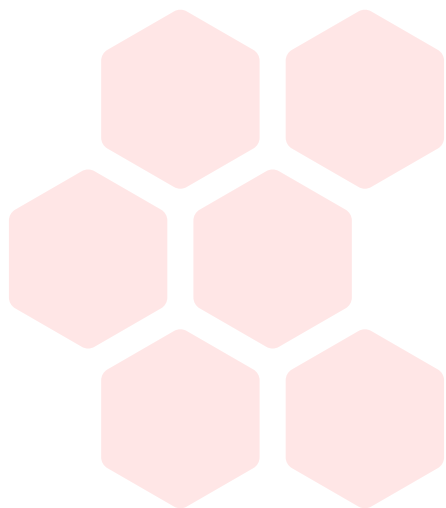
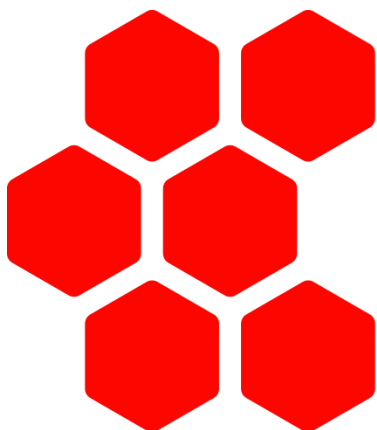


# Shell and Tube Type Hydraulic and Lube Oil Coolers

Series 4000



Serck



**Serck**

# Shell and Tube Type Hydraulic and Lube Oil Coolers

Application of Shell & Tube Water-Oil Coolers wherein Two fluids, of different starting temperatures, flow through the heat exchanger. One fluid flows through the internal tubes and the other flows around the tubes inside the shell. Heat is transferred from one fluid to the other through the tube walls, either from inside the tubes to the surrounding fluid or vice versa.

These Oil Coolers have been designed specifically for Hydraulic systems, but they are equally suitable for cooling lubricating oils, heat transfer fluids, etc. The high efficiency tube-bundle stack increases the thermal heat transfer performance and incorporates the fixed type Serck tube-to-tubeplate joint ensuring reliability under extreme operating conditions.

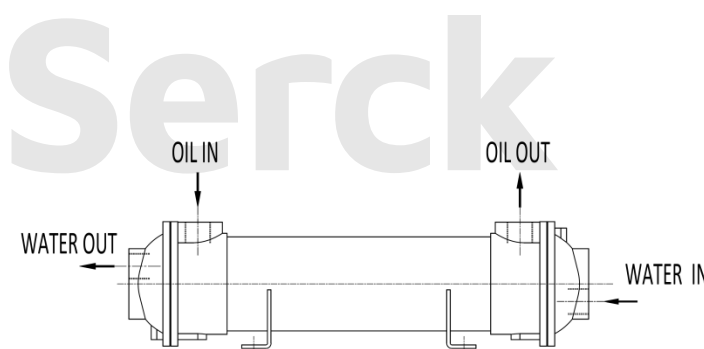
## Installation

The illustration shows the correct position of the oil and water connections for horizontal mounting to ensure that the coolers operate with full of water. The cooler is usually mounted in the system return line or drain line to the tank and the water should be connected in counter flow to the oil flow. Long lengths of unsupported pipe or excessive pipe vibration should be avoided and If there are extreme fluctuations in flow or pressure it may be advisable to mount the cooler 'off-line' with its own recirculating pump.

A check valve to by-pass oil across the cooler under cold starting conditions is recommended especially for oil with a high viscosity.

### Design

|                                |        |
|--------------------------------|--------|
| Maximum Working Temperature    | 140 °C |
| Maximum Working Oil Pressure   | 20 bar |
| Maximum Working Water Pressure | 10 bar |



## Materials

Standard Industrial version specifications.

|            |                              |
|------------|------------------------------|
| Tubes      | Copper/Nickel-90/10 / Copper |
| Tubeplates | Naval Brass / Carbon Steel   |
| End Cover  | Carbon Steel                 |
| Shell      | Carbon Steel                 |
| Gasket     | Temafast - Non Asbestos      |

# Performance

The following tables give typical examples of cooler performance at specified oil and water flow using Viscosity Grade ISO 46 oil at an inlet temperature of 65°C and a water supply temperature of 20°C. This is for general cooler selection only; performance curves are also provided for more accurate selection. If you require help with cooler selection please contact the Serck Sales Department.

Prolonged use with polluted water or outside these flow limits may result in tube failure.

| Model | Heat Dissipated | Oil Flow  | Oil Pressure Drop |      | Water Flow @20°C | Water Pressure Drop |      |
|-------|-----------------|-----------|-------------------|------|------------------|---------------------|------|
|       | kW              | litre/min | kPa               | bar  | litre/min        | kPa                 | Bar  |
| 4308  | 3.4             | 50        | 40                | 0.4  | 8                | 1                   | 0.01 |
| 4314  | 7.1             | 80        | 50                | 0.5  | 16               | 3                   | 0.03 |
| 4324  | 13.1            | 100       | 120               | 1.2  | 21               | 7                   | 0.07 |
| 4414  | 13.5            | 120       | 30                | 0.3  | 30               | 1                   | 0.01 |
| 4424  | 28.8            | 180       | 70                | 0.7  | 50               | 3                   | 0.03 |
| 4436  | 54.5            | 220       | 110               | 1.1  | 70               | 7                   | 0.07 |
| 4514  | 21              | 160       | 30                | 0.3  | 45               | 2                   | 0.02 |
| 4524  | 37              | 200       | 45                | 0.45 | 60               | 5                   | 0.05 |
| 4536  | 60              | 250       | 90                | 0.9  | 87               | 15                  | 0.15 |
| 4624  | 82.6            | 360       | 91                | 0.91 | 180              | 10                  | 0.1  |
| 4636  | 123             | 400       | 126               | 1.26 | 200              | 12                  | 0.12 |
| 4640  | 163             | 420       | 190               | 1.9  | 210              | 14                  | 0.14 |
| 4660  | 191             | 440       | 206               | 2.06 | 220              | 18                  | 0.18 |
| 4824  | 140             | 490       | 86                | 0.86 | 245              | 10.1                | 0.10 |
| 4836  | 203             | 520       | 130               | 1.3  | 260              | 14.5                | 0.15 |
| 4840  | 252             | 550       | 150               | 1.5  | 275              | 19                  | 0.19 |
| 4860  | 290             | 580       | 170               | 1.7  | 290              | 26                  | 0.26 |
| 4872  | 348             | 610       | 200               | 2    | 305              | 35                  | 0.35 |

## Cooler Selection

Oil pressure drop correction factor/oil viscosity (cSt)

| cSt | C.F |
|-----|-----|
| 12  | 0.7 |
| 16  | 0.9 |
| 24  | 1.0 |
| 27  | 1.1 |
| 32  | 1.3 |
| 44  | 1.5 |
| 56  | 1.7 |
| 80  | 2.2 |
| 100 | 2.7 |
| 150 | 3.6 |
| 200 | 4.5 |
| 300 | 6.3 |

The following curves provide a more precise selection than the general table. The method of selection is as follows:

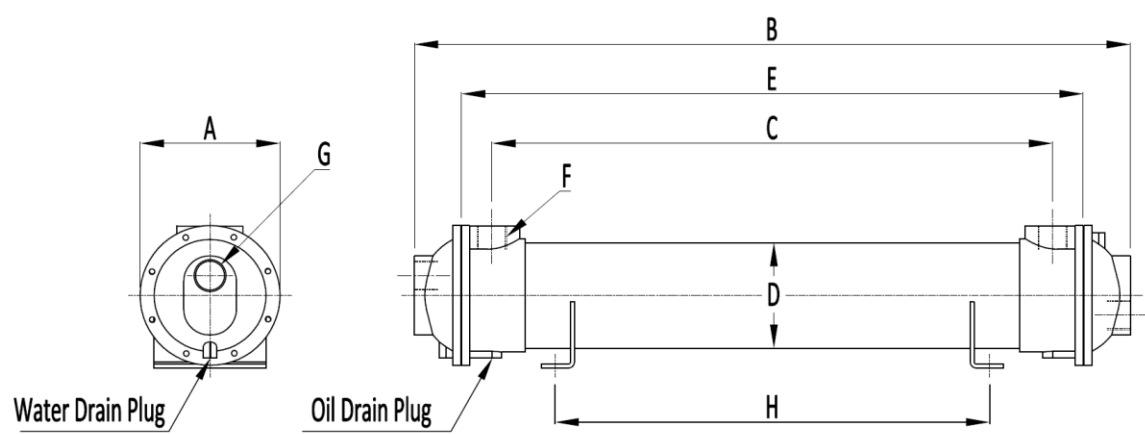
- Calculate the specific heat dissipation (P) using the following expression

$$P = \frac{E}{th1 - tc1}$$

Where **E** = required heat dissipation (kW)  
**th1** = oil inlet temperature to cooler (°C)  
**tc1** = water inlet temperature (°C)
- Select cooler part number from the cooler graph A at value of P obtained in step 1 using the appropriate oil flow through cooler.
- The pressure drop can be read off from graph B. The graphs are for viscosity grade 46 oil at 65°C. For other temperatures or viscosities multiply the pressure drop obtained by the c.f in the table 1.
- The water flow required is given in the selection table for each model.
- If the values for P are outside the standard graph range, the Serck sales department can be contacted for accurate selection.

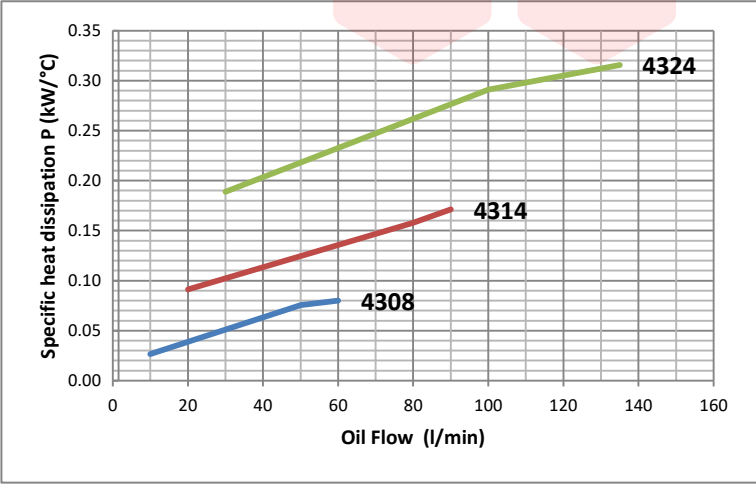
Table 1

# 4300 Series

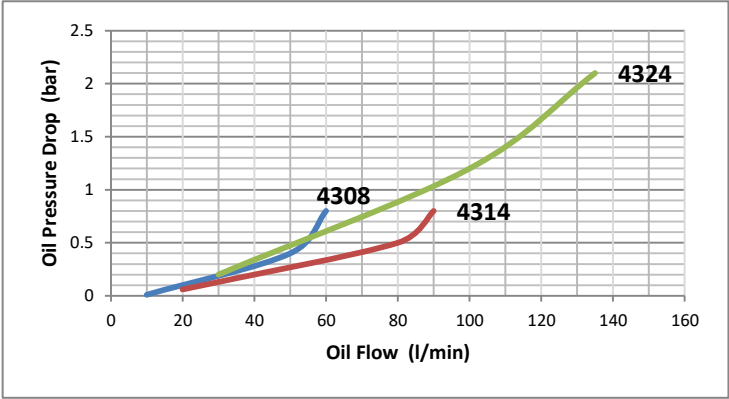


| Serck Model | Shell Dia D (mm) | Flange Dia A (mm) | Overall Length B (mm) | Oil Connection C/C C (mm) | Shell Length E (mm) | Oil Connection F (NPT)-Inch | Water Connection G (NPT)-Inch | Mounting Hole C/C H (mm) | Oil Vol (L) | Water Vol (L) |
|-------------|------------------|-------------------|-----------------------|---------------------------|---------------------|-----------------------------|-------------------------------|--------------------------|-------------|---------------|
| 4308        | 89               | 116               | 286                   | 155                       | 204                 | 1                           | 1.5                           | 184                      | 0.7         | 0.8           |
| 4314        | 89               | 116               | 438                   | 308                       | 356                 | 1                           | 1.5                           | 336                      | 1.2         | 0.98          |
| 4324        | 89               | 116               | 692                   | 562                       | 610                 | 1                           | 1.5                           | 375                      | 2           | 1.2           |

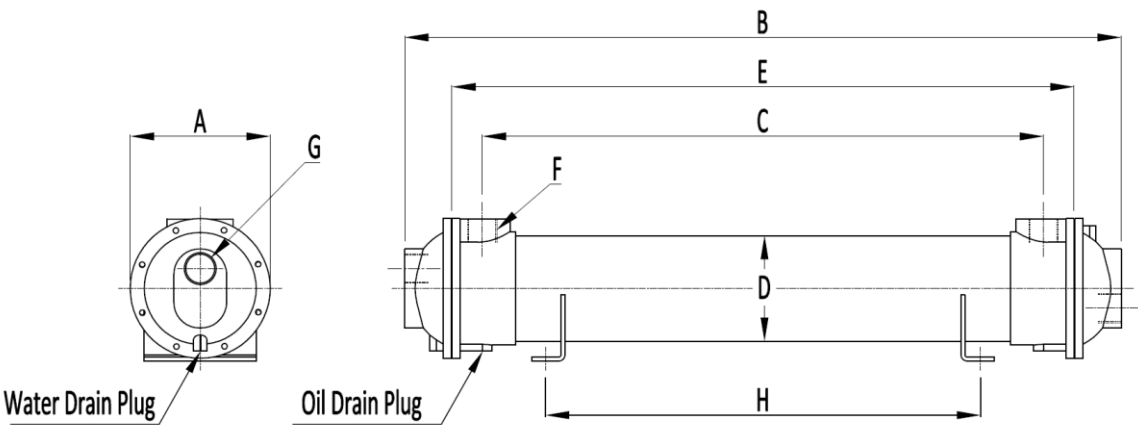
A



B

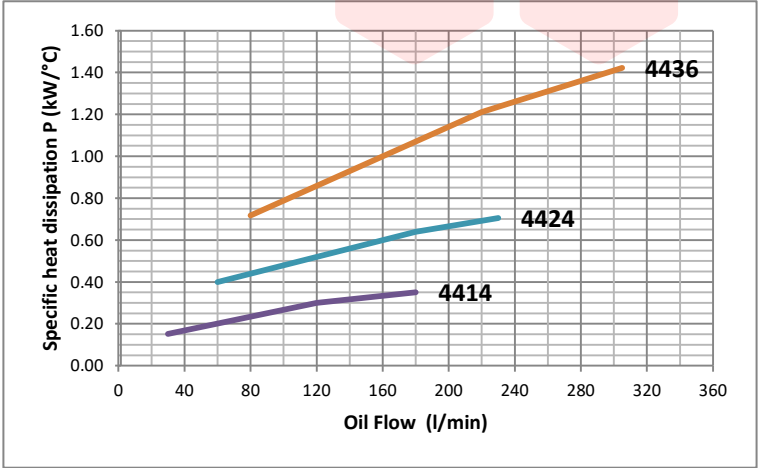


# 4400 Series

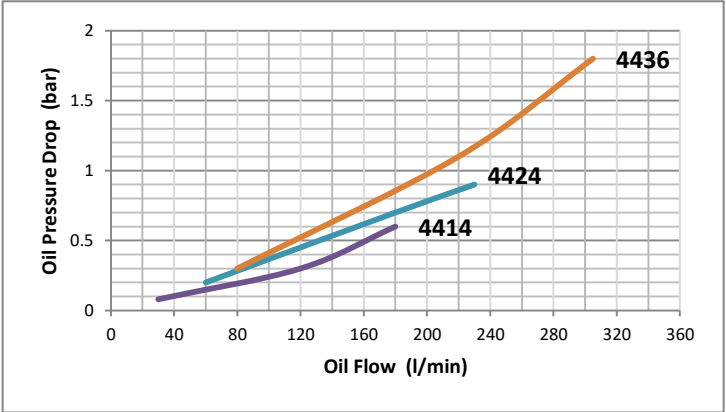


| Serck Model | Shell Dia D (mm) | Flange Dia A (mm) | Overall Length B (mm) | Oil Connection C/C C (mm) | Shell Length E (mm) | Oil Connection F (NPT)-Inch | Water Connection G (NPT)-Inch | Mounting Hole C/C H (mm) | Oil Vol (L) | Water Vol (L) |
|-------------|------------------|-------------------|-----------------------|---------------------------|---------------------|-----------------------------|-------------------------------|--------------------------|-------------|---------------|
| 4414        | 114              | 159               | 457                   | 282                       | 356                 | 1.5                         | 2                             | 336                      | 2           | 2.1           |
| 4424        | 114              | 159               | 711                   | 536                       | 610                 | 1.5                         | 2                             | 375                      | 3.2         | 2.7           |
| 4436        | 114              | 159               | 1016                  | 841                       | 914                 | 1.5                         | 2                             | 664                      | 4.7         | 3.3           |

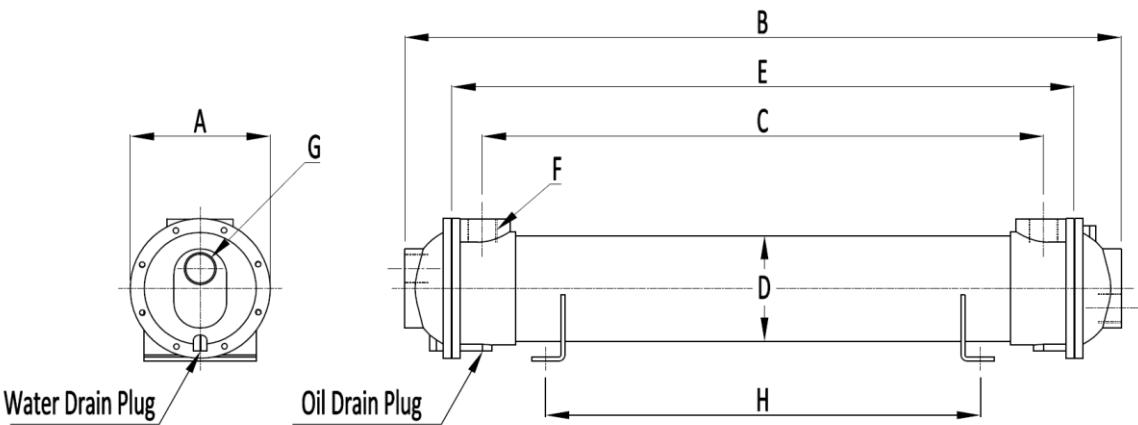
A



B

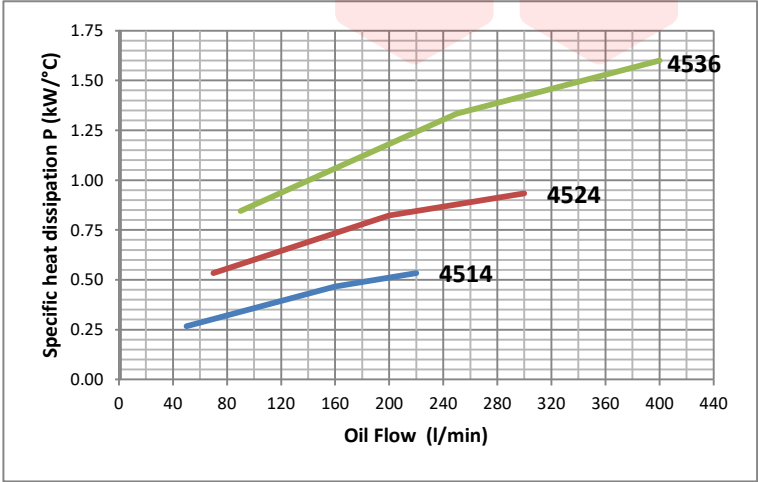


# 4500 Series

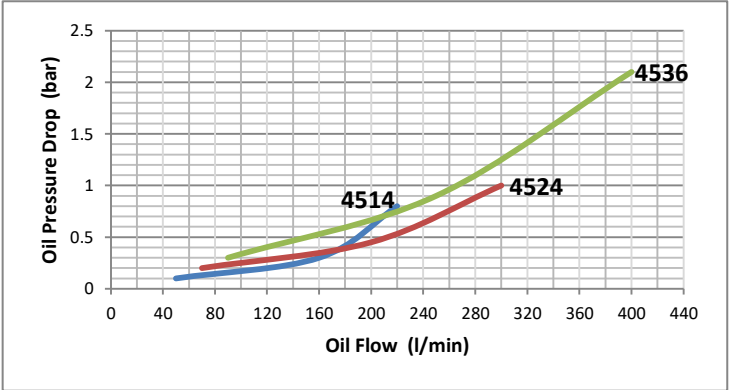


| Serck Model | Shell Dia D (mm) | Flange Dia A (mm) | Overall Length B (mm) | Oil Connection C/C C (mm) | Shell Length E (mm) | Oil Connection F (NPT)-Inch | Water Connection G (NPT)-Inch | Mounting Hole C/C H (mm) | Oil Vol (L) | Water Vol (L) |
|-------------|------------------|-------------------|-----------------------|---------------------------|---------------------|-----------------------------|-------------------------------|--------------------------|-------------|---------------|
| 4514        | 141              | 176               | 470                   | 282                       | 356                 | 1.5                         | 2                             | 336                      | 2.9         | 3.3           |
| 4524        | 141              | 176               | 724                   | 536                       | 610                 | 1.5                         | 2                             | 375                      | 4.7         | 4.2           |
| 4536        | 141              | 176               | 1029                  | 841                       | 914                 | 1.5                         | 2                             | 664                      | 7           | 5.1           |

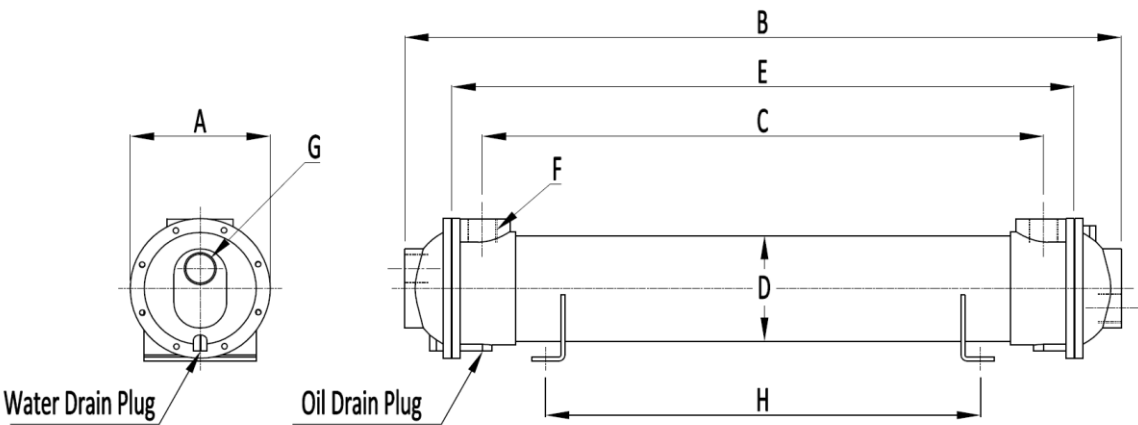
A



B

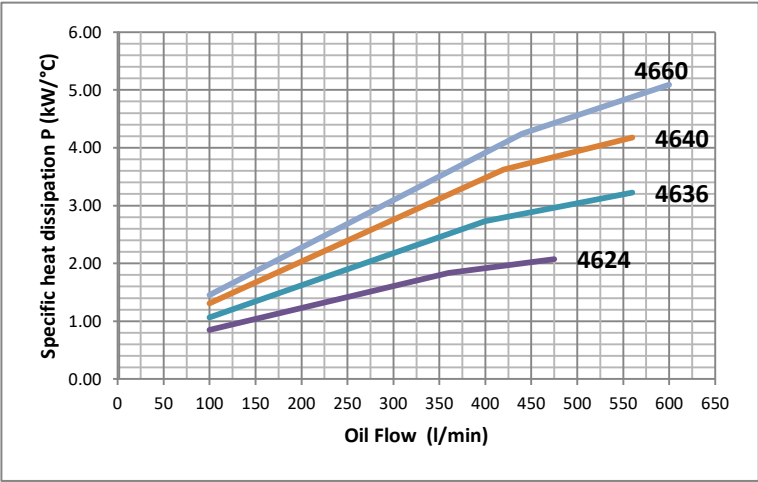


# 4600 Series

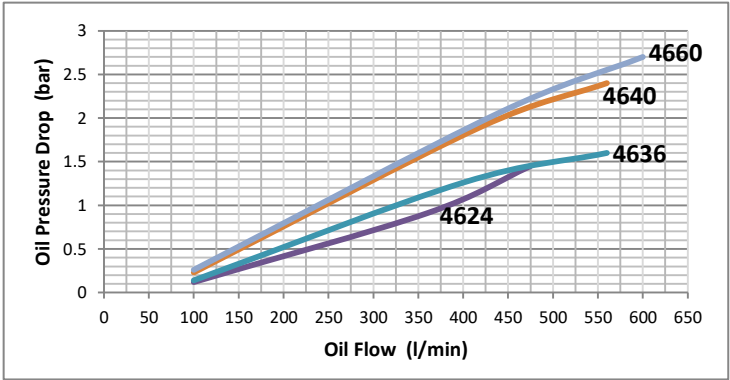


| Serck Model | Shell Dia D (mm) | Flange Dia A (mm) | Overall Length B (mm) | Oil Connection C/C C (mm) | Shell Length E (mm) | Oil Connection F (NPT)-Inch | Water Connection G (NPT)-Inch | Mounting Hole C/C H (mm) | Oil Vol (L) | Water Vol (L) |
|-------------|------------------|-------------------|-----------------------|---------------------------|---------------------|-----------------------------|-------------------------------|--------------------------|-------------|---------------|
| 4624        | 168              | 203               | 737                   | 521                       | 610                 | 2                           | 3                             | 375                      | 6.7         | 6.5           |
| 4636        | 168              | 203               | 1041                  | 826                       | 914                 | 2                           | 3                             | 664                      | 9.8         | 8             |
| 4640        | 168              | 203               | 1346                  | 1130                      | 1219                | 2                           | 3                             | 969                      | 12.8        | 9.5           |
| 4660        | 168              | 203               | 1651                  | 1435                      | 1524                | 2                           | 3                             | 1274                     | 15.9        | 11            |

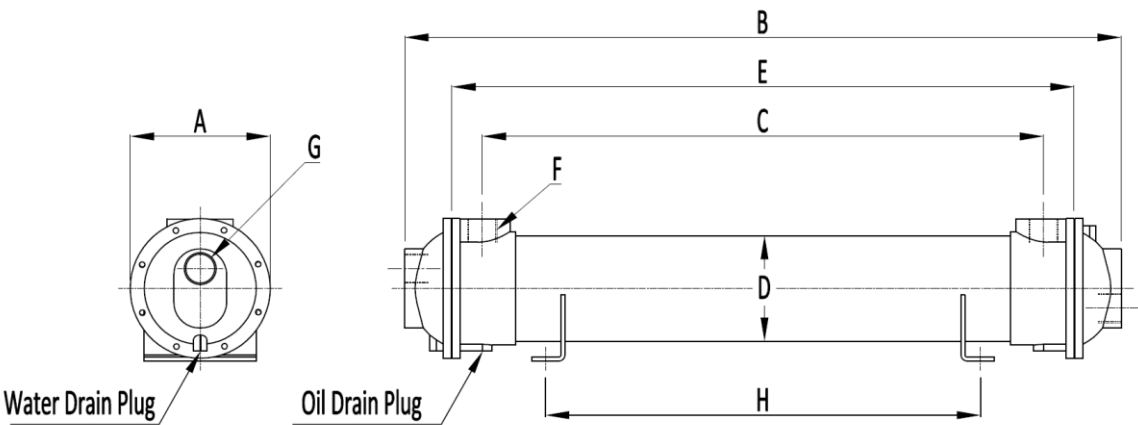
A



B

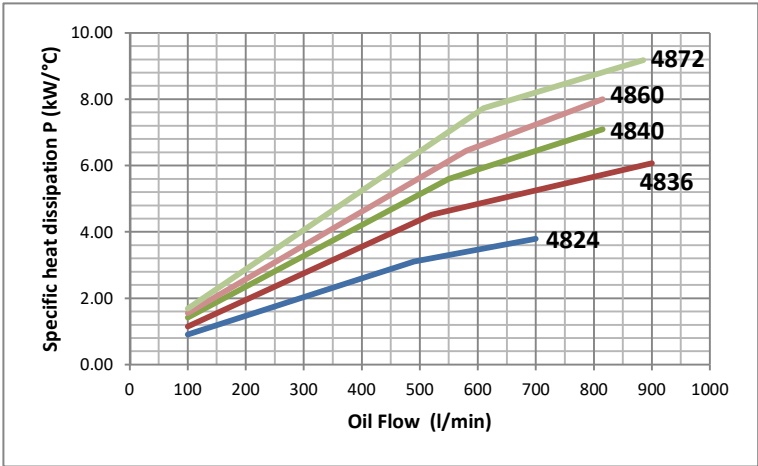


# 4800 Series

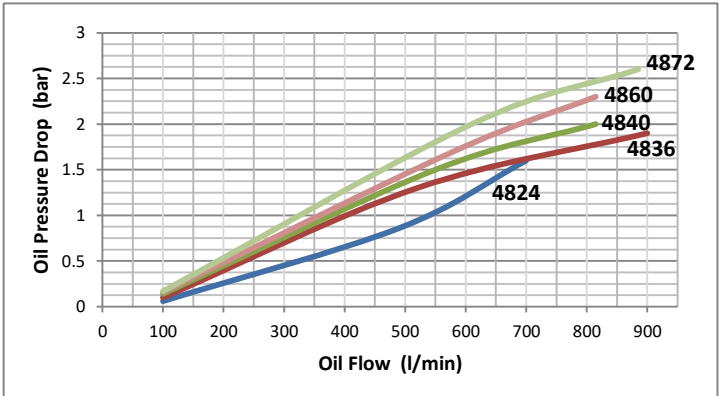


| Serck Model | Shell Dia D (mm) | Flange Dia A (mm) | Overall Length B (mm) | Oil Connection C/C C (mm) | Shell Length E (mm) | Oil Connection F (NPT)-Inch | Water Connection G (NPT)-Inch | Mounting Hole C/C H (mm) | Oil Vol (L) | Water Vol (L) |
|-------------|------------------|-------------------|-----------------------|---------------------------|---------------------|-----------------------------|-------------------------------|--------------------------|-------------|---------------|
| 4824        | 219              | 263               | 787                   | 483                       | 610                 | 3                           | 3                             | 375                      | 11.5        | 13.4          |
| 4836        | 219              | 263               | 1092                  | 787                       | 914                 | 3                           | 3                             | 664                      | 16.7        | 15.9          |
| 4840        | 219              | 263               | 1397                  | 1092                      | 1219                | 3                           | 3                             | 969                      | 22.1        | 18.4          |
| 4860        | 219              | 263               | 1702                  | 1397                      | 1524                | 3                           | 3                             | 1274                     | 27.5        | 20.9          |
| 4872        | 219              | 263               | 2007                  | 1702                      | 1828                | 3                           | 3                             | 1578                     | 32.9        | 23.4          |

A



B





## ENQUIRY DATA SHEET

|            |  |
|------------|--|
| ENQUIRY No |  |
| DATE       |  |

|                |  |
|----------------|--|
| COMPANY        |  |
| ADDRESS        |  |
| CONTACT NAME   |  |
| TELEPHONE NO.  |  |
| E-MAIL ADDRESS |  |

|                   |  |
|-------------------|--|
| ENQUIRY REFERENCE |  |
|-------------------|--|

|                         |       | HOT / PRIMARY SIDE | COLD / SECONDARY SIDE |
|-------------------------|-------|--------------------|-----------------------|
| OPERATING FLUID TYPE    |       |                    |                       |
| REQUIRED HEAT TRANSFER  | kW    |                    |                       |
| INLET TEMPERATURE       | °C    |                    |                       |
| OUTLET TEMPERATURE      | °C    |                    |                       |
| FLOW RATE               | l/min |                    |                       |
| ALLOWABLE PRESSURE DROP | kPa   |                    |                       |
| WORKING PRESSURE        | Bar   |                    |                       |
| VELOCITY LIMITS         | m/s   |                    |                       |

|                                        |  |
|----------------------------------------|--|
| ANY PARTICULAR MODEL NUMBER INTERESTED |  |
|----------------------------------------|--|

|                        |
|------------------------|
| ADDITIONAL INFORMATION |
|                        |



An ISO 9001:2015, 14001:2015 & 45001:2018 Certified Company

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