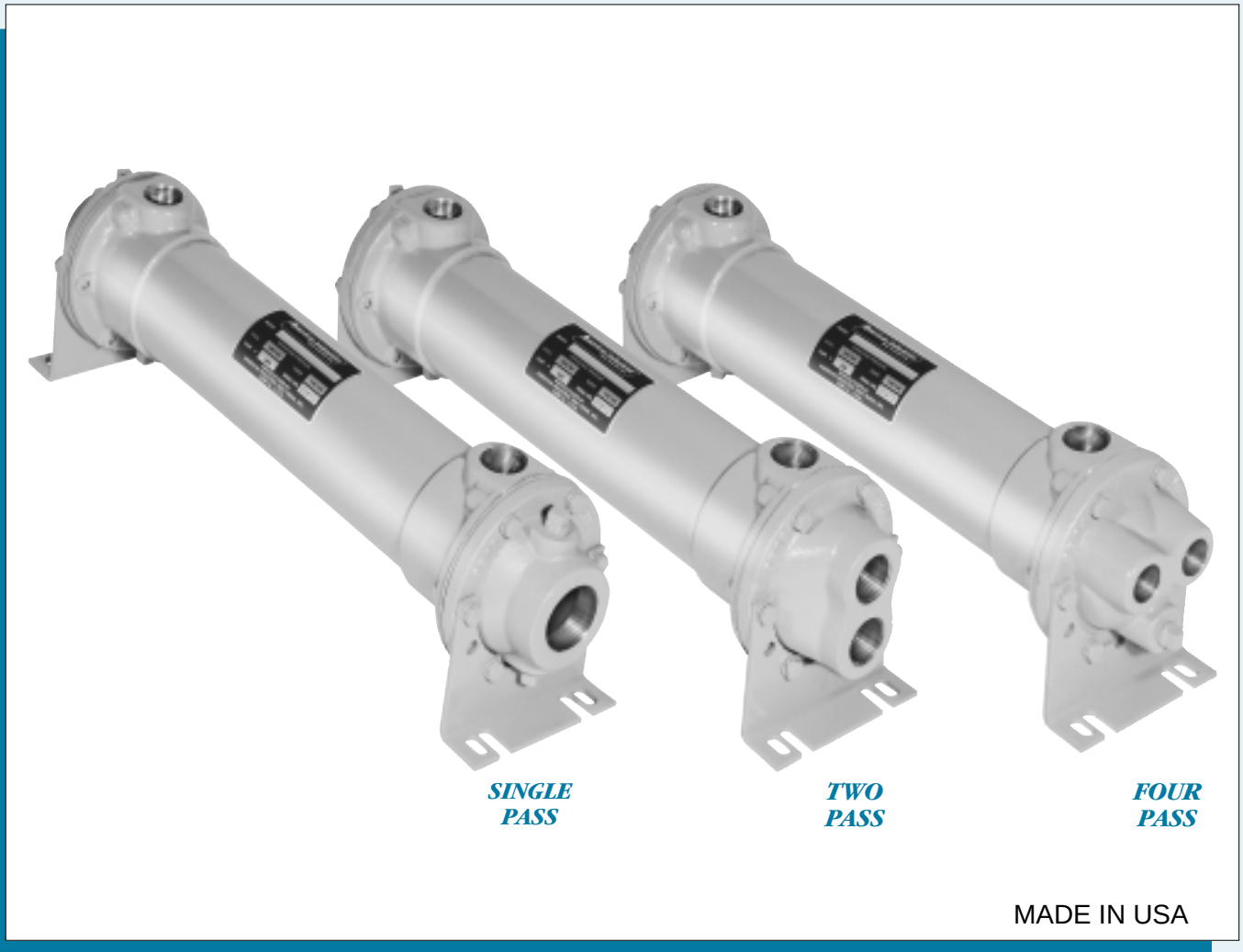
**American Industrial Heat Transfer Inc.®**

*Manufacturer of Quality Heat Exchangers*

***AB - AB2000 - SAE - STS - EAB SERIES***




***Fixed Tube Bundle / Water Cooled***

*Visit our Web Site at www.aihti.com*

# *HEAT EXCHANGERS*

- Operating pressure for tubes 150 PSI.
- Operating pressure for shell 300 PSI.
- Operating temperature 300 °F.
- Can be customized to fit your needs.
- Cools: Fluid power systems, rock crushers, presses, shears, lubrication equipment for paper machinery, gear drives, marine transmissions, etc.
- This brochure contains important user information such as: installation, serviceability, and terms & conditions.

AB,STS,SAE&EAB-2001 supersedes AB,STS,SAE&EAB-2000 and all previous printings.

# INTRODUCTION

### *AB SERIES: When non ferrous materials are required.*

Fixed tube construction heat exchangers with NPT connections are made of brass with copper tubing and cast iron end bonnets. Sizes from 2" through 10" diameters, and from 1.4 to 540 sq.ft. Standard one, two, or four pass models are available. Options include 90/10 copper nickel and 316 stainless steel tube, bronze bonnets and zinc anodes. Can be customized to fit your requirements.

Commonly used for water processing, chillers, hydraulic systems, lubrication oils, etc…

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### *STS SERIES: For applications requiring stainless steel construction.*

Fixed tube construction heat exchangers are made of 316 stainless steel. Sizes from 2" through 10" diameters, and from 1.4 to 540 sq.ft. Standard one, two or four pass models are available. Options include Viton, Teflon, EPR, Buna, and Kalrez seals. Can be customized to fit your requirements.

Commonly used for chemical processing, food processing, military systems, medical equipment, etc…

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### *SAE SERIES: When non ferrous materials are required.*

Fixed tube construction heat exchangers with SAE O-Ring or four bolt flanges, made of brass with copper tubing and cast iron end bonnets. Sizes from 2" through 10" diameters, and from 1.4 to 540 sq.ft. Standard one, two or four pass models are available. Options include 90/10 copper nickel and 316 stainless steel tube, bronze bonnets and zinc anodes. Can be customized to fit your requirements.

Commonly used in automotive plants, hydraulic power units, oil processing, etc…

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### *EAB SERIES: when severe thermal shock exists due to high differential temperature.*

Unit bellows minimizes the effects of differential expansion and contraction between the shell and the tubing, prolonging the overall life of the heat exchanger by reducing fatigue.

Fixed tube construction heat exchangers made of brass hub, steel shell, 90/10 copper nickel tubing and cast iron end bonnets. Sizes from 3.5" through 8" diameters, and from 3.6 to 220 sq.ft. Standard one, two or four pass models are available.

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### *AB-2000 SERIES: Where higher capacity flow and heat removal is required.*

Fixed tube construction heat exchangers are made of steel with copper tubing and cast iron end bonnets. 10" diameter with sizes from 194 to 540 sq.ft. Standard one, two or four pass models are available. Options include 90/10 copper nickel and 316 stainless steel tube, bronze bonnets and zinc anodes. Can be customized to fit your requirements.

Commonly used for engine jacket-water, lubrication systems, paper machinery, oil field, off shore equipment, etc…

# CONSTRUCTION FEATURES

**TUBES JOINT**
Roller expanded tube joint to integral forged hub.

**THREAD**
CNC precision threading to provide accurate leak-proof connections.

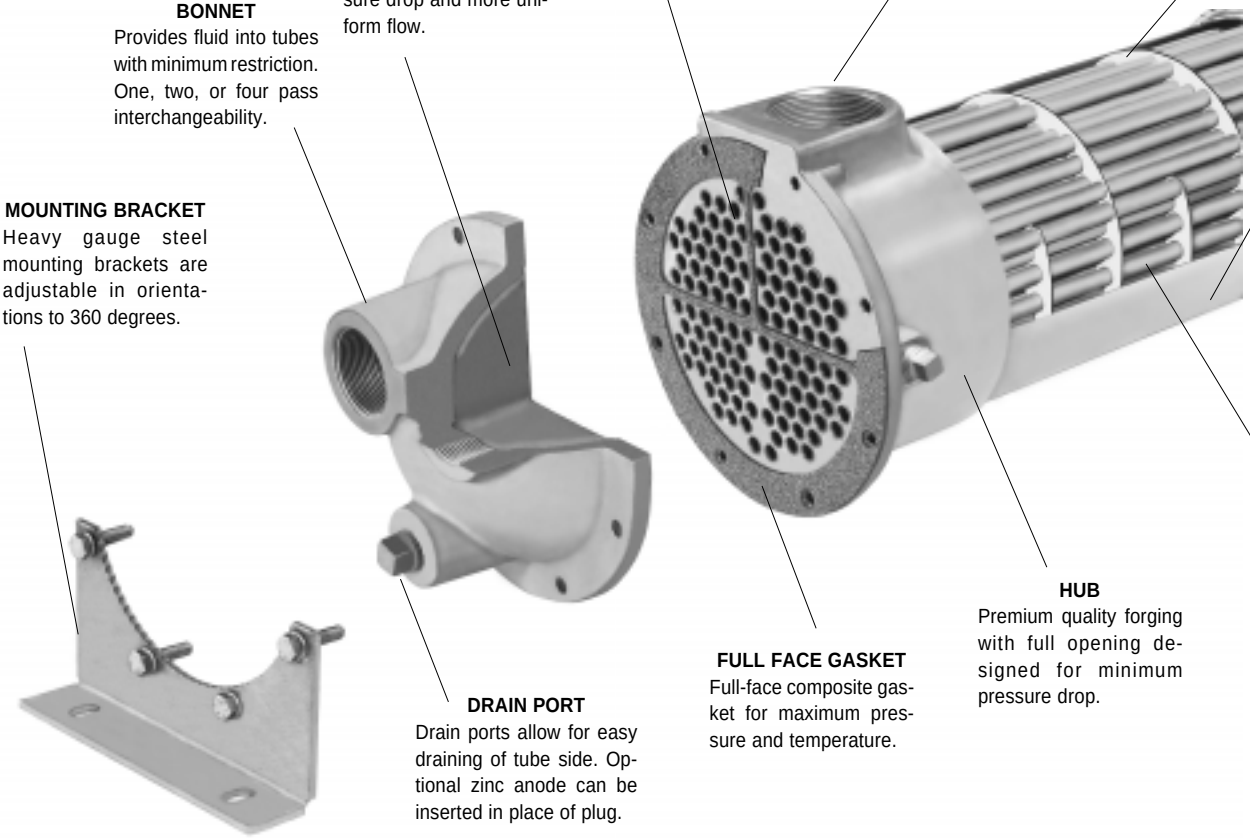
**BAFFLES**
CNC manufactured baffles to provide maximum turbulence and heat transfer with a minimum fluid pressure drop.

**FLOW CAVITY**
Generously sized to allow for minimum pressure drop and more uniform flow.

**BONNET**
Provides fluid into tubes with minimum restriction. One, two, or four pass interchangeability.

**FINISH**
Gray semigloss enamel suitable for outdoor service. Can be used as a base for additional coats.

**MOUNTING BRACKET**
Heavy gauge steel mounting brackets are adjustable in orientations to 360 degrees.



**SHELL & TUBE BUNDLE ASSEMBLY**
CNC precision manufactured parts to guarantee a close fit between the baffles, tubes, and shell. Clearances are minimized to provide for maximum heat transfer.

**HUB**
Premium quality forging with full opening designed for minimum pressure drop.

**FULL FACE GASKET**
Full-face composite gasket for maximum pressure and temperature.

**DRAIN PORT**
Drain ports allow for easy draining of tube side. Optional zinc anode can be inserted in place of plug.

## UNIT CODING

**Example Model**

Options

AB - 1204 - C 4 - TP - CNT - B - Z

- **Model**: AB, STS, SAE, EAB
- **Shell Diameter**: 400 = 2.13", 700 = 3.65", 1000 = 5.13", 1200 = 6.13", 1600 = 8.00", 2000 = 10.75"
- **Effective Tube Length** (9" increments)
- **Baffle Spacing Code**: A = 1 1/8", B = 2 1/4", C = 4 1/2", D = 9 ", E = 18 "
- **Cooling Tube Diamenter**: 4 = 1/4", 6 = 3/8", 10 = 5/8"
- **Tube Side Passes**: SP = 1 pass, TP = 2 pass, FP = 4 pass
- **Tubing**: Blank = Standard; *Options*: CNT= 90/10 Cu Ni, STS = Stainless Steel, C = Carbon Steel
- **End Bonnets**: Blank = Standard; *Options*: B = Bronze
- **Zinc Anode**

## STANDARD CONSTRUCTION MATERIALS & RATINGS

| Standard Model | AB Series | STS Series | SAE Series | EAB Series | AB-2000 Series | Standard Unit Ratings |
|---|---|---|---|---|---|---|
| Shell | Brass | 316 Stainless Steel | Brass | Steel | Steel | |
| Tubes | Copper | 316 Stainless Steel | Copper | 90/10 Copper Nickel | Copper | Operating Pressure Tubes |
| Baffle | Brass | 316 Stainless Steel | Brass | Brass | Steel | 150 psig |
| Integral End Hub | Forged Brass | 316 Stainless Steel | Forged Brass | Forged Brass | Steel | Operating Pressure Shell |
| End Bonnets | Cast Iron | 316 Stainless Steel | Cast Iron | Cast Iron | Cast Iron | 300 psig |
| Mounting Brackets | Steel | Steel | Steel | Steel | Steel | Operating Temperature |
| Gasket | Hypalon Composite | Hypalon Composite | Hypalon Composite | Phenolic Resin | Hypalon Composite | 300 ºF |
| Expansion Bellows | - | - | - | Stainless Steel | - | |

# ENGINEERING SELECTION

## STEP 1: Calculate the heat load

The heat load in BTU/HR or (Q) can be derived by using several methods. To simplify things, we will consider general specifications for hydraulic system oils and other fluids that are commonly used with shell & tube heat exchangers.

**Terms**

GPM = Gallons Per Minute
CN = Constant Number for a given fluid
ΔT = Temperature differential across the potential
PSI = Pounds per Square Inch (pressure) of the operating side of the system
MHP = Horsepower of the electric motor driving the hydraulic pump
Kw = Kilowatt (watts x 1000)
$T_{in}$ = Hot fluid entering temperature in °F
$T_{out}$ = Hot fluid exiting temperature in °F
$t_{in}$ = Cold fluid temperature entering in °F
$t_{out}$ = Cold fluid temperature exiting in °F
Q = BTU / HR

For example purposes, a hydraulic system has a 125 HP (93Kw) electric motor installed coupled to a pump that produces a flow of 80 GPM @ 2500 PSIG. The temperature differential of the oil entering the pump *vs* exiting the system is about 5.3°F. Even though our return line pressure operates below 100 psi, we must calculate the system heat load potential (Q) based upon the prime movers (pump) capability. We can use one of the following equations to accomplish this:

To derive the required heat load (Q) to be removed by the heat exchanger, apply ONE of the following. Note: The calculated heat loads may differ slightly from one formula to the next. This is due to assumptions made when estimating heat removal requirements. The factor *(v)* represents the percentage of the overall input energy to be rejected by the heat exchanger. The *(v)* factor is generally about 30% for most hydraulic systems, however it can range from 20%-70% depending upon the installed system components and heat being generated (ie. servo valves, proportional valves, etc…will increase the percentage required).

| Formula | Example |
|---|---|
| A) Q = GPM x CN x actual ΔT | A) Q =80 x 210 x 5.3°F = 89,040 BTU/HR |
| B) Q = [ (PSI x GPM) / 1714 ] x (*v*) x 2545 | B) Q =[(2500x80)/1714] x .30 x 2545 = 89,090 BTU/HR |
| C) Q = MHP x (*v*) x 2545 | C) Q =125 x .30 x 2545 = 95,347 BTU/HR |
| D) Q = Kw to be removed x 3415 | D) Q =28 x 3415 = 95,620 BTU/HR |
| E) Q = HP to be removed x 2545 | E) Q =37.5 x 2545 = 95,437 BTU/HR |

**Constant for a given fluid ( CN )**

1) Oil ..... CN = 210
2) Water ..... CN = 500
3) 50% E. Glycol ..... CN = 450

## STEP 2: Calculate the Mean Temperature Difference

When calculating the MTD you will be required to choose a liquid flow rate to derive the cold side ΔT. If your water flow is unknown you may need to assume a number based on what is available. As a normal rule of thumb, for oil to water cooling a 2:1 oil to water ratio is used. For applications of water to water or 50 % Ethylene Glycol to water, a 1:1 ratio is common.

Formula

**HOT FLUID ΔT (Oil)** $= \frac{Q}{CN \times GPM}$

**COLD FLUID Δt (Water)** $= \frac{BTU / hr}{CN \times GPM}$

Example

$\Delta T = \frac{89{,}090\ BTU/hr}{210\ CN \times 80GPM}$ (from step 1,item B) = 5.3°F = ΔT Rejected

$\Delta t = \frac{89{,}090\ BTU/hr}{500\ CN \times 40GPM}$ (for a 2:1 ratio) = 4.45°F = ΔT Absorbed

$T_{in}$ = Hot Fluid entering temperature in degrees F
$T_{out}$ = Hot Fluid exiting temperature in degrees F
$t_{in}$ = Cold Fluid entering temperature in degrees F
$t_{out}$ = Cold Fluid exiting temperature in degrees F

$T_{in}$ = 125.3 °F
$T_{out}$ = 120.0 °F
$t_{in}$ = 70.0 °F
$t_{out}$ = 74.5 °F

$\frac{T_{out} - t_{in}}{T_{in} - t_{out}} = \frac{S[\text{smaller temperature difference}]}{L\ [\text{larger temperature difference}]} = \left(\frac{S}{L}\right)$

$\frac{120.0°F - 70.0°F = 50.0°F}{125.3°F - 74.5°F = 50.8°F} = \frac{50.0°F}{50.8°F} = .984$

## STEP 3: Calculate Log Mean Temperature Difference (LMTD)

To calculate the LMTD please use the following method;

L = Larger temperature difference from step 2.
M = S/L number (LOCATED IN TABLE A).

**$LMTD_i$ = L x M**

$LMTD_i$ = 50.8 x .992 (FROM TABLE A) = 50.39

To correct the $LMTD_i$ for a multipass heat exchangers calculate **R** & **K** as follows:

Formula

$$R = \frac{T_{in} - T_{out}}{t_{out} - t_{in}}$$

$$K = \frac{t_{out} - t_{in}}{T_{in} - t_{in}}$$

Example

$R = \frac{125.3°F - 120°F}{74.5°F - 70°F} = \frac{5.3°F}{4.5°F} =$ **{1.17=R}**

$K = \frac{74.5°F - 70°F}{124.5°F - 70°F} = \frac{4.5°F}{55.4°F} =$ **{0.081=K}**

Locate the correction factor $CF_B$ (FROM TABLE B)
$LMTD_c = LMTD_i \times CF_B$
$LMTD_c$ = 50.39 x 1 = **50.39**

## STEP 4: Calculate the area required

**Required Area sq.ft.** = $\dfrac{\text{Q (BTU / HR)}}{\text{LMTD}_c \text{ x U (FROM TABLE C)}}$ $\dfrac{89{,}090}{50.39 \text{ x } 100}$ = **17.68 sq.ft.**

## STEP 5: Selection

a) From TABLE E choose the correct series size, baffle spacing, and number of passes that best fits your flow rates for both shell and tube side. Note that the tables suggest minimum and maximum information. Try to stay within the 20-80 percent range of the indicated numbers.

Example

Oil Flow Rate = 80 GPM = Series Required from Table E = **1200 Series**
Baffle Spacing from Table E = **C baffle**
Water Flow Rate = 40 GPM = Passes required in 1200 series = **4 (FP)**

b) From TABLE D choose the heat exchanger model size based upon the sq.ft. or surface area in the series size that will accommodate your flow rate.

Example

Required Area = 17.68sq.ft Closest model required based upon sq.ft. & series = **AB-1202-C4-FP**

If you require a computer generated data sheet for the application, or if the information that you are trying to apply does not match the corresponding information, please contact our engineering services department for further assistance.

### TABLE A- FACTOR M/LMTD = L x M

| S/L | M | S/L | M | S/L | M | S/L | M |
|---|---|---|---|---|---|---|---|
| | | .25 | .541 | .50 | .721 | .75 | .870 |
| .01 | .215 | .26 | .549 | .51 | .728 | .76 | .864 |
| .02 | .251 | .27 | .558 | .52 | .734 | .77 | .879 |
| .03 | .277 | .28 | .566 | .53 | .740 | .78 | .886 |
| .04 | .298 | .29 | .574 | .54 | .746 | .79 | .890 |
| .05 | .317 | .30 | .582 | .55 | .753 | .80 | .896 |
| .06 | .334 | .31 | .589 | .56 | .759 | .81 | .902 |
| .07 | .350 | .32 | .597 | .57 | .765 | .82 | .907 |
| .08 | .364 | .33 | .604 | .58 | .771 | .83 | .913 |
| .09 | .378 | .34 | .612 | .59 | .777 | .84 | .918 |
| .10 | .391 | .35 | .619 | .60 | .783 | .85 | .923 |
| .11 | .403 | .36 | .626 | .61 | .789 | .86 | .928 |
| .12 | .415 | .37 | .634 | .62 | .795 | .87 | .934 |
| .13 | .427 | .38 | .641 | .63 | .801 | .88 | .939 |
| .14 | .438 | .39 | .648 | .64 | .806 | .89 | .944 |
| .15 | .448 | .40 | .655 | .65 | .813 | .90 | .949 |
| .16 | .458 | .41 | .662 | .66 | .818 | .91 | .955 |
| .17 | .469 | .42 | .669 | .67 | .823 | .92 | .959 |
| .18 | .478 | .43 | .675 | .68 | .829 | .93 | .964 |
| .19 | .488 | .44 | .682 | .69 | .836 | .94 | .970 |
| .20 | .497 | .45 | .689 | .70 | .840 | .95 | .975 |
| .21 | .506 | .46 | .695 | .71 | .848 | .96 | .979 |
| .22 | .515 | .47 | .702 | .72 | .852 | .97 | .986 |
| .23 | .524 | .48 | .709 | .73 | .658 | .98 | .991 |
| .24 | .533 | .49 | .715 | .74 | .864 | .99 | .995 |

### TABLE B- LMTD correction factor for Multipass Exchanges

| R \ K | .05 | .1 | .15 | .2 | .25 | .3 | .35 | .4 | .45 | .5 | .6 | .7 | .8 | .9 | 1.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | .999 | .993 | .984 | .972 | .942 | .908 | .845 | .71 |
| .4 | 1 | 1 | 1 | 1 | 1 | 1 | .994 | .983 | .971 | .959 | .922 | .855 | .70 | | |
| .6 | 1 | 1 | 1 | 1 | 1 | .992 | .980 | .965 | .948 | .923 | .840 | | | | |
| .8 | 1 | 1 | 1 | 1 | .995 | .981 | .965 | .945 | .916 | .872 | | | | | |
| 1.0 | 1 | 1 | 1 | 1 | .988 | .970 | .949 | .918 | .867 | .770 | | | | | |
| 2.0 | 1 | 1 | .997 | .973 | .940 | .845 | .740 | | | | | | | | |
| 3.0 | 1 | 1 | .997 | .933 | .835 | | | | | | | | | | |
| 4.0 | 1 | .993 | .950 | .850 | | | | | | | | | | | |
| 5.0 | 1 | .982 | .917 | | | | | | | | | | | | |
| 6.0 | 1 | .968 | .855 | | | | | | | | | | | | |
| 8.0 | 1 | .930 | | | | | | | | | | | | | |
| 10.0 | .996 | .880 | | | | | | | | | | | | | |
| 12.0 | .985 | .720 | | | | | | | | | | | | | |
| 14.0 | .972 | | | | | | | | | | | | | | |
| 16.0 | .958 | | | | | | | | | | | | | | |
| 18.0 | .940 | | | | | | | | | | | | | | |
| 20.0 | .915 | | | | | | | | | | | | | | |

### TABLE D- Surface Area

| Model Number | Surface Area in Sq.ft. | | | Model Number | Surface Area in Sq.ft. | | |
|---|---|---|---|---|---|---|---|
| | 1 / 4" O.D Tubing | 3 / 8" O.D Tubing | 5 / 8 O.D Tubing | | 1 / 4" O.D Tubing | 3 / 8" O.D Tubing | 5 / 8 O.D Tubing |
| AB-401 | 1.4 | – | – | AB-1602 | 44.4 | 30.3 | 17.6 |
| AB-402 | 3.0 | – | – | AB-1603 | 66.3 | 45.3 | 26.5 |
| AB-403 | 4.6 | – | – | AB-1604 | 88.3 | 60.3 | 35.3 |
| | | | | AB-1605 | 110.3 | 75.6 | 44.1 |
| AB-701 | 3.6 | 2.6 | – | AB-1606 | 132.3 | 90.4 | 53.0 |
| AB-702 | 7.3 | 5.2 | – | AB-1607 | 154.3 | 105.4 | 61.8 |
| AB-703 | 11.1 | 7.9 | – | AB-1608 | 176.3 | 120.4 | 70.6 |
| AB-704 | 14.9 | 10.6 | – | AB-1609 | 197.9 | 135.2 | 79.5 |
| AB-705 | 18.7 | 13.3 | – | AB-1610 | 219.9 | 150.2 | 88.3 |
| | | | | AB-1611 | 241.9 | 165.2 | 97.1 |
| AB-1002 | 17.7 | 11.2 | 5.9 | AB-1612 | 263.9 | 180.2 | 105.9 |
| AB-1003 | 26.5 | 16.8 | 8.8 | AB-1613 | 285.9 | 195.2 | 114.7 |
| AB-1004 | 35.4 | 22.4 | 11.8 | | | | |
| AB-1005 | 44.3 | 28.0 | 14.7 | AB-2004 | 155.1 | 110.7 | 60.8 |
| AB-1006 | 53.2 | 33.6 | 17.6 | AB-2005 | 193.8 | 138.4 | 76.1 |
| | | | | AB-2006 | 232.6 | 166.1 | 91.3 |
| AB-1202 | 25.5 | 17.9 | 8.8 | AB-2007 | 271.4 | 193.8 | 106.5 |
| AB-1203 | 38.0 | 26.7 | 13.2 | AB-2008 | 310.2 | 221.4 | 121.7 |
| AB-1204 | 50.3 | 35.4 | 17.6 | AB-2009 | 349.0 | 249.1 | 137.0 |
| AB-1205 | 63.0 | 44.2 | 22.1 | AB-2010 | 387.7 | 276.8 | 152.2 |
| AB-1206 | 75.6 | 53.2 | 26.5 | AB-2011 | 426.5 | 304.5 | 167.4 |
| AB-1207 | 88.2 | 62.0 | 30.9 | AB-2012 | 465.3 | 332.2 | 182.7 |
| AB-1208 | 100.6 | 70.7 | 35.3 | AB-2013 | 504.1 | 359.9 | 197.9 |
| AB-1209 | 113.0 | 79.4 | 39.6 | AB-2014 | 542.9 | 387.6 | 213.2 |
| AB-1210 | 125.4 | 88.1 | 44.1 | AB-2015 | 581.7 | 415.3 | 228.4 |

### TABLE E- Flow Rate for Shell & Tube

| Shell dia . | Max. Liquid Flow - Shell Side | | | | | Liquid Flow - Tube Side | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Baffle Spacing | | | | | SP | | TP | | FP | |
| Code | A | B | C | D | E | Min. | Max. | Min. | Max. | Min. | Max. |
| 400 | 10 | 15 | 20 | — | — | 3.5 | 21 | — | — | — | — |
| 700 | 17 | 29 | 30 | 35 | — | 9 | 61 | 4.5 | 30 | 2.2 | 15 |
| 800 | 20 | 35 | 40 | — | — | 10 | 50 | 4.5 | 38 | 3 | 21 |
| 1000 | 24 | 48 | 68 | 70 | — | 20 | 120 | 10 | 70 | 5.0 | 37 |
| 1200 | 29 | 56 | 105 | 115 | 120 | 30 | 250 | 15 | 112 | 7.5 | 56 |
| 1600 | 38 | 70 | 150 | 200 | 220 | 57 | 460 | 29 | 180 | 14 | 90 |
| 2000 | – | – | 190 | 370 | 550 | 90 | 650 | 45 | 320 | 25 | 160 |

### TABLE C

| U | TUBE FLUID | SHELL FLUID |
|---|---|---|
| 400 | Water | Water |
| 350 | Water | 50% E. Glycol |
| 100 | Water | Oil |
| 300 | 50% E. Glycol | 50% E. Glycol |
| 90 | 50% E. Glycol | Oil |

## Instructions

The selection chart provided contains an array of popular sizes for quick sizing. It does not provide curves for all models available. Refer to page 4 & 5 for detailed calculation information.

Computer selection data sheets for standard or special models are available through the engineering department of American Industrial. To use the followings graphs correctly, refer to the instruction notes "1-5".

1) HP Curves are based upon a 40°F approach temperature; for example: oil leaving a cooler at 125°F, using 85°F cooling water (125°F – 85°F = 40°F ).

2) The oil to water ratio of 1:1 or 2:1 means that for every 1 gallon of oil circulated, a minimum of 1 or 1/2 gallon (respectively) of 85°F water must be circulated to match the curve results.

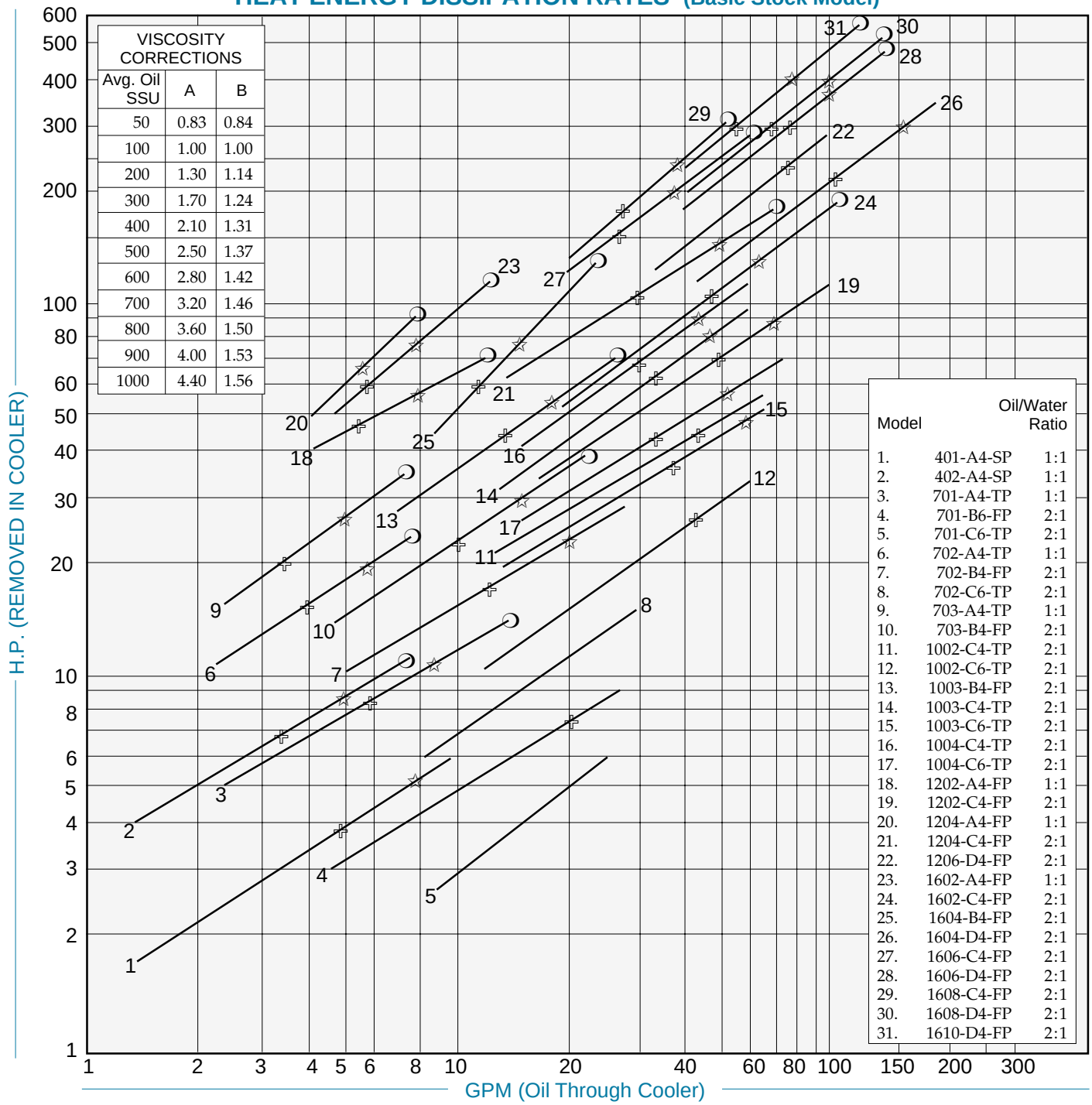
3) OIL PRESSURE DROP CODING: ✙ = 5 psi; ☆= 10 psi; ❍ = 20 psi; Δ= 50psi. Curves that have no pressure drop code symbols indicate that the oil pressure drop is less than 5 psi for the flow rate shown.

4) Pressure Drop is based upon oil with an average viscosity of 100 SSU. If the average oil viscosity is other than 100 SSU, then multiply the indicated Pressure Drop by the corresponding value from corrections table A.

5) Corrections for approach temperature and oil viscosity are as follows:

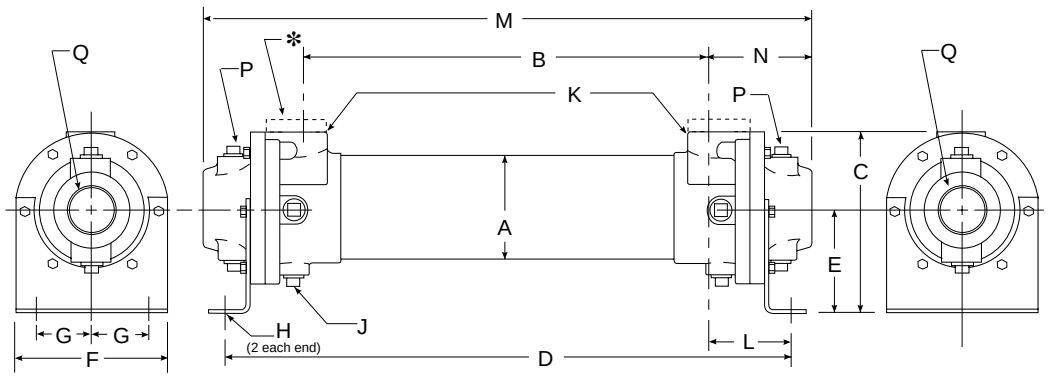
$$H.P._{(\text{Removed In Cooler})} = H.P._{(\text{Actual Heat Load})} \times \left(\frac{40}{\text{Actual Approach}}\right) \times B.$$

## HEAT ENERGY DISSIPATION RATES (Basic Stock Model)



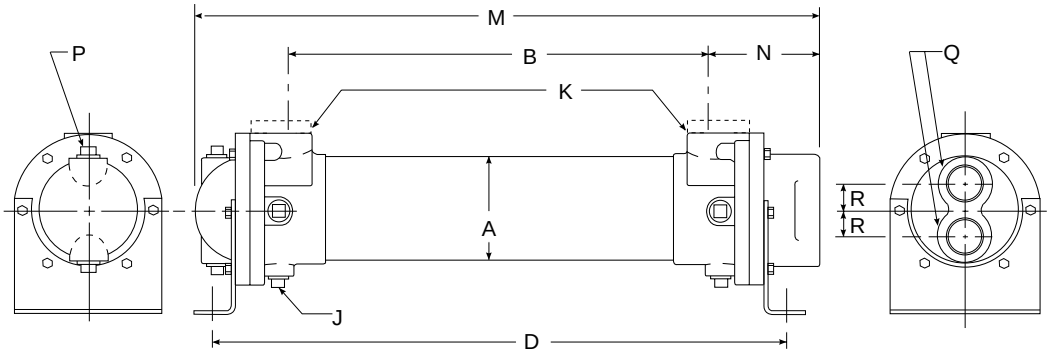

| VISCOSITY CORRECTIONS | | |
|---|---|---|
| Avg. Oil SSU | A | B |
| 50 | 0.83 | 0.84 |
| 100 | 1.00 | 1.00 |
| 200 | 1.30 | 1.14 |
| 300 | 1.70 | 1.24 |
| 400 | 2.10 | 1.31 |
| 500 | 2.50 | 1.37 |
| 600 | 2.80 | 1.42 |
| 700 | 3.20 | 1.46 |
| 800 | 3.60 | 1.50 |
| 900 | 4.00 | 1.53 |
| 1000 | 4.40 | 1.56 |

| | Model | Oil/Water Ratio |
|---|---|---|
| 1. | 401-A4-SP | 1:1 |
| 2. | 402-A4-SP | 1:1 |
| 3. | 701-A4-TP | 1:1 |
| 4. | 701-B6-FP | 2:1 |
| 5. | 701-C6-TP | 2:1 |
| 6. | 702-A4-TP | 1:1 |
| 7. | 702-B4-FP | 2:1 |
| 8. | 702-C6-TP | 2:1 |
| 9. | 703-A4-TP | 1:1 |
| 10. | 703-B4-FP | 2:1 |
| 11. | 1002-C4-TP | 2:1 |
| 12. | 1002-C6-TP | 2:1 |
| 13. | 1003-B4-FP | 2:1 |
| 14. | 1003-C4-TP | 2:1 |
| 15. | 1003-C6-TP | 2:1 |
| 16. | 1004-C4-TP | 2:1 |
| 17. | 1004-C6-TP | 2:1 |
| 18. | 1202-A4-FP | 1:1 |
| 19. | 1202-C4-FP | 2:1 |
| 20. | 1204-A4-FP | 1:1 |
| 21. | 1204-C4-FP | 2:1 |
| 22. | 1206-D4-FP | 2:1 |
| 23. | 1602-A4-FP | 1:1 |
| 24. | 1602-C4-FP | 2:1 |
| 25. | 1604-B4-FP | 2:1 |
| 26. | 1604-D4-FP | 2:1 |
| 27. | 1606-C4-FP | 2:1 |
| 28. | 1606-D4-FP | 2:1 |
| 29. | 1608-C4-FP | 2:1 |
| 30. | 1608-D4-FP | 2:1 |
| 31. | 1610-D4-FP | 2:1 |



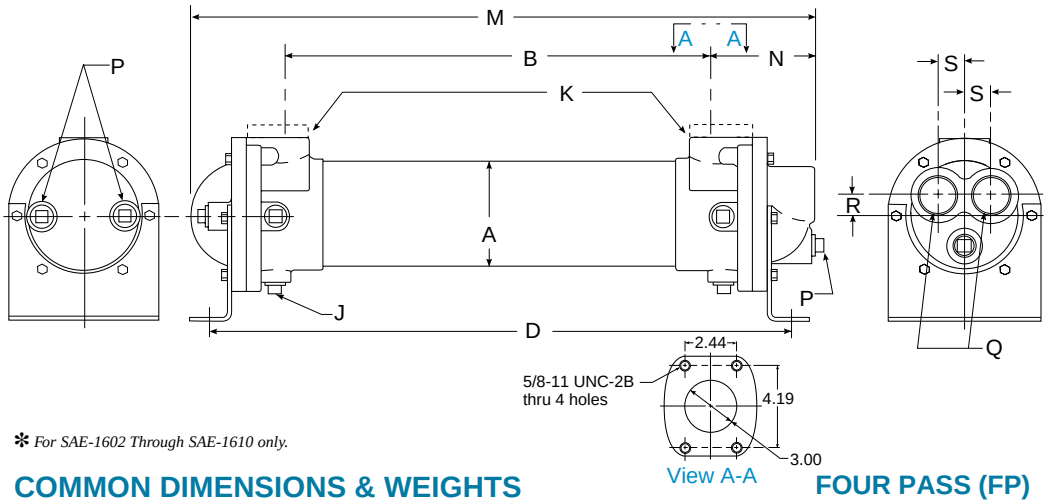

SINGLE PASS (SP)

| Model | M | N | P NPT | Q NPT |
|---|---|---|---|---|
| 401 | 11.24 | 1.81 | - | 1.00 |
| 402 | 20.24 | | | |
| 701 | 13.47 | 3.24 | (4) .38 | 1.50 |
| 702 | 22.47 | | | |
| 703 | 31.47 | | | |
| 704 | 40.47 | | | |
| 1002 | 23.60 | 4.05 | (4) .38 | 2.00 |
| 1003 | 32.60 | | | |
| 1004 | 41.60 | | | |
| 1202 | 24.38 | 4.88 | (4) .50 | 3.00 |
| 1203 | 33.25 | | | |
| 1204 | 42.12 | | | |
| 1205 | 51.12 | | | |
| 1206 | 60.25 | | | |
| 1207 | 69.25 | | | |
| 1208 | 78.12 | | | |
| 1209 | 87.12 | | | |
| 1210 | 96.12 | | | |
| 1602 | 26.62 | 6.52 | (4) .50 | 4.00 |
| 1603 | 35.62 | | | |
| 1604 | 44.62 | | | |
| 1605 | 53.62 | | | |
| 1606 | 62.62 | | | |
| 1607 | 71.62 | | | |
| 1608 | 80.62 | | | |
| 1609 | 89.62 | | | |
| 1610 | 98.62 | | | |




TWO PASS (TP)

| Model | M | N | P NPT | Q NPT | R |
|---|---|---|---|---|---|
| 701 | 13.28 | 3.30 | (2) .38 | 1.00 | .88 |
| 702 | 22.28 | | | | |
| 703 | 31.28 | | | | |
| 704 | 40.28 | | | | |
| 1002 | 23.29 | 3.80 | (2) .38 | 1.50 | 1.19 |
| 1003 | 32.29 | | | | |
| 1004 | 41.29 | | | | |
| 1202 | 23.94 | 4.56 | (2) .50 | 2.00 | 1.44 |
| 1203 | 32.81 | | | | |
| 1204 | 41.69 | | | | |
| 1205 | 50.69 | | | | |
| 1206 | 59.81 | | | | |
| 1207 | 68.81 | | | | |
| 1208 | 77.69 | | | | |
| 1209 | 86.69 | | | | |
| 1210 | 95.69 | | | | |
| 1602 | 25.10 | 6.08 | (2) .50 | 2.50 | 1.88 |
| 1603 | 34.10 | | | | |
| 1604 | 43.10 | | | | |
| 1605 | 52.10 | | | | |
| 1606 | 61.10 | | | | |
| 1607 | 70.10 | | | | |
| 1608 | 79.10 | | | | |
| 1609 | 88.10 | | | | |
| 1610 | 97.10 | | | | |




FOUR PASS (FP)

| Model | M | N | P NPT | Q NPT | R | S |
|---|---|---|---|---|---|---|
| 701 | 13.42 | 3.24 | (3) .38 | .75 | .62 | .88 |
| 702 | 22.42 | | | | | |
| 703 | 31.42 | | | | | |
| 704 | 40.42 | | | | | |
| 1002 | 23.55 | 4.06 | (3) .38 | 1.00 | .75 | 1.19 |
| 1003 | 32.55 | | | | | |
| 1004 | 41.55 | | | | | |
| 1202 | 24.44 | 4.90 | (2) .38 (1) .50 | 1.50 | 1.06 | 1.44 |
| 1203 | 33.31 | | | | | |
| 1204 | 42.19 | | | | | |
| 1205 | 51.19 | | | | | |
| 1206 | 60.31 | | | | | |
| 1207 | 69.31 | | | | | |
| 1208 | 78.19 | | | | | |
| 1209 | 87.19 | | | | | |
| 1210 | 96.19 | | | | | |
| 1602 | 26.72 | 6.48 | (3) .50 | 2.00 | 1.38 | 1.88 |
| 1603 | 35.72 | | | | | |
| 1604 | 44.72 | | | | | |
| 1605 | 53.72 | | | | | |
| 1606 | 62.72 | | | | | |
| 1607 | 71.72 | | | | | |
| 1608 | 80.72 | | | | | |
| 1609 | 89.72 | | | | | |
| 1610 | 98.72 | | | | | |

✻ *For SAE-1602 Through SAE-1610 only.*

## COMMON DIMENSIONS & WEIGHTS

| Model | A | B | C | D | E | F | G | H | J NPT | K NPT | K SAE | L | Weight Net | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 401 | 2.125 | 7.62 | 3.50 | 10.91 | 1.94 | 2.62 | .88 | .41 ϕ | - | .50 | #8 | 1.72 | 7 | 401 |
| 402 | | 16.62 | | 20.91 | | | | | | | 3/4-16 | | 10 | 402 |
| 701 | 3.656 | 7.00 | 6.25 | 12.38 | 3.62 | 5.25 | 1.50 | .44ϕ x 1.00 | (2) .38 | 1.00 | #16 | 2.69 | 21 | 701 |
| 702 | | 16.00 | | 21.38 | | | | | | | 1 5/16-12 | | 26 | 702 |
| 703 | | 25.00 | | 30.38 | | | | | | | | | 31 | 703 |
| 704 | | 34.00 | | 39.38 | | | | | | | | | 36 | 704 |
| 1002 | 5.125 | 15.50 | 7.38 | 21.62 | 4.00 | 6.75 | 2.00 | .44ϕ x 1.00 | (6) .38 | 1.50 | #24 | 3.06 | 49 | 1002 |
| 1003 | | 24.50 | | 30.62 | | | | | | | 1 7/8-12 | | 65 | 1003 |
| 1004 | | 33.50 | | 39.62 | | | | | | | | | 72 | 1004 |
| 1202 | 6.125 | 14.62 | 8.81 | 21.50 | 4.75 | 7.50 | 2.50 | .44ϕ x 1.00 | (6) .38 | 2.00 | #32 | 3.44 | 72 | 1202 |
| 1203 | | 23.50 | | 30.38 | | | | | | | 2 1/2-12 | | 85 | 1203 |
| 1204 | | 32.38 | | 39.25 | | | | | | | | | 100 | 1204 |
| 1205 | | 41.38 | | 48.25 | | | | | | | | | 118 | 1205 |
| 1206 | | 50.50 | | 57.38 | | | | | | | | | 136 | 1206 |
| 1207 | | 59.50 | | 66.38 | | | | | | | | | 154 | 1207 |
| 1208 | | 68.38 | | 75.25 | | | | | | | | | 172 | 1208 |
| 1209 | | 77.38 | | 84.25 | | | | | | | | | 190 | 1209 |
| 1210 | | 86.38 | | 93.25 | | | | | | | | | 208 | 1210 |
| 1602 | 8.00 | 13.60 | 12.13 | 22.38 | 6.50 | 10.00 | 3.50 | .44ϕ x 1.00 | (6) .38 | 3.00 | 3.0" Four bolt Flange | 4.39 | 135 | 1602 |
| 1603 | | 22.60 | | 31.38 | | | | | | | | | 162 | 1603 |
| 1604 | | 31.60 | | 40.38 | | | | | | | | | 190 | 1604 |
| 1605 | | 40.60 | | 49.38 | | | | | | | | | 218 | 1605 |
| 1606 | | 49.60 | | 58.38 | | | | | | | | | 245 | 1606 |
| 1607 | | 58.60 | | 67.38 | | | | | | | | | 273 | 1607 |
| 1608 | | 67.60 | | 76.38 | | | | | | | | | 301 | 1608 |
| 1609 | | 76.60 | | 85.38 | | | | | | | | | 329 | 1609 |
| 1610 | | 85.60 | | 94.38 | | | | | | | | | 356 | 1610 |

*NOTES: We reserve the right to make reasonable design changes without notice.*

## Instructions

The selection chart provided contains an array of popular sizes for quick sizing. It does not provide curves for all models available. Refer to page 4 & 5 for detailed calculation information.

Computer selection data sheets for standard or special models are available through the engineering department of American Industrial. To use the followings graphs correctly, refer to the instruction notes "1-5".

1) HP Curves are based upon a 40°F approach temperature; for example: oil leaving a cooler at 125°F, using 85°F cooling water (125°F – 85°F = 40°F ).

2) The oil to water ratio of 1:1 or 2:1 means that for every 1 gallon of oil circulated, a minimum of 1 or 1/2 gallon (respectively) of 85°F water must be circulated to match the curve results.

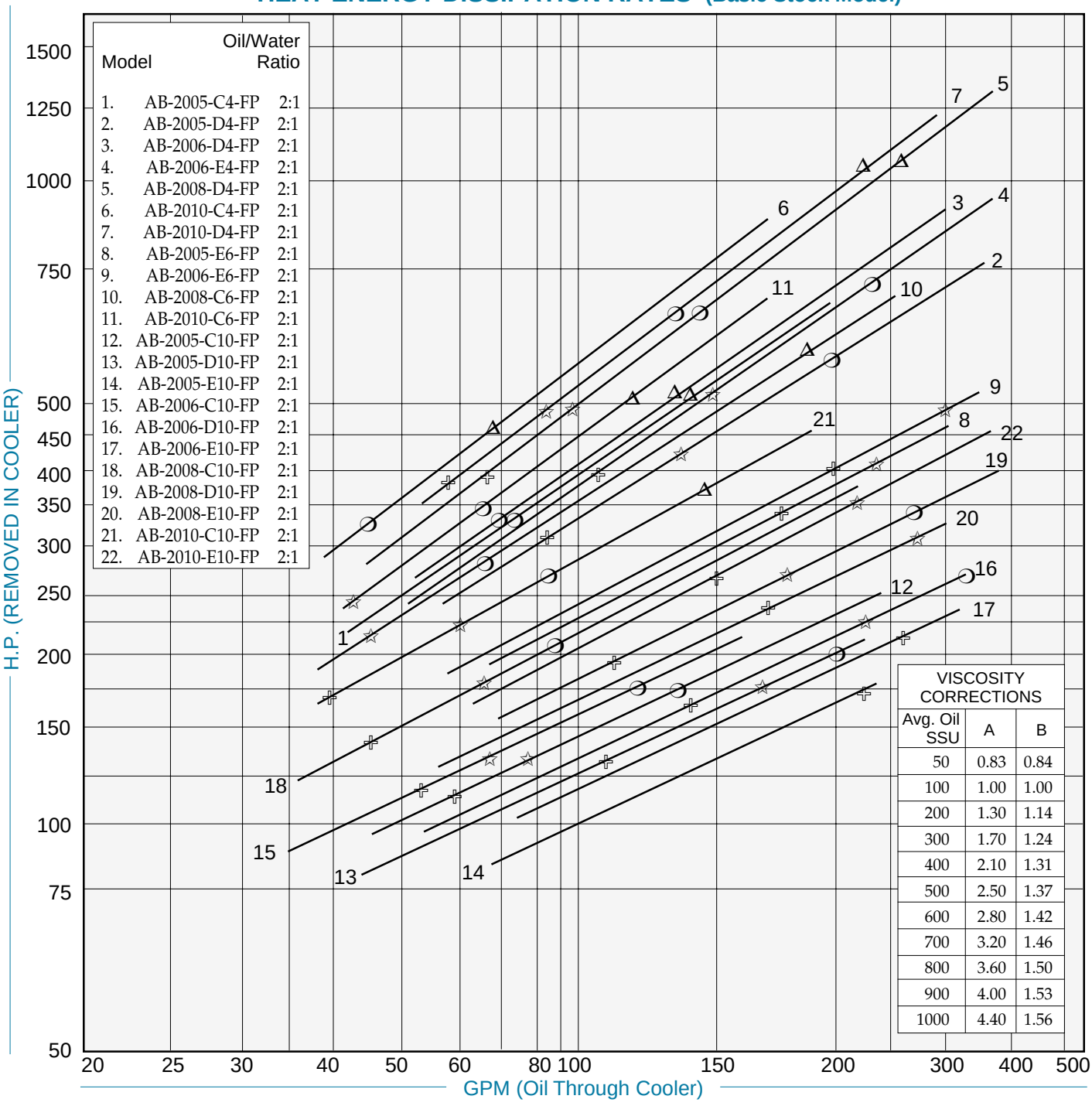
3) OIL PRESSURE DROP CODING: ✙ = 5 psi; ☆= 10 psi; ❍ = 20 psi; Δ= 50psi. Curves that have no pressure drop code symbols indicate that the oil pressure drop is less than 5 psi for the flow rate shown.

4) Pressure Drop is based upon oil with an average viscosity of 100 SSU. If the average oil viscosity is other than 100 SSU, then multiply the indicated Pressure Drop by the corresponding value from corrections table A.

5) Corrections for approach temperature and oil viscosity are as follows:

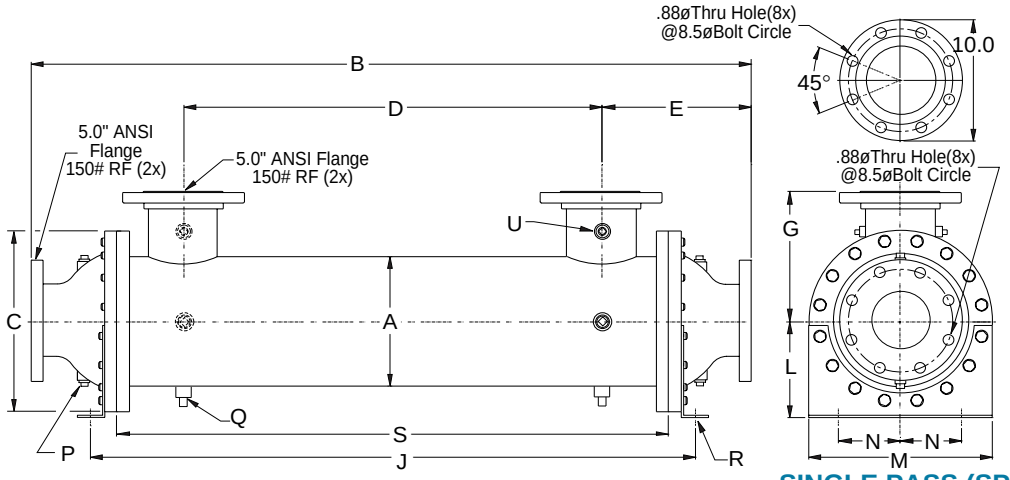
$$H.P.(\text{Removed In Cooler}) = H.P.(\text{Actual Heat Load}) \times \left(\frac{40}{\text{Actual Approach}}\right) \times B.$$

## HEAT ENERGY DISSIPATION RATES (Basic Stock Model)



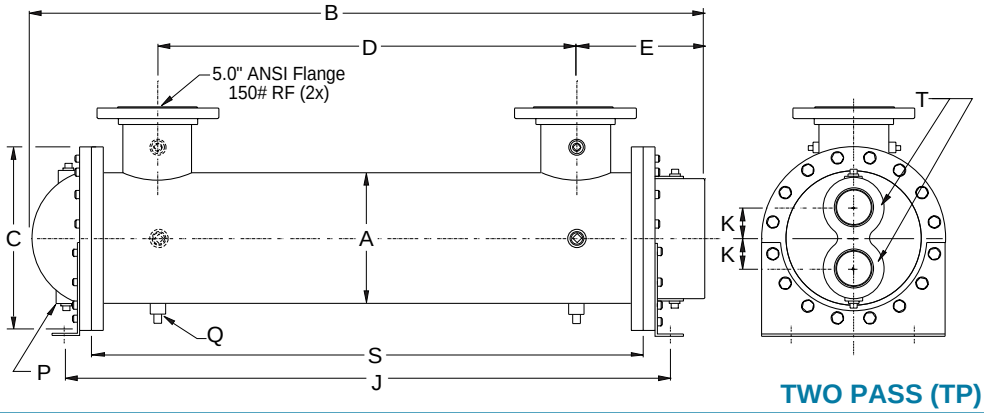

| Model | | Oil/Water Ratio |
|---|---|---|
| 1. | AB-2005-C4-FP | 2:1 |
| 2. | AB-2005-D4-FP | 2:1 |
| 3. | AB-2006-D4-FP | 2:1 |
| 4. | AB-2006-E4-FP | 2:1 |
| 5. | AB-2008-D4-FP | 2:1 |
| 6. | AB-2010-C4-FP | 2:1 |
| 7. | AB-2010-D4-FP | 2:1 |
| 8. | AB-2005-E6-FP | 2:1 |
| 9. | AB-2006-E6-FP | 2:1 |
| 10. | AB-2008-C6-FP | 2:1 |
| 11. | AB-2010-C6-FP | 2:1 |
| 12. | AB-2005-C10-FP | 2:1 |
| 13. | AB-2005-D10-FP | 2:1 |
| 14. | AB-2005-E10-FP | 2:1 |
| 15. | AB-2006-C10-FP | 2:1 |
| 16. | AB-2006-D10-FP | 2:1 |
| 17. | AB-2006-E10-FP | 2:1 |
| 18. | AB-2008-C10-FP | 2:1 |
| 19. | AB-2008-D10-FP | 2:1 |
| 20. | AB-2008-E10-FP | 2:1 |
| 21. | AB-2010-C10-FP | 2:1 |
| 22. | AB-2010-E10-FP | 2:1 |

| VISCOSITY CORRECTIONS | | |
|---|---|---|
| Avg. Oil SSU | A | B |
| 50 | 0.83 | 0.84 |
| 100 | 1.00 | 1.00 |
| 200 | 1.30 | 1.14 |
| 300 | 1.70 | 1.24 |
| 400 | 2.10 | 1.31 |
| 500 | 2.50 | 1.37 |
| 600 | 2.80 | 1.42 |
| 700 | 3.20 | 1.46 |
| 800 | 3.60 | 1.50 |
| 900 | 4.00 | 1.53 |
| 1000 | 4.40 | 1.56 |



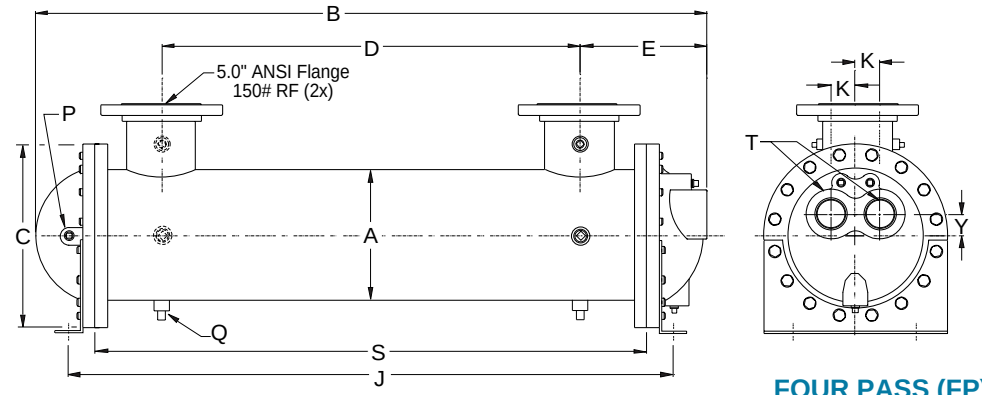

SINGLE PASS (SP)

| Model | B | E | H | P NPT |
|---|---|---|---|---|
| AB-2005 | 59.88 | 12.88 | 17.44 | (4) .50 |
| AB-2006 | 68.88 | | | |
| AB-2007 | 77.88 | | | |
| AB-2008 | 86.88 | | | |
| AB-2009 | 95.88 | | | |
| AB-2010 | 104.88 | | | |
| AB-2011 | 113.88 | | | |
| AB-2012 | 122.88 | | | |
| AB-2013 | 131.88 | | | |
| AB-2014 | 140.88 | | | |




TWO PASS (TP)

| Model | B | E | H | K | P NPT | T NPT |
|---|---|---|---|---|---|---|
| AB-2005 | 55.63 | 10.88 | 15.38 | 2.50 | (4) .50 | 3.00 |
| AB-2006 | 64.63 | | | | | |
| AB-2007 | 73.63 | | | | | |
| AB-2008 | 82.63 | | | | | |
| AB-2009 | 91.63 | | | | | |
| AB-2010 | 100.63 | | | | | |
| AB-2011 | 109.63 | | | | | |
| AB-2012 | 118.63 | | | | | |
| AB-2013 | 127.63 | | | | | |
| AB-2014 | 136.63 | | | | | |




FOUR PASS (FP)

| Model | B | E | H | K | P NPT | Y | T NPT |
|---|---|---|---|---|---|---|---|
| AB-2005 | 55.63 | 10.88 | 15.38 | 2.00 | (5) .50 | 1.75 | 2.50 |
| AB-2006 | 64.63 | | | | | | |
| AB-2007 | 73.63 | | | | | | |
| AB-2008 | 82.63 | | | | | | |
| AB-2009 | 91.63 | | | | | | |
| AB-2010 | 100.63 | | | | | | |
| AB-2011 | 109.63 | | | | | | |
| AB-2012 | 118.63 | | | | | | |
| AB-2013 | 127.63 | | | | | | |
| AB-2014 | 136.63 | | | | | | |

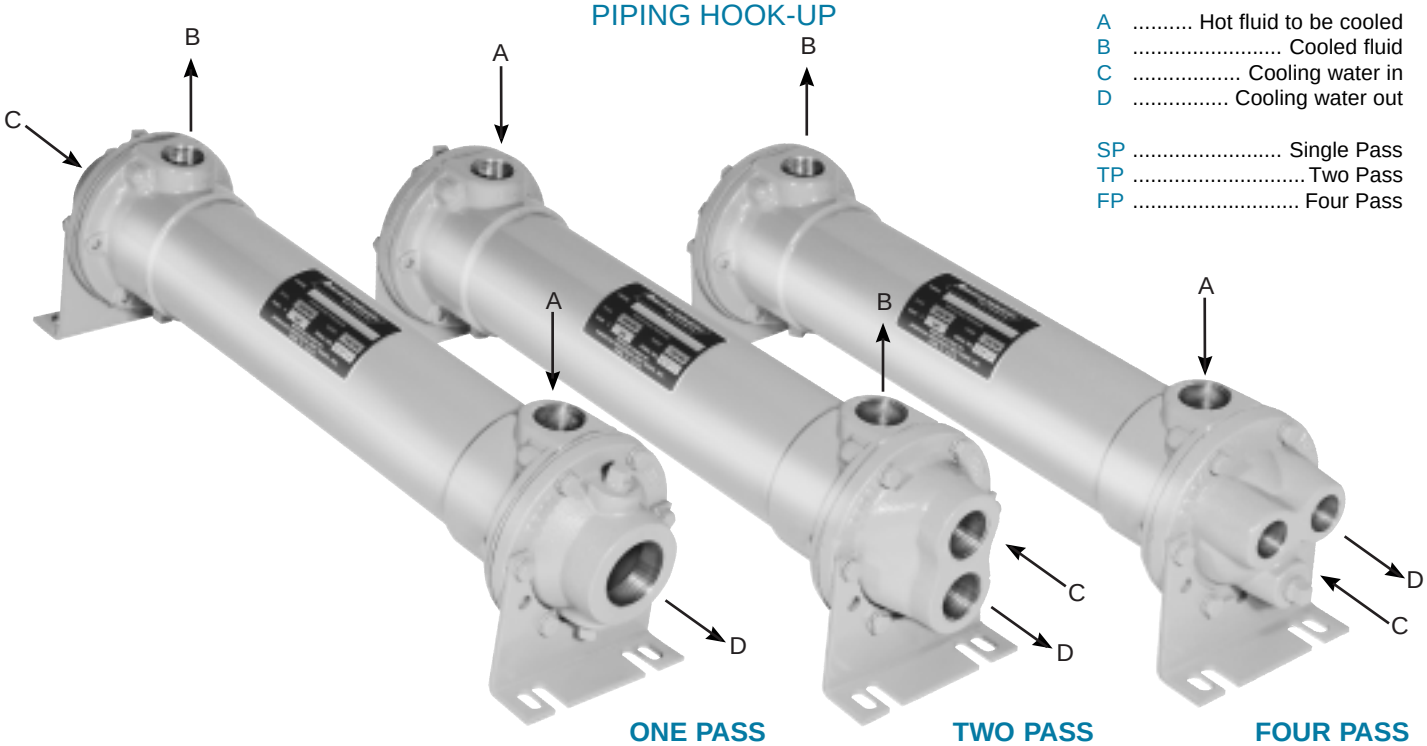
## COMMON DIMENSIONS & WEIGHTS

| Model | A | C | D | G | J | L | M | N | Q NPT | R | S | U NPT | WEIGHT LBS | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AB-2005 | 10.75 | 15.00 | 34.12 | 10.75 | 51.00 | 8.00 | 15.00 | 5.00 | (4) .50 | .75"ø x 1.25" Thru Slot (2x each bracket) | 46.12 | (2) .38 | 670 | AB-2005 |
| AB-2006 | | | 43.12 | | 60.00 | | | | | | 55.12 | | 720 | AB-2006 |
| AB-2007 | | | 52.12 | | 69.00 | | | | | | 64.12 | | 770 | AB-2007 |
| AB-2008 | | | 61.12 | | 78.00 | | | | | | 73.12 | | 820 | AB-2008 |
| AB-2009 | | | 70.12 | | 87.00 | | | | | | 82.12 | | 870 | AB-2009 |
| AB-2010 | | | 79.12 | | 96.00 | | | | | | 91.12 | | 920 | AB-2010 |
| AB-2011 | | | 88.12 | | 105.00 | | | | | | 100.12 | | 970 | AB-2011 |
| AB-2012 | | | 97.12 | | 114.00 | | | | | | 109.12 | | 1020 | AB-2012 |
| AB-2013 | | | 106.12 | | 123.00 | | | | | | 118.12 | | 1070 | AB-2013 |
| AB-2014 | | | 115.12 | | 132.00 | | | | | | 127.12 | | 1120 | AB-2014 |

*NOTE: We reserve the right to make reasonable design changes without notice.*

# INSTALLATION & MAINTENANCE

## PIPING HOOK-UP




### Receiving / Installation

a) Inspect unit for any shipping damage before uncrating. Indicate all damages to the trucking firms' delivery person, and mark it on the receiving bill before accepting the freight. Make sure that there is no visible damage to the outside surface of the heat exchanger. *Since the warranty is based upon the unit date code located on the model identification tags, removal or manipulation of the identification tags will void the manufacturers warranty.*

b) When handling the shell & tube heat exchanger, special care should be taken to avoid dropping the unit since mishandling could cause the heat exchanger to crack and leak. Mishandling of the unit is not covered under the manufacturers warranty. All units are shipped with partial wood/corrugated cardboard containers for safe handling.

c) Standard Enamel Coating: American Industrial provides its standard products with a normal base coat of oil base air cure enamel paint. The enamel paint is applied as a temporary protective and esthetic coating prior to shipment. While the standard enamel coating is durable, American Industrial does not warranty it as a long-term finish coating. It is strongly suggested that a more durable final coating be applied after installation or prior to long-term storage in a corrosive environment to cover any accidental scratches, enhance esthetics, and further prevent corrosion. It is the responsibility of the customer to provide regular maintenance against chips, scratches, etc... and regular touch up maintenance must be provided for long-term benefits and corrosion prevention.

d) Special Coatings: American Industrial offers as customer options, Air-Dry Epoxy, and Heresite (Air-Dry Phenolic) coatings at additional cost. American Industrial offers special coatings upon request, however American Industrial does not warrantee coatings to be a permanent solution for any equipment against corrosion. It is the responsibility of the customer to provide regular maintenance against chips, scratches, etc... and regular touch up maintenance must be provided for long-term benefits and corrosion prevention.

e) American Industrial recommends that the equipment supplied should be installed by qualified personnel who have solid understanding of system design, pressure and temperature ratings, and piping assembly. Verify the service conditions of the system prior to applying any shell & tube heat exchanger. If the system pressure or temperature does not fall within the parameters on model rating tag located on the heat exchanger, contact our factory prior to installation or operation.

f) Plan the installation to meet the requirements indicated on the piping installation diagram as illustrated (page 10). It is recommended to put the hot fluid to be cooled through the shell side and the cold fluid through the tube side. The indicated port assembly sequence in the diagram maximizes the performance, and minimizes the possibility of thermal shock. In instances where the fluids are required to be reversed, *hot fluid in the tubes and cold fluid in the shell* the heat exchanger will work with reduced performance.

g) When installing a series EAB heat exchanger (expansion bellow), it is recommended to use a shoulder bolt to allow the heat exchanger to move freely while expanding and contracting due to high differential temperatures.

h) It is recommended to use flexible hose wherever possible to reduce vibration and allow slight movement. However, hoses are not required. Hydraulic carrying lines should be sized to handle the appropriate flow and to meet system pressure drop requirements based upon the systems parameters, and not based upon the

units supply and return connection size. We recommend that a low cracking pressure direct acting relief valve be installed at the heat exchanger inlet to protect it from pressure spikes by bypassing oil in the event the system experiences a high flow surge. If preventative filtration is used it should be located ahead of the cooler on both shell and tube side to catch any scale or sludge from the system before it enters the cooler. Failure to install filters ahead of the heat exchanger could lead to possible heat exchanger failure due to high pressure if the system filters plug.

i) Standard shell & tube coolers are built with a rolled tube-sheet construction. However, the differential operating temperature between the entering shell side fluid and the entering tube side fluid should not exceed 150°F. If this condition exists, a severe thermal shock could occur leading to product failure and mixing of the fluids. For applications with a differential temperatures of 150°F or more, we recommend using a series with a floating tube-sheet, u-tube, or expansion joint to reduce the potential for the effects of thermal shock.

j) Water requirements vary from location to location. If the source of cooling water is from other than a municipal water supply, it is recommended that a water strainer be installed ahead of the heat exchanger to prevent dirt and debris from entering and clogging the flow passages. If a water modulating valve is used it is recommended to be installed at the inlet to the cooler to regulate the water flow.

k) For steam service, or other related applications, please consult our engineering department for additional information.

## Maintenance

a) Inspect the heat exchanger for loosened bolts, connections, rust spots, corrosion, and for internal or external fluid leakage. Any corroded surfaces should be cleaned and recoated with paint.

b) *Shell side:* In many cases with clean hydraulic system oils it will not be necessary to flush the interior of the shell side of the cooler. In circumstances where the quality of hydraulic fluid is in question, the shell side should be disconnected and flushed on a yearly basis with a clean flushing oil/solvent to remove any sludge that has been deposited. For severe cases where the unit is plugged and cannot be flushed clean with solvent, the heat exchanger should be replaced to maintain the proper cooling performance.

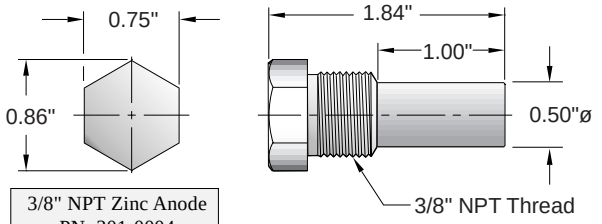
c) *Tube side:* In many cases it will be necessary to clean the tube side of the heat exchanger due to poor fluid quality, debris, calcium deposits, corrosion, mud, sludge, seaweed, etc.... To clean the tube side, flush with clean water or any good quality commercial cleaner that does not attack the particular material of construction. With straight tube heat exchangers you can use a rod to carefully push any debris out of the tubes.

d) Zinc anodes are normally used to reduce the risk of failure due to electrolysis. Zinc anodes are a sacrificial component designed to wear and dissolve through normal use. Normally, zinc anodes are applied to the water supply side of the heat exchanger. Depending upon the amount of corrosive action, one, two, three, or more anodes can be applied to help further reduce the risk of failure. American Industrial Heat Transfer, Inc. offers zinc anodes as an option, to be specified and installed at the request our customers. It is the responsibility of the customer to periodically check and verify the condition of the zinc anode and replace it as needed.

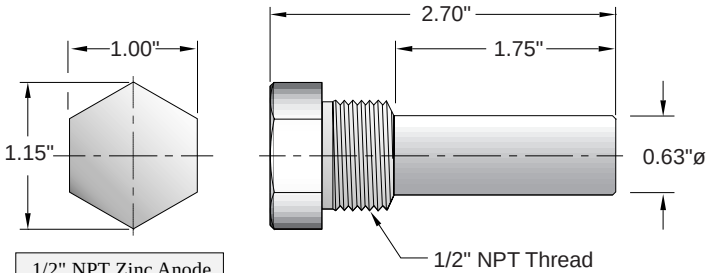
Applications vary due to water chemical makeup and quality, material differences, temperature, flow rate, piping arrangements, and machine grounding. For those reasons, zinc anodes do not follow any scheduled factory predetermined maintenance plan moreover they must be checked routinely by the customer, and a maintenance plan developed based upon the actual wear rate.

If substantial wear occurs or zinc dissolves without replacement, premature failure or permanent damage may occur to the heat exchanger. American Industrial does not warranty customer applications. It is the responsibility of the customer to verify and apply the proper system materials of construction and overall system requirements. Failures resulting from properly applied or misapplied use of zinc anode(s) into non-specified or specified applications will be the sole responsibility of the customer.

e) A routine maintenance schedule should be developed and adjusted to meet your systems requirements based upon water quality, etc….Failure to regularly maintain and clean your heat exchanger can result in a reduction in operational performance and life expectancy.




| 3/8" NPT Zinc Anode<br>PN: 301-0004 |
|---|
| AB-400 thru AB-1000<br>AA-400 thru AA-1000<br>CS-600 thru CS-1000 |




| 1/2" NPT Zinc Anode<br>PN: 301-0003 |
|---|
| AB-1200 thru AB-2000<br>AA-1200 thru AA-1600<br>CS-1200 thru CS-1700 |

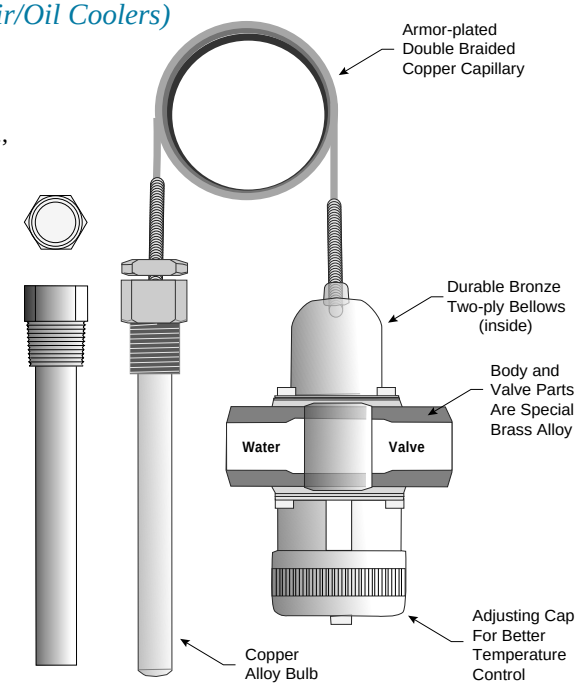
# ACCESSORIES

## *56T THERMOSTATIC MODULATING WATER VALVE WITH BULB WELL ASSEMBLY*

*(for Shell & Tube Heat Exchangers And Air/Oil Coolers)*

### SPECIFICATIONS

| | |
|---|---|
| **Sizes** | 0.375", 0.50", 0.75", 1.00", 1.25" FPT |
| **Fluid Pressure** | 125psi (max.) |
| **Standard Temperature** | 40° - 100° F., 60° - 140° F., 100° - 175° F., 125° - 200° F., 140° - 240° F., 200° - 275°F. |
| **Body** | Brass alloy casting |
| **Valve Parts** | Brass alloy |
| **Standard Capillary Length** | 6' & 20' foot |
| **Standard Bulbs** | For 3/8" & 1/2" valve sizes: 5/8" x 6 with 3/4" union connections. For 3/4" & 1" valve sizes: 5/8" x 8-1/4" with 3/4" union connections. Stainless steel construction available. |
| **Standard Bulb Mounting** | 3/4" NPT |
| **Seat Disk** | Buna-N-replaceable |
| **Seat Bead** | Stainless Steel - replaceable |




### APPLICATION INFORMATION

- Built for rugged machine tool and hydraulic applications.
- Adjustable temperature range to meet your requirements.
- Quick response to temperature changes.
- Extra heavy-duty direct acting bellows for longer service.

Note: Please consult factory if a non-cataloged temperature is required.

The type 56-T valve gives smooth regulation of water and other fluids. It's designed for the most rugged application. For example: hydraulic power packaging equipment, hydraulic presses, plastic molding equipment, and anywhere reliability in temperature control is demanded. The type 56-t valve is a better designed product that won't leak or chatter. To insure dependability, every valve is factory tested three times in different temperature baths. Extra performance can be expected of the bellows also. They are direct acting with sturdy walls, and the inner spring is zinc coated. The seat beads are stainless steel to resist the erosive effects of *wire drawing* and provide longer life for your needs. Additional features include mounting in any position, Buna-N seat disc, and manual flushing.

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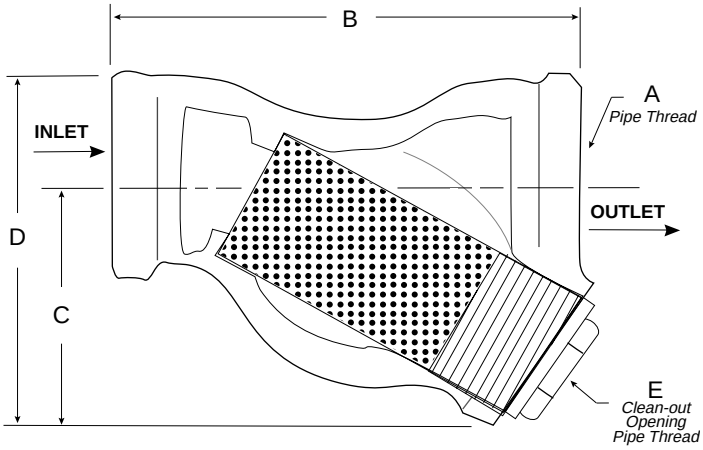
## *"Y" STRAINER (for Shell & Tube Heat Exchangers And Air/Oil Coolers)*




| MODEL | SIZE A (NPT) | DIMENSIONS (Inches) B | C | D | E (NPT) | WT. (lbs.) |
|---|---|---|---|---|---|---|
| 18 - Y | 0.38" | 2.50" | 2.63" | 2.00" | 0.25" | 0.75 |
| | 0.50" | 2.50" | 2.63" | 2.00" | 0.25" | 0.75 |
| | 0.75" | 3.50" | 3.75" | 2.75" | 0.50" | 1.75 |
| | 1.00" | 3.50" | 3.75" | 2.75" | 0.50" | 1.75 |
| 20 - Y | 0.50" | 4.00" | 3.25" | 2.50" | 0.38" | 1.75 |
| | 0.75" | 4.00" | 3.25" | 2.50" | 0.38" | 1.75 |
| | 1.00" | 4.75" | 4.38" | 3.38" | 0.75" | 4.00 |
| | 1.25" | 6.00" | 5.13" | 3.88" | 0.75" | 4.75 |
| | 1.50" | 6.00" | 5.13" | 3.88" | 0.75" | 4.75 |
| | 2.00" | 8.13" | 6.38" | 4.63" | 0.75" | 13.00 |
| PRESSURE RATINGS, ALL MODELS: 125lbs. per Sq.In. | | | | | | |

### APPLICATIONS & SPECS. ("Y" Strainers)

These strainers are engineered for water or steam, and are adaptable for many other uses. Cleaning is accomplished by simply removing a pipe plug without disconnecting any piping. Or, if it is desirable to clean without interrupting service, a blow-off valve can be connected to the clean-out opening. ***Note:*** Pumps, control valves, traps, or other equipment controlling the flow of liquids or gases require proper protection with strainers for trouble free operation.

### 18 - Y BRASS STRAINERS

The 18 - Y strainer body is a sturdy red brass casting. Standard units have 50 mesh brass wire screens. Brazing connections are available on special order instead of pipe threads.

### 20 - Y STRAINERS

The 20 - Y strainer has a heavy cast iron body with accurately machined pipe thread inlet and outlet (National Pipe Thread N.P.T.). It contains a strainer screen of 0.02" thick brass with 100, 1/16" perforations per inch.

*American Industrial's state-of-the-art manufacturing facility.*

## Mission Statement

*To manufacture Heat Transfer products by applying state-of-the-art technologies, with the ability to serve a wide variety of industries through professional distribution affiliations throughout North America and abroad.*

Since 1985, American Industrial Heat Transfer, Inc. is pleased to offer more than thirty fully manufactured product lines to meet the requirements of most heat transfer needs. American Industrial manufactures all of the heat exchangers as advertised, so that your company is never compromised. Modern state-of-the-art CNC manufacturing machinery, top quality raw materials, and professional engineering services are all offered by American Industrial for the convenience of our customers.

Many innovative liquid and air-cooled heat exchanger designs are offered for a wide variety of mobile and industrial applications. The latest technology data processing, manufacturing, and engineering systems are employed throughout our company.

American Industrial is proud to offer one of the strongest authorized distribution networks in the industry with worldwide coverage. Direct access to professional engineering services, no service charge 24 hour expedite delivery, custom modifications, competitive pricing, etc... are just a few benefits of being an American Industrial customer.

We know that our future relies on the future of our customers. For that reason we have invested in high-technology automation and professional personnel to give us the competitive edge far into the future.

If you would like to know more about our products, please contact your local American Industrial distributor or contact our company. You can also see us on the web at www.aihti.com We appreciate your business and we hope to share with you in your successes.

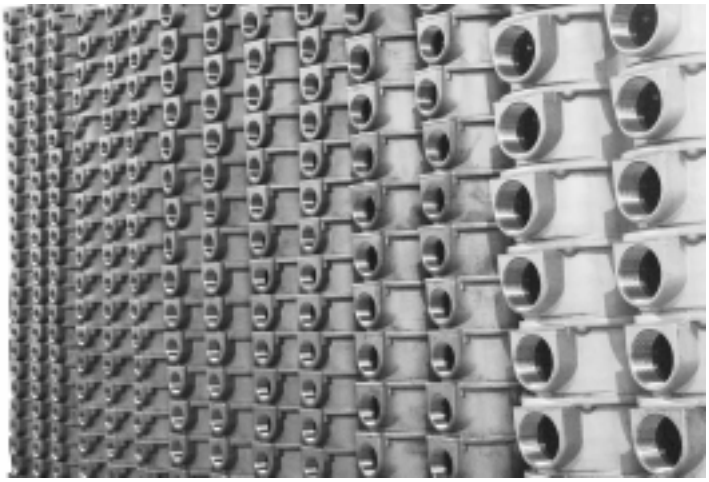
*Our courteous and professional staff is available to provide quality customer service assistance.*

*A full line of engineering services is available to assist with technical support as well as detailed Auto Cad drawings.*

# COMPANY PROFILE

### *RAW MATERIALS*

*High quality forged brass hub combines tube-sheet and porting into one common forging. This superior hub provides a heavier construction wall and web to allow greater tube joint strength. The nonporous forging provides consistent leakproof quality with a smooth reliable finish. Our integral brass hub can be modified to accept a wide array of fitting and tube sizes.*



### *MANUFACTURING*

*Historically, American Industrial has embraced high technology machinery to manufacture a consistent, reliable, and quality product. Our Computer Numeric Controlled rapid parts production facility is instrumental in reducing cost of components, giving you true quality at a low cost. Special designs or modifications are quickly manufactured in our computerized state-of-the-art manufacturing complex.*

### *STOCK*

*American Industrial is committed to carrying a variety of standard heat exchangers. Hundreds of shell & tube and air/oil heat exchangers are available from stock ready for immediate shipment. Standard units that are not in stock can be manufactured and shipped within 24 or 48 hours.*

### *SHIPPING*

*American Industrial has consulted with top freight carriers to determine the best packaging methods to ensure safe, undamaged shipments. To further ensure the safe arrival of our products to its destination, we package our products with additional wood crating, skids, and fiberboard. We then apply a final layer of plastic wrap to protect from water and other external problems.*

### Limited Warranty

Seller makes no warranties expressed or implied, including but not by way of limitation, any implied warranty of merchantability and any implied warranty of fitness for a particular purpose, on any order except that seller warrants title to all goods furnished by seller and except that seller warrants for a period of one year from the date mark located on the seller's identification tag that all goods described on seller's acknowledgment of purchaser's purchase order will be manufactured in accordance with the specifications, if any, set forth in said purchase order and expressly accepted in seller's acknowledgment subject to seller's standard manufacturing variations and practices. In the case of components or accessories furnished by suppliers to seller, purchaser's warranty from seller shall be limited to the warranty of the component or accessory supplier. The foregoing warranties are the sole and exclusive warranties applicable to the goods delivered under this order, and all other warranties, express or implied, including without limitation any warranty of merchantability, are hereby expressly disclaimed and negated. Without limiting the generality of the foregoing, purchaser acknowledges that seller's products are not packaged or protected for long periods of storage and thus may corrode or rust over time.

### Limitation of Purchaser's Remedies; Exclusive of Damages

Purchaser's remedies with respect to any claim arising out of any order, any goods delivered pursuant to any order and expressly accepted in seller's acknowledgment, or seller's performance in connection with any order, including, without limitation, any claim arising out of any recall, defect or alleged defect in any goods or services furnished by seller, shall be limited exclusively to the right of repair or replacement of such goods or services, at seller's option. Without in any way limiting the generality of the foregoing, in no event shall seller be liable for any consequential or incidental damages, including, without limitation, any loss of anticipated profits incurred by purchaser with respect to any goods or services furnished by seller, or any damages arising from injuries to persons as a result of purchaser's or a third party's negligence. Seller's warranty does not cover failures resulting from the improper installation, mounting design or application or from corrosion. The provisions of this paragraph are a material term of this transaction.

### Disputes

Seller and purchaser agree to submit any disputes regarding any order, any goods delivered pursuant to any order and expressly accepted in seller's acknowledgment, or seller's performance in connection with any order, including without limitation seller's limited warranty obligation, to mediation by an independent mediator to be mutually agreed upon by seller and purchaser. The cost of such mediation shall be borne equally by seller and purchaser. In the event such mediation does not resolve their dispute, seller and purchaser agree to submit such dispute to an independent arbitrator, to be mutually agreed upon by seller and purchaser or, otherwise, chosen by the mediator. Seller and purchaser agree that all mediation and arbitration shall be conducted in Zion, Illinois. The non-prevailing party at the arbitration shall pay the prevailing party's attorneys' fees and costs incurred in participating in the arbitration.

### Governing Law

Seller and Purchaser's agreement shall be governed by and interpreted in accordance with the laws of the State of Illinois of the United States of America. Manufacture, shipment and delivery are subject to any prohibition, restriction, priority, allocation, regulation or condition imposed by or on behalf of the United States of America or any other governmental body with appropriate jurisdiction which may prevent or interfere with fulfillment of any order.

### Permissible Variations

Goods shipped by Seller shall be within the limits and sizes published by Seller, subject, however, to Seller's right to ship overages or underages in accordance with Seller's standard practices and goods shipped by Seller will be subject to standard variations provided such variations are non-functional or are not material in nature.

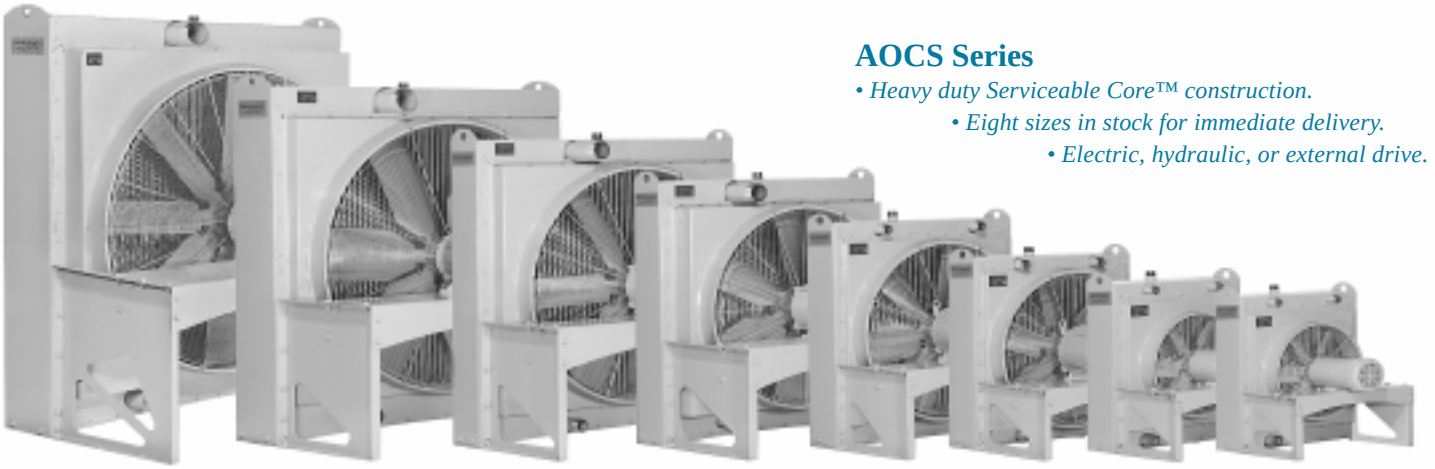
### Technical Assistance and Advice

Seller's warranty shall not be enlarged and no obligation or liability shall arise out of Seller's rendering of technical assistance, technical advice facilities, service or recommendations made by Seller in connection with Purchaser's purchases of the goods hereunder. Said technical services, advice, assistance or recommendations made by Seller or any representative of Seller concerning any use or application of any goods furnished hereunder is believed to be reliable, but SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, AND THE SAME ARE HEREBY EXPRESSLY DISCLAIMED as to the same and the results to be obtained. Purchaser assumes all responsibility for loss or damage resulting from the use of any such goods.

For standard dimensional information please refer to our corresponding product brochure. For information regarding a special engineered product please contact our company. All specially engineered products specifying a 5-digit suffix will be supplied with a drawing for customer approval at the time of purchase. Additional costs may be added if requirements should change from the original specifications, or have been initially overlooked. Please be aware that "normal shipping" lead-times are estimated based upon components in stock at the time of quotation, extended shipping time up to as much as two weeks or more may be required if changes to inventory availability occur. Cancellation charges will be incurred for special order equipment.

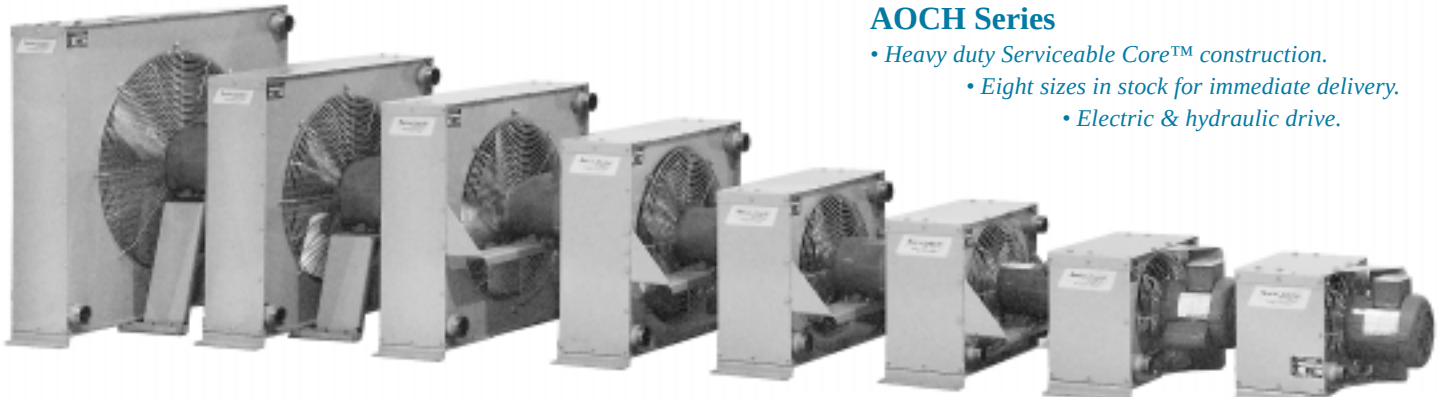
American Industrial Heat Transfer, Inc. provides a complete installation manual included with each unit sold containing a complete copy of our 3 page*"Terms and Conditions of Sale"*. If an installation manual was not received or misplaced for your equipment additional copies may be acquired. To receive a copy of American Industrial Heat Transfer, Inc. Installation Manual including *"Standard Terms and Conditions of Sale"* please refer to the following sources. 1) The American Industrial product catalog. 2) Our Internet site *www.aihti.com*, 3) Contact American Industrial directly at 1-847-731-1000.

# AVAILABLE PRODUCTS



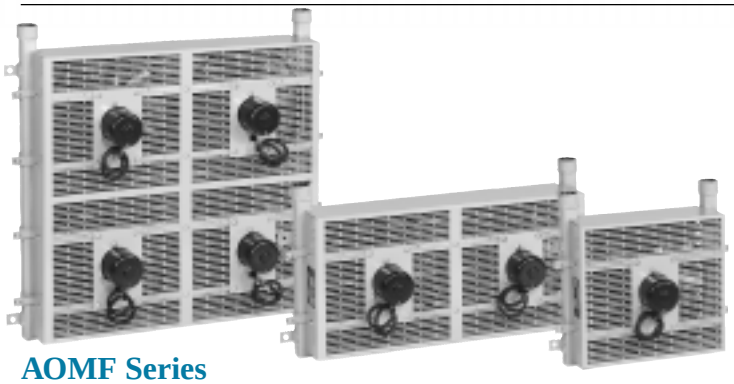
## AOCS Series

*• Heavy duty Serviceable Core™ construction.*
*• Eight sizes in stock for immediate delivery.*
*• Electric, hydraulic, or external drive.*



## AOCH Series

*• Heavy duty Serviceable Core™ construction.*
*• Eight sizes in stock for immediate delivery.*
*• Electric & hydraulic drive.*



## AOMF Series

*• Low profile air-cooled heat exchanger with 12 & 24 volt fan drive for mobile applications.*

## AC,ACHM & ACF Series

*• Industrial high capacity air/oil heat exchanger available in 8 standard sizes with electric or hydraulic drive.*

## URCS Series

*• U-tube heat exchangers for steam services with removable tube bundle, in copper, 316L SS, or 90/10 Cu Ni.*

## AA Series

*• Variety of sizes from 2"-8" diameters available in a wide range of materials.*

*3905 Route 173 Zion, Illinois 60099*
*Telephone: (800) 338-5959 or (847) 731-1000*
*FAX: (847) 731-1010*





American Industrial Heat Transfer Inc.®
*Manufacturer of Quality Heat Exchangers*