, copper/nickel, or stainless steel construction

Brazed plate construction

Internal fins

Diameters up to 10 inches

Lengths up to 12 feet

Product Options

Thermal Transfer industrial hydraulic oil coolers are available with a host of options to meet the demands of your application.

Brass construction

Steel construction

Internal finned construction

Brazed plate construction

Internal bypass

Seawater service

Applications

Our hydraulic oil coolers are used worldwide in a broad range of industrial applications, including:

Hydraulic presses

Plastic injection molding

Lube oil coolers

Extrusion machinery

Gear boxes

Hydraulic power units

And more.

For application help and quoting, visit our Full TTP site or contact ttpsales@apiheattransfer.com.

C/UC/UCV Series

Industrial Hydraulic Oil Coolers

Thermal Transfer Products offers a full line of standard catalog hydraulic oil coolers for all industrial machine hydraulics for system cooling.

Air to Oil Cooling

Up to +500 HP of heat removal from hydraulic oil

Round tube copper, brass or steel

Brazed aluminum plate & bar (P-BAR™)

Extruded aluminum tube (T-BAR™)

Aluminum/steel fin construction

All aluminum brazed

Water to Oil Cooling

Steel, copper, copper/nickel, or stainless steel construction

Brazed plate construction

Internal fins

Diameters up to 10 inches

Lengths up to 12 feet

Product Options

Thermal Transfer industrial hydraulic oil coolers are available with a host of options to meet the demands of your application.

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Steel construction

Internal finned construction

Brazed plate construction

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Applications

Our hydraulic oil coolers are used worldwide in a broad range of industrial applications, including:

Hydraulic presses

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Extrusion machinery

Gear boxes

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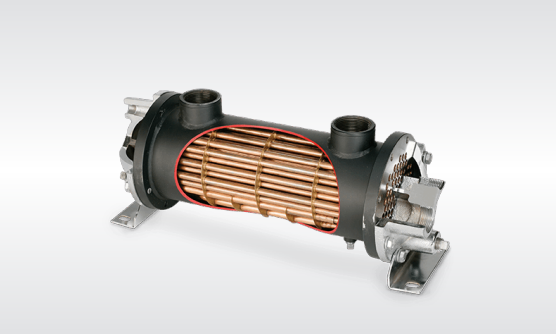
And more.

For application help and quoting, visit our Full TTP site or contact ttpsales@apiheattransfer.com.



COPPER & STEEL CONSTRUCTION

Features

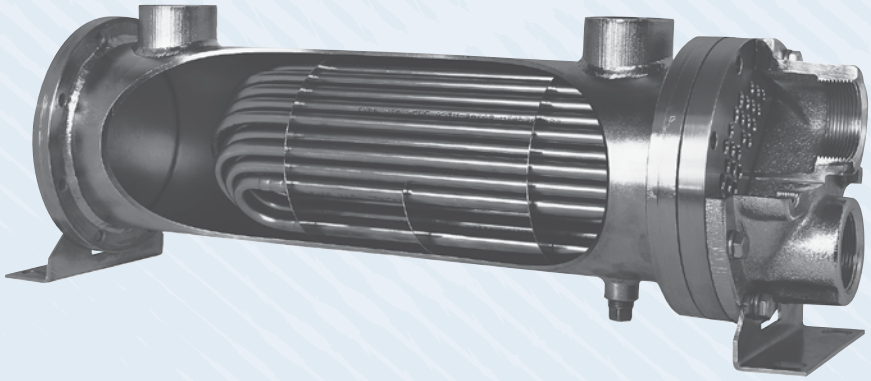
- **Steam & Large Temperature Differentials**
- **Removable Tube Bundle for Servicing**
- **Reduces Thermal Expansion Stresses**
- **3/8" Tubes**
- Built-In Expansion Chamber
- Threaded or Flanged Connections
- Mounting Brackets Included
- Steel Shell Assembly

OPTIONS

Wide Variety of Materials Available

Custom Sizes/Designs

Stainless Steel Hardware and Mounting



Ratings

UC SERIES

Maximum Shell Pressure 250 psi

Maximum Tube Side Pressure 150 psi

Maximum Temperature 400° F

UCV SERIES

Maximum Shell Pressure
600, 800, 1000 250 psi
1200, 1700 150 psi

Maximum Tube Side Pressure 150 psi

Maximum Temperature 400° F

Materials UC/UCV Series

Tubes Copper

Tube Sheets Steel

Shell Steel/316L Stainless Steel (UCV)

Shell Connections Steel

Baffles Stainless Steel

End Bonnets Cast Iron

Mounting Brackets Steel

Gaskets Non-Asbestos Fiber/Nitrile Rubber

Nameplate Aluminum Foil

Materials USSC/USSCV Series

Tubes 316L Stainless Steel

Tube Sheets 316L Stainless Steel

Shell 316L Stainless Steel

Shell Connections 316L Stainless Steel

Baffles 316L Stainless Steel

End Bonnets 316L Stainless Steel

Mounting Brackets Steel

Gaskets Non-Asbestos Fiber/Nitrile Rubber

Nameplate Aluminum Foil

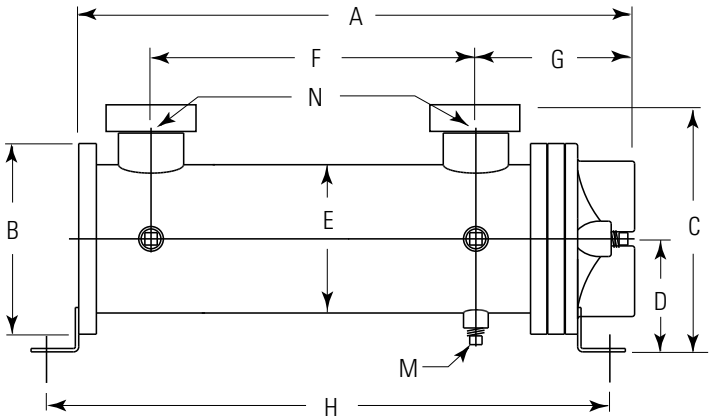
How to Order

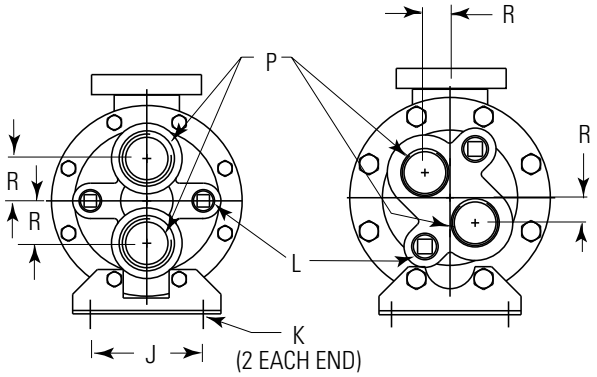
Model Series	Model Size Selected	Baffle Spacing	Tube Diameter	Tubeside Passes	Cooling Tube Material	End Bonnet Material	Tube Sheet Material	Zinc Anodes
UC/USSC **UCA/USSCA** **UCV/USSCV**				**T** - Two Pass **F** - Four Pass	**Blank** - Copper **CN** - CuNi **SS** - Stainless Steel	**Blank** - Cast Iron **B** - Bronze **SB** - Stainless Steel	**Blank** - Steel **W** - CuNi **S** - Stainless Steel	**Blank** - None **Z** - Zinc

UC/USSC = NPT Shell Connections; NPT Tube Connections
UCA/USSCA = ASME/ANSI Flange Shell Connections, NPT Tube Connections
UCV/USSCV = 1000 and Smaller: Inlet and Outlet NPT Shell Connections Rotated 180°, NPT Tube Side Connections
UCV/USSCV = 1200 and Larger: ASME/ANSI Flange Inlet and NPT Outlet Shell Connections Rotated 180°, NPT Tube Side Connections

Dimensions

UC Two Pass





All models except UC-800 & UC-1200 Series

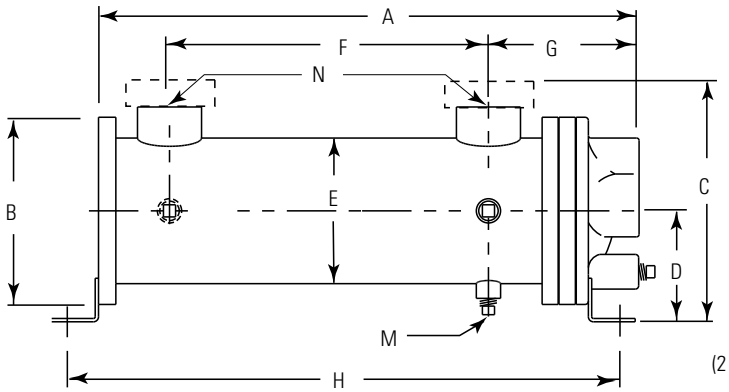
UC-800 & UC-1200 Series

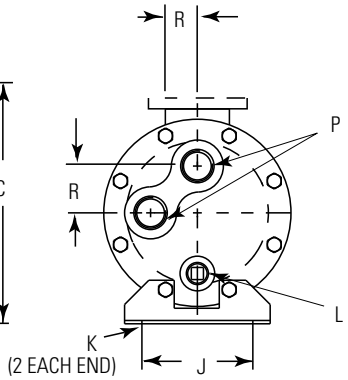
MODEL	A	B DIA	C NPT	C ASME* FLANGE	D	E DIA	F	G	H	J	K	L NPT	M NPT	N NPT	P NPT	R	FT² SURFACE AREA
612	17.22	4.50	5.38	6.75	2.75	3.25	11.25	4.03	17.66	3.25	.44 DIA	(2) .38	(3) .25	1.00	1.00	—	2.4
624	29.22						23.25		29.66							—	4.7
812	19.47	6.00	6.75	8.25	3.50	4.25	12.38	4.97	19.65	3.50	.44 DIA	(2) .38	(3) .25	1.50	1.25	0.75	4.0
824	31.47						24.38		31.65								7.9
836	43.47						36.38		43.65								11.9
1012	19.68	6.75	7.75	9.25	4.00	5.25	11.50	5.62	19.94	4.00	.50 x .75 SLOT	(2) .38	(3) .38	1.50	1.50	1.50	7.4
1024	31.68						23.50		31.94								14.5
1036	43.68						35.50		43.94								21.5
1218	26.22	7.75	8.75	10.38	4.50	6.25	17.38	5.89	26.12	5.00	.50 x .75 SLOT	(2) .50	(3) .38	2.00	2.00	1.10	15.3
1224	32.22						23.38		32.12								21.1
1236	44.22						35.38		44.12								31.3
1248	56.22						47.38		56.12								41.6
1724	34.69	10.50	11.58	13.00	5.75	8.62	23.50	7.81	34.27	7.00	.62 x .88 SLOT	(2) .50	(3) .38	3.00	2.50	2.25	47.7
1736	46.69						35.50		46.27								70.1
1748	58.69						47.50		58.27								92.5
1760	70.69						59.50		70.27								114.8

**150# ASME/ANSI Flange (Optional). NOTE: We reserve the right to make reasonable design changes without notice. Consult factory. All dimensions are inches.*

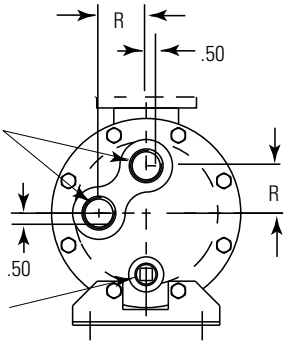
Dimensions

UC Four Pass





All models except UC-1700 Series



UC-1700 Series

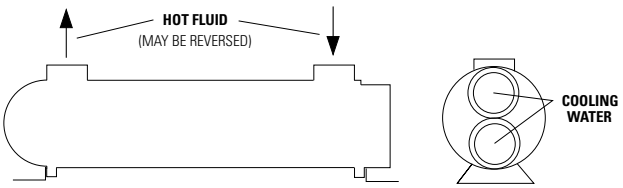
MODEL	A	B DIA	C NPT	C ASME* FLANGE	D	E DIA	F	G	H	J	K	L NPT	M NPT	N NPT	P NPT	R	FT² SURFACE AREA
612	17.20	4.50	5.38	6.75	2.75	3.25	11.25	4.01	17.66	3.25	.44 DIA	—	(3) .25	1.00	.75	1.00	2.4
624	29.20						23.25		29.66			—					4.7
812	19.47	6.00	6.75	8.25	3.50	4.25	12.00	4.97	19.65	3.50	.44 DIA	(2) .38	(3) .25	1.50	.75	1.25	4.0
824	31.47						24.00		31.65								7.9
836	43.47						36.00		43.65								11.9
1012	19.50	6.75	7.75	9.25	4.00	5.25	11.50	5.43	19.95	4.00	.50 x .75 SLOT	(2) .38	(3) .38	1.50	1.00	1.69	7.4
1024	31.50						23.50		31.95								14.5
1036	43.50						35.50		43.95								21.5
1218	26.22	7.75	8.75	10.38	4.50	6.25	17.38	5.89	26.12	5.00	.50 x .75 SLOT	(2) .38	(3) .38	2.00	1.50	2.00	15.3
1224	32.22						23.38		32.12								21.1
1236	44.22						35.38		44.12								31.3
1248	56.22						47.38		56.12								41.6
1724	34.69	10.50	11.58	13.00	5.75	8.62	23.50	7.81	34.27	7.00	.62 x .88 SLOT	(2) .38	(3) .38	3.00	2.00	2.50	47.7
1736	46.69						35.50		46.27								70.1
1748	58.69						47.50		58.27								92.5
1760	70.69						59.50		70.27								114.8

**150# ASME/ANSI Flange (Optional). NOTE: We reserve the right to make reasonable design changes without notice. Consult factory. All dimensions are inches.*

UC Applications

U-Tube Heat Exchangers allow the shell and tube bundle to expand and contract independently with temperature fluctuation. This reduces temperature dependent stresses so they are ideal in applications with large temperature differentials. Some typical examples for **UC** units include quench oil coolers, liquid to liquid heaters, and barrel oil coolers for plastic extrusion machines. The removable bundle design allows for easier cleaning of the shell side cavity when the bundle is removed.

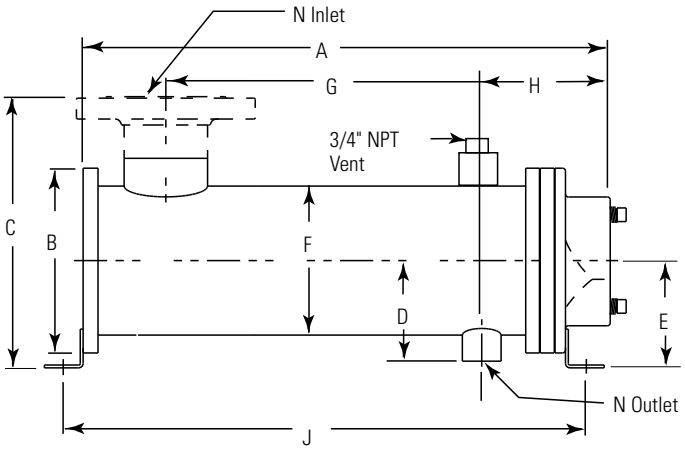
Piping Hook-up

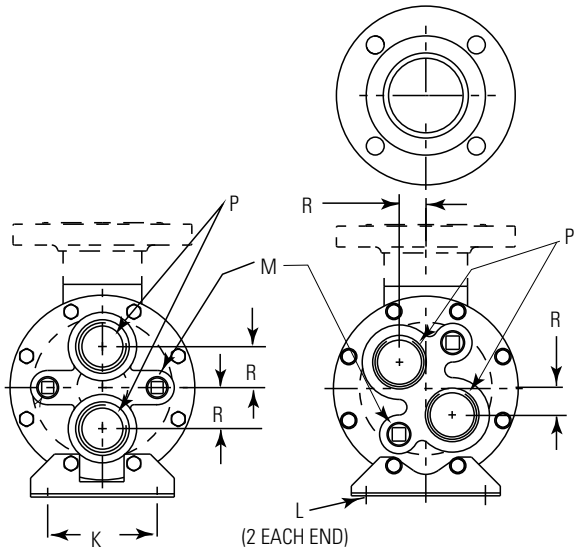


Specific applications may have different piping arrangements. Consult factory for assistance.

Dimensions

UCV Two Pass





All models except UCV-800 & UCV-1200 Series

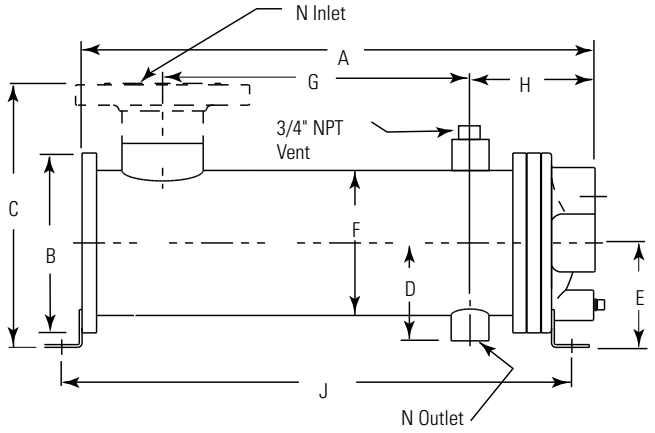
UCV-800 & UC-1200 Series

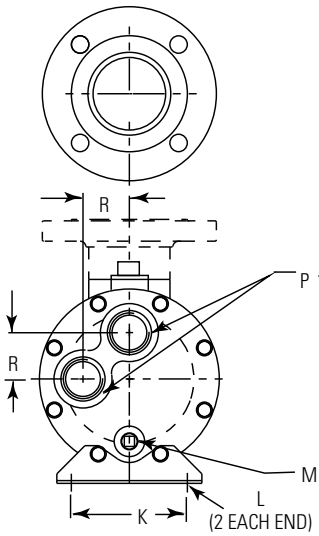
MODEL	A	B DIA	C	D	E	F DIA	G	H	J	K	L	M NPT	N INLET	N OUTLET	P NPT	R	FT^2 SURFACE AREA
612	17.22	4.50	5.25	2.62	2.75	3.25	11.00	4.00	17.66	3.25	.44 DIA	(2) .38	1.25	.75	1.00	—	2.4
624	29.22						23.00		29.66							—	4.7
812	19.47	6.00	6.75	3.15	3.50	4.25	12.00	4.60	19.65	3.50	.44 DIA	(2) .38	1.50	.75	1.25	0.75	4.0
824	31.47						24.00		31.65								7.9
836	43.47						36.00		43.65								11.9
1012	19.68	6.75	7.77	3.70	4.00	5.25	11.50	5.37	19.94	4.00	.50 x .75 SLOT	(2) .38	2.00	1.00	1.50	1.50	7.4
1024	31.68						23.50		31.94								14.5
1036	43.68						35.50		43.94								21.5
1218	26.22	7.75	11.38	4.22	4.50	6.25	17.38	5.38	26.12	5.00	.50 x .75 SLOT	(2) .50	3.00*	1.00	2.00	1.10	15.3
1224	32.22						23.38		32.12								21.1
1236	44.22						35.38		44.12								31.3
1248	56.22						47.38		56.12								41.6
1724	34.69	10.50	14.00	5.58	5.75	8.62	23.00	7.31	34.27	7.00	.62 x .88 SLOT	(2) .50	4.00*	1.50	2.50	2.25	47.7
1736	46.69						35.00		46.27								70.1
1748	58.69						47.00		58.27								92.5
1760	70.69						59.00		70.27								114.8

**150# ASME/ANSI Flange. NOTE: We reserve the right to make reasonable design changes without notice. Consult factory. All dimensions are inches.*

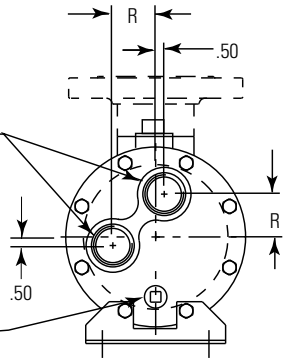
Dimensions

UCV Four Pass





All models except UCV-1700 Series



UCV-1700 Series

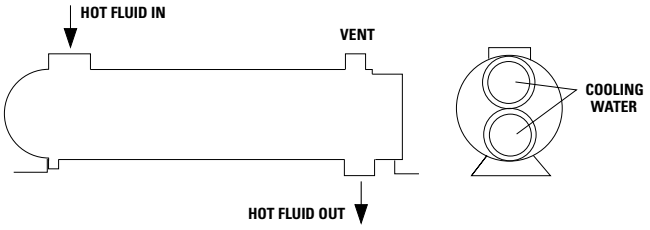
MODEL	A	B DIA	C	D	E	F DIA	G	H	J	K	L	M NPT	N INLET	N OUTLET	P NPT	R	FT² SURFACE AREA
612	17.20	4.50	5.25	2.62	2.75	3.25	11.00	3.98	17.66	3.25	.44 DIA	(2) .38	1.25	.75	.75	1.00	2.4
624	29.20						23.00		29.66								4.7
812	19.47	6.00	6.75	3.15	3.50	4.25	12.38	4.60	19.65	3.50	.44 DIA	(2) .38	1.50	.75	.75	1.25	4.0
824	31.47						24.38		31.65								7.9
836	43.47						36.38		43.65								11.9
1012	19.50	6.75	7.77	3.70	4.00	5.25	11.50	5.18	19.95	4.00	.50 x .75 SLOT	(2) .38	2.00	1.00	1.00	1.69	7.4
1024	31.50						23.50		31.95								14.5
1036	43.50						35.50		43.95								21.5
1218	26.22	7.75	10.38	4.22	4.50	6.25	17.38	5.38	26.12	5.00	.50 x .75 SLOT	(2) .38	3.00*	1.00	1.50	2.00	15.3
1224	32.22						23.38		32.12								21.1
1236	44.22						35.38		44.12								31.3
1248	56.22						47.38		56.12								41.6
1724	34.69	10.50	13.00	5.58	5.75	8.62	23.00	7.31	34.27	7.00	.62 x .88 SLOT	(2) .38	4.00*	1.50	2.00	2.50	47.7
1736	46.69						35.00		46.27								70.1
1748	58.69						47.00		58.27								92.5
1760	70.69						59.00		70.27								114.8

**150# ASME/ANSI Flange. NOTE: We reserve the right to make reasonable design changes without notice. Consult factory. All dimensions are inches.*

UCV Applications

U-Tube Heat Exchangers allow the shell and tube bundle to expand and contract independently with temperature fluctuation. This reduces temperature dependent stresses so they are ideal in applications with large temperature differentials. A typical example for **UCV** units is steam to liquid heaters. The removable bundle design allows for easier cleaning of the shell side cavity when the bundle is removed.

Piping Hook-up



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

Heat transfer performance to the highest degree.

Everything about API Heat Transfer is focused on performance. It's a part of our 130-year heritage designing and delivering world-class heat transfer products for nearly every industry. It's bolstered by our worldwide network of manufacturing facilities and more than 1,800 employees who provide sales, service, and support. And it's ingrained in a process that has served customers around the world well for nearly a century and a half. Upon working with us, you'll find it's our performance that sets us apart.
There's heat transfer. Then there's API Heat Transfer.

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