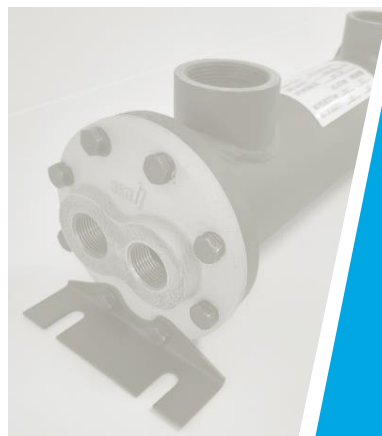
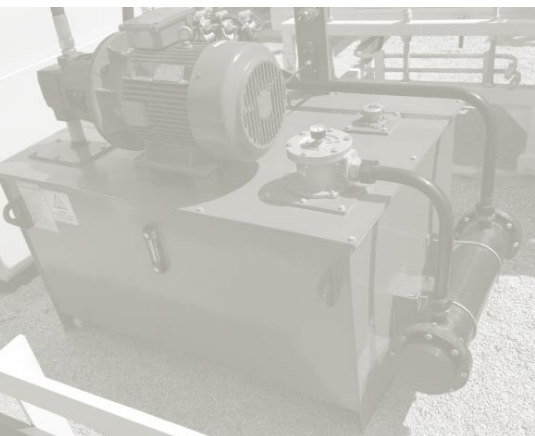




Thermal Systems
Tube & Fin Heat Exchanger
Oil/Water Coolers
Shell & Tube Heat Exchanger



be different.
make a difference.

Oil/Water Coolers

ST-Series

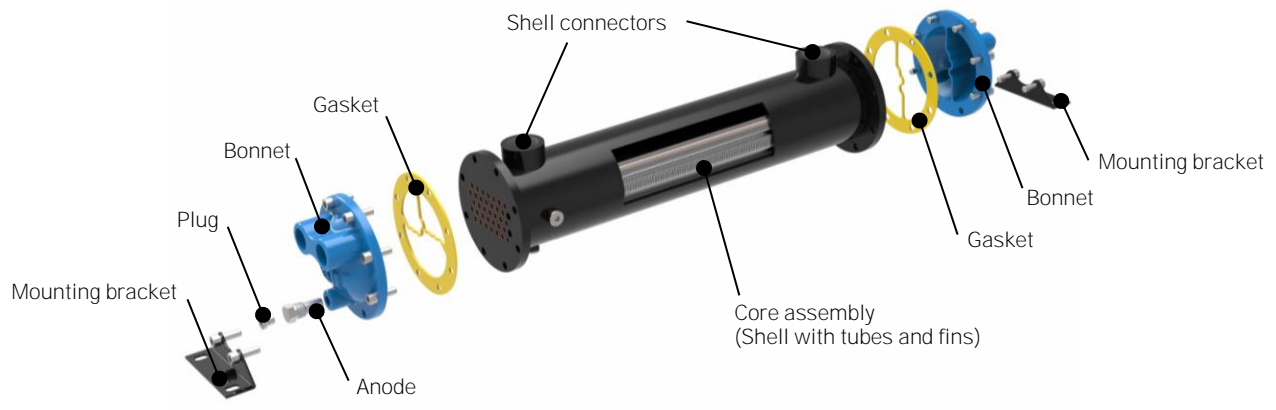
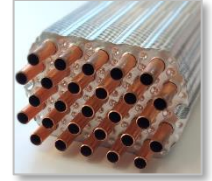


Function

The **asa** hybrid Shell & Tube series represents a major development of shell and tube heat exchangers for a wide range of industrial applications. Its innovative hybrid design with finned tubes provides an expanded cooling surface area, while the bonnets can be easily removed to perform effortless cleaning of the waterside, thus maintaining the highest operational efficiency. The primary benefit of this design lies in its superior heat exchange performance when compared to other types of heat exchangers, coupled with its versatile applicability that is less dependent on the quality of the fluid that is used. We supply single or more pass configurations as well as different material combinations.

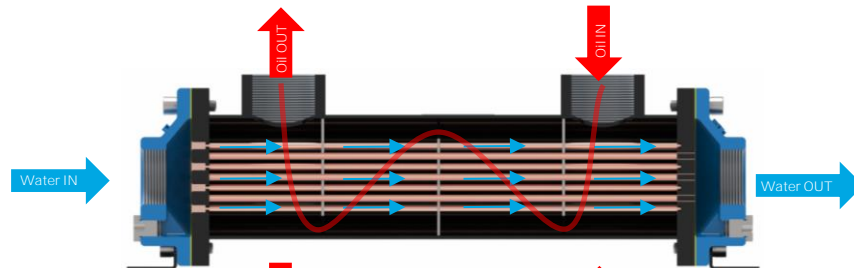
Design

The tubes in the bundle are rotary expanded on both ends in a tube sheet and inserted into a bigger tube (shell) for heat exchanging purposes. Aluminium fins are pushed over the tube bundle and friction-locked together for substantially increasing the heat exchange surface, if compared to a "smooth tube" shell and tube designs. The end flanges are sealed with a gasket and the connection to the waterside is implemented in the bonnet. One fluid flows through the inner tubes (the tube side) and the other through the outer tube (shell side). The heat transfers from one fluid to the other through the fins and the tube walls. With this innovative design, the **asa** Hybrid series offers enhanced performance with a compact footprint.

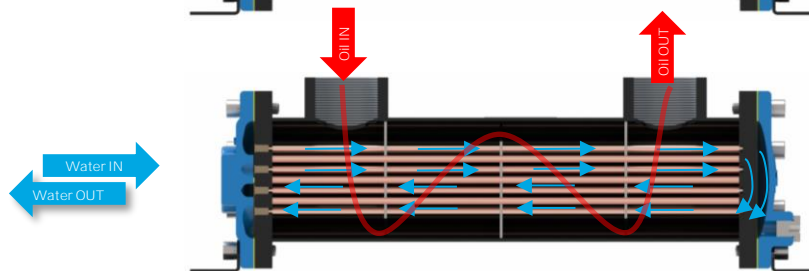


Apart from different sizes we offer one-pass, two pass and four pass configuration:

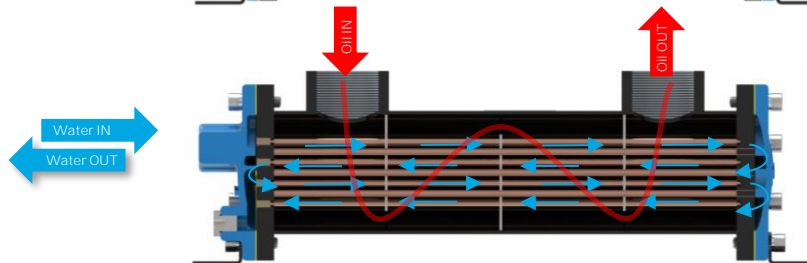
one-pass



two-pass



four-pass



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Oil/Water Coolers

ST-Series



Material and Limits

Depending on the projected application we offer different material configurations to all of our ST series modules.

Materials	A	B
shell	carbon steel	carbon steel
tube sheet	carbon steel	copper/nickel 90/10
tube	copper	copper/nickel 90/10
bonnet	cast iron	admiralty brass + zinc anode
extended fins	aluminium	aluminium
mounting brackets	carbon steel	carbon steel

Working pressure

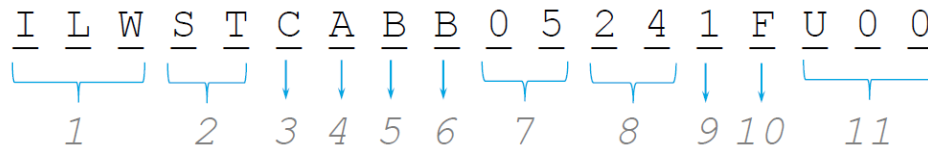
shell side (oil side)	max. 290 PSI *
tube side	max. 145 PSI

Max. working temperature

oil	248°F
water	212°F

* Valid only for liquids (oil) from group 2, of PED 2014/68/EU

Order Code



1 Product Series

I	Industrial Application
L	Heat exchanger
W	Oil/Water cooling

2 Product Series

ST	shell tube cooler series
----	--------------------------

3 Tube diameter

hybrid with fin	
C	0.20 in tube Ø – with fin / only shell 02, 03 & 05
D	0.37 in tube Ø – with fin / only shell 05, 06 & 08

4 Material configuration

A	Oil/Water configuration A
B	Oil/Water configuration B
...	any other configuration and material on request

5 Shell connection / compatible bonnet connection

B	BSP thread / only with BSP bonnet
N	NPT cone thread / only with NPT bonnet
U	SAE o-ring (UNF) / only with NPT bonnet
S	4-bolt SAE flange / only with NPT bonnet
F	Pipe flange (on request) / only with pipe flange bonnet

6 Bonnet connection

B	BSP thread
N	NPT cone thread
F	Pipe flange (on request)

7 Shell inner diameter / compatible tube lengths)

02	2.36 in / only with 8 & 10
03	3.15 in / only with 14 & 24
05	4.92 in / only with 24 & 36
06	5.91 in / only with 24, 36 & 48
08	7.87 in / only with 36, 48, & 60

8 Tube length

08	8 in
10	10 in
12	12 in
14	14 in
18	18 in
24	24 in
36	36 in
48	48 in
60	60 in

9 Flow passes

1	One pass
2	Two pass
4	Four pass

10 Gasket material

F	Compressed fiber (standard)
P	PTFE (on request)
N	NBR (on request)
V	Viton / FPM (on request)

11 Index /customized

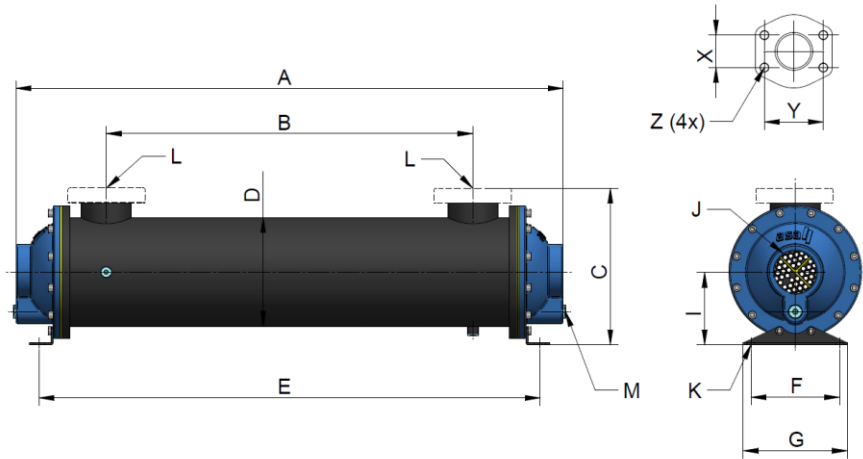
U00	Standard US sales kit
UXX	To be advised by asa

Oil/Water Coolers

ST-Series



ONE PASS



SAE Flange	X	Y	Z
1 1/2"	1.42	2.76	M12
2"	1.69	3.07	M12
3"	2.44	4.17	M16

Dimension

order number	A	B	C		D	E	F	G	I	J	K	L		M	weight
	[in]	[in]	Thread BSPP/ NPT [in]	Flange SAE [in]	Ø [in]	[in]	[in]	[in]	[in]	BSPP/ NPT	slot [in]	BSPP/ NPT	SAE	BSPP	[lbs]
ILWSTCA....02081FU00	10.39	3.86	3.90	n/a	2.56	10.43	2.52	3.50	1.61	3/4"	0.35x0.63	3/4"	n/a	n/a	6.6
ILWSTCA....02101FU00	12.40	5.87	3.90	n/a	2.56	12.44	2.52	3.50	1.61	3/4"	0.35x0.63	3/4"	n/a	n/a	8.8
ILWSTCA....03081FU00	11.14	2.99	5.47	5.71	3.50	10.71	2.99	5.00	2.60	1 1/4"	0.43x0.75	1 1/2"	1 1/2"	1/4"	15.4
ILWSTCA....03141FU00	17.13	8.98	5.47	5.71	3.50	16.69	2.99	5.00	2.60	1 1/4"	0.43x0.75	1 1/2"	1 1/2"	1/4"	19.8
ILWSTCA....03181FU00	21.14	12.99	5.47	5.71	3.50	20.71	2.99	5.00	2.60	1 1/4"	0.43x0.75	1 1/2"	1 1/2"	1/4"	22.0
ILWSTCA....03241FU00	27.13	18.98	5.47	5.71	3.50	26.69	2.99	5.00	2.60	1 1/4"	0.43x0.75	1 1/2"	1 1/2"	1/4"	26.5
ILWSTCA....05181FU00	21.34	12.20	7.48	8.11	5.00	21.46	4.02	6.50	4.02	1 1/2"	0.43x0.98	1 1/2"	2"	1/4"	41.9
ILWSTCA....05241FU00	27.32	18.19	7.48	8.11	5.00	27.44	4.02	6.50	4.02	1 1/2"	0.43x0.98	1 1/2"	2"	1/4"	50.7
ILWSTCA....05361FU00	39.33	30.20	7.48	8.11	5.00	39.45	4.02	6.50	4.02	1 1/2"	0.43x0.98	1 1/2"	2"	1/4"	66.1
ILWSTCA....05481FU00	51.34	42.17	7.48	8.11	5.00	51.42	4.02	6.50	4.02	1 1/2"	0.43x0.98	1 1/2"	2"	1/4"	77.2
ILWSTDA....05241FU00	30.00	20.12	7.48	8.11	5.24	27.44	4.02	5.24	4.02	2"	0.51x0.75	1 1/2"	2"	3/8"	44.1
ILWSTDA....05361FU00	42.01	32.13	7.48	8.11	5.24	40.24	4.02	5.24	4.02	2"	0.51x0.75	1 1/2"	2"	3/8"	66.1
ILWSTDA....06241FU00	30.12	19.02	8.58	9.21	6.26	28.11	5.00	6.26	4.49	3"	0.51x0.75	2"	2"	3/8"	99.2
ILWSTDA....06361FU00	42.13	30.98	8.58	9.21	6.26	40.24	5.00	6.26	4.49	3"	0.51x0.75	2"	2"	3/8"	125.7
ILWSTDA....06481FU00	54.13	42.99	8.58	9.21	6.26	52.13	5.00	6.26	4.49	3"	0.51x0.75	2"	2"	3/8"	149.9
ILWSTDA....08361FU00	45.24	30.75	11.30	12.20	8.62	41.89	7.01	8.27	5.75	4"	0.63x0.87	3"	3"	3/8"	200.6
ILWSTDA....08481FU00	57.24	42.76	11.30	12.20	8.62	53.90	7.01	8.27	5.75	4"	0.63x0.87	3"	3"	3/8"	251.3
ILWSTDA....08601FU00	69.25	54.76	11.30	12.20	8.62	65.91	7.01	8.27	5.75	4"	0.63x0.87	3"	3"	3/8"	302.0



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Oil/Water Coolers

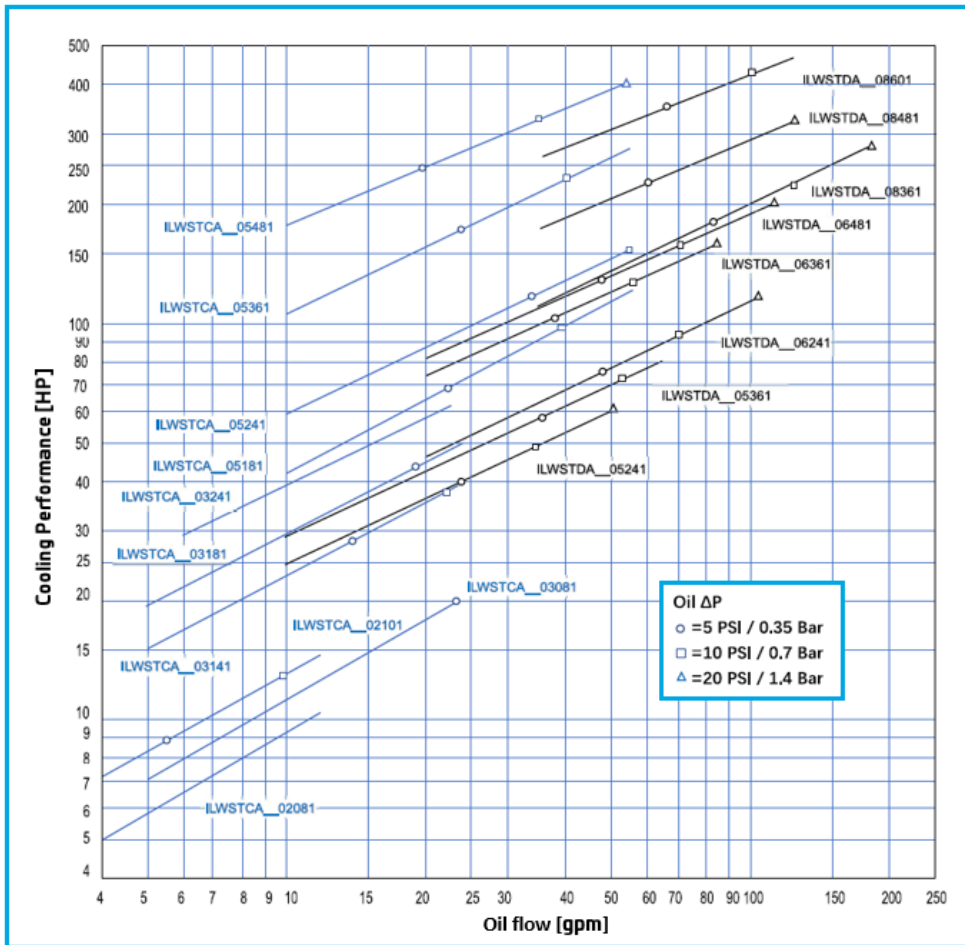
ST-Series



ONE PASS

Performance at 150SSU

1:1 Oil to Water Ratio-High Water Usage



Maximum Water Flow Rates 1 Pass	
size	[gpm]
2"	13
3"	24
5" (0,20 in)	56
5" (0.37 in)	65
6"	120
8"	220

Oil Pressure Drop

- Most systems can tolerate a pressure drop through the heat exchanger of 1 to 2 Bar.
- Excessive pressure drop should be avoided.

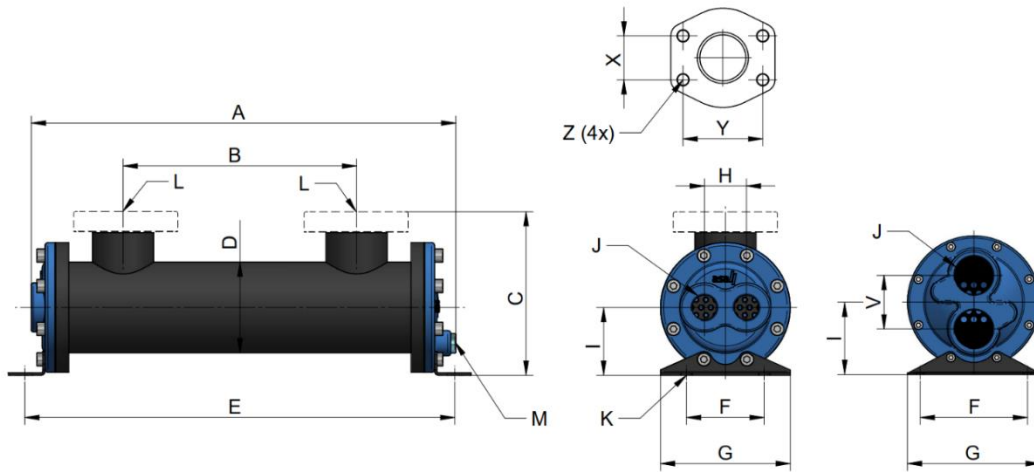
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Oil/Water Coolers

ST-Series



TWO PASS



SAE Flange	X	Y	Z
1 1/2"	1.42	2.76	M12
2"	1.69	3.07	M12
3"	2.44	4.17	M16

Dimension

order number	A	B	C	D	E	F	G	H	I	J	K	L	M	V	weight		
	[in]	[in]	Thread BSP/ NPT [in]	Flange SAE [in]	Ø [in]	[in]	[in]	[in]	[in]	[in]	slot [in]	BSP/ NPT	SAE	BSP/ NPT	[in]	[lbs]	
ILWSTCA....02082FU00	10.39	3.86	3.90	-	2.56	10.43	2.52	3.50	1.14	1.61	3/8"	0.35x0.63	3/4"	n/a	n/a	-	6.6
ILWSTCA....02102FU00	12.40	5.87	3.90	-	2.56	12.44	2.52	3.50	1.14	1.61	3/8"	0.35x0.63	3/4"	n/a	n/a	-	8.8
ILWSTCA....03082FU00	10.39	2.99	5.47	5.71	3.50	10.71	2.99	5.00	1.61	2.60	3/4"	0.43x0.75	1 1/2"	1 1/2"	1/4"	-	15.4
ILWSTCA....03142FU00	16.18	8.98	5.47	5.71	3.50	16.69	2.99	5.00	1.61	2.60	3/4"	0.43x0.75	1 1/2"	1 1/2"	1/4"	-	19.8
ILWSTCA....03182FU00	20.39	12.99	5.47	5.71	3.50	20.71	2.99	5.00	1.61	2.60	3/4"	0.43x0.75	1 1/2"	1 1/2"	1/4"	-	22.0
ILWSTCA....03242FU00	26.18	18.98	5.47	5.71	3.50	26.69	2.99	5.00	1.61	2.60	3/4"	0.43x0.75	1 1/2"	1 1/2"	1/4"	-	26.5
ILWSTCA....05182FU00	20.55	12.20	7.48	8.11	5.00	21.46	4.02	6.50	2.40	4.02	1"	0.43x0.98	1 1/2"	2"	1/4"	-	41.9
ILWSTCA....05242FU00	26.73	18.19	7.48	8.11	5.00	27.44	4.02	6.50	2.40	4.02	1"	0.43x0.98	1 1/2"	2"	1/4"	-	48.5
ILWSTCA....05362FU00	38.74	30.20	7.48	8.11	5.00	39.45	4.02	6.50	2.40	4.02	1"	0.43x0.98	1 1/2"	2"	1/4"	-	66.1
ILWSTCA....05482FU00	50.75	42.17	7.48	8.11	5.00	51.42	4.02	6.50	2.40	4.02	1"	0.43x0.98	1 1/2"	2"	1/4"	-	77.2
ILWSTDA....05242FU00	30.00	20.12	7.48	8.11	5.24	27.44	4.02	5.24	-	4.02	1 1/2"	0.51x0.75	1 1/2"	2"	3/8"	2.99	44.1
ILWSTDA....05362FU00	42.01	32.13	7.48	8.11	5.24	40.24	4.02	5.24	-	4.02	1 1/2"	0.51x0.75	1 1/2"	2"	3/8"	2.99	66.1
ILWSTDA....06242FU00	30.43	19.02	8.58	9.21	6.26	28.11	5.00	6.26	-	4.49	2"	0.51x0.75	2"	2"	3/8"	3.15	99.2
ILWSTDA....06362FU00	42.44	30.98	8.58	9.21	6.26	40.24	5.00	6.26	-	4.49	2"	0.51x0.75	2"	2"	3/8"	3.15	125.7
ILWSTDA....06482FU00	54.49	42.99	8.58	9.21	6.26	52.13	5.00	6.26	-	4.49	2"	0.51x0.75	2"	2"	3/8"	3.15	149.9
ILWSTDA....08362FU00	45.24	30.75	11.30	12.20	8.62	41.89	7.01	8.27	-	5.75	2 1/2"	0.63x0.87	3"	3"	3/8"	2.24	200.6
ILWSTDA....08482FU00	57.24	42.76	11.30	12.20	8.62	53.90	7.01	8.27	-	5.75	2 1/2"	0.63x0.87	3"	3"	3/8"	2.24	251.3
ILWSTDA....08602FU00	69.25	54.76	11.30	12.20	8.62	65.91	7.01	8.27	-	5.75	2 1/2"	0.63x0.87	3"	3"	3/8"	2.24	302.0



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Oil/Water Coolers

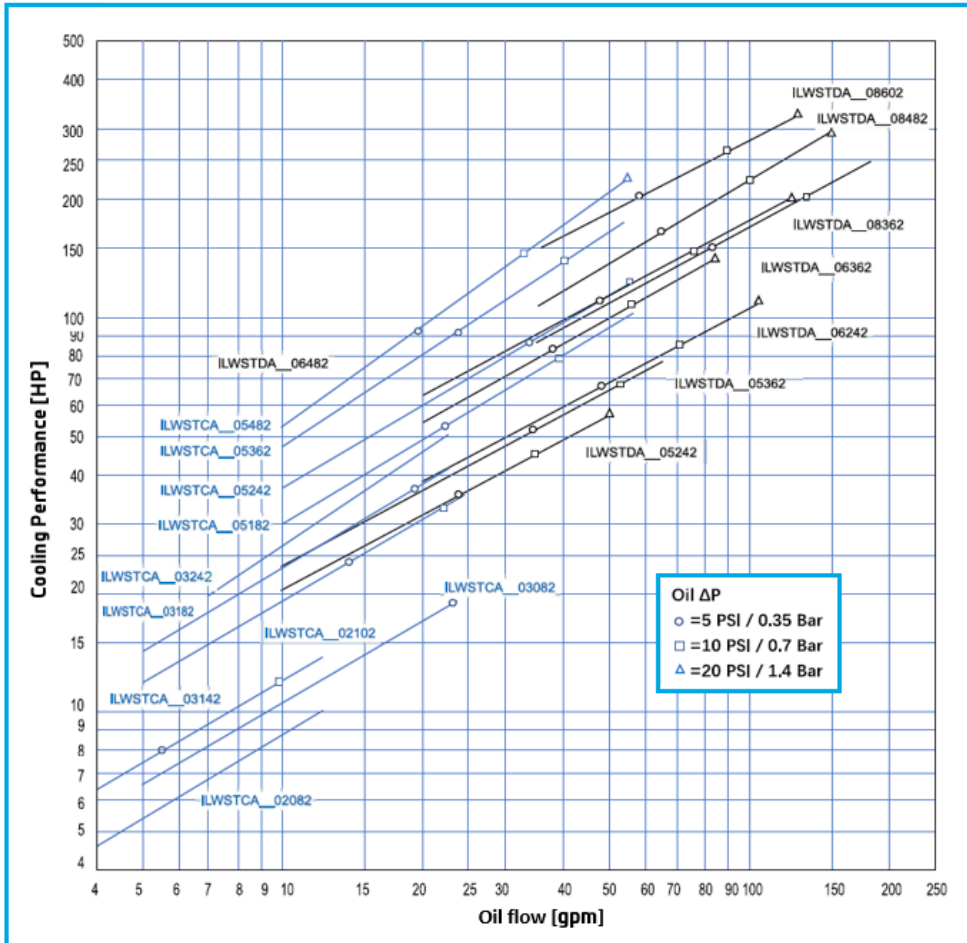
ST-Series



TWO PASS

Performance at 150SSU

2:1 Oil to Water Ratio-Medium Water Usage



Maximum Water Flow Rates 2 Pass	
size	[gpm]
2"	6.1
3"	11.9
5" (0,20 in)	28.0
5" (0,37 in)	32.0
6"	60.0
8"	109.9

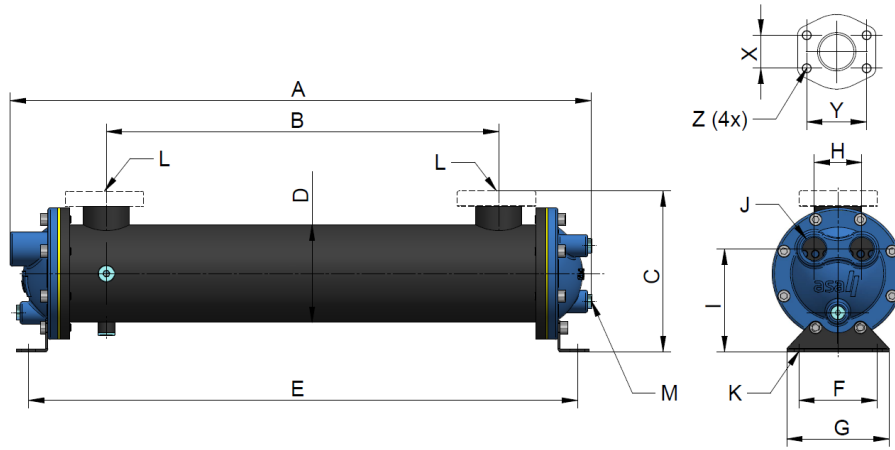
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Oil/Water Coolers

ST-Series



FOUR PASS



SAE Flange	X	Y	Z
1 1/2"	1.42	2.76	M12
2"	1.69	3.07	M12
3"	2.44	4.17	M16

Dimension

order number	A	B	C		D	E	F	G	H	I	J	K	L		M	weight
	[in]	[in]	Thread BSPP/ NPT [in]	Flange SAE [in]	Ø [in]	[in]	[in]	[in]	[in]	[in]	BSPP/ NPT	slot [in]	BSPP/ NPT	SAE	BSPP	[lbs]
ILWSTCA_03084FU00	10.67	2.99	5.47	5.71	3.50	10.71	2.99	5.00	1.77	3.31	1/2"	0.43x0.75	1 1/2"	1 1/2"	1/4"	15.4
ILWSTCA...03144FU00	16.65	8.98	5.47	5.71	3.50	16.69	2.99	5.00	1.77	3.31	1/2"	0.43x0.75	1 1/2"	1 1/2"	1/4"	19.8
ILWSTCA_03184FU00	20.67	12.99	5.47	5.71	3.50	20.71	2.99	5.00	1.77	3.31	1/2"	0.43x0.75	1 1/2"	1 1/2"	1/4"	22.0
ILWSTCA...03244FU00	26.65	18.98	5.47	5.71	3.50	26.69	2.99	5.00	1.77	3.31	1/2"	0.43x0.75	1 1/2"	1 1/2"	1/4"	26.5
ILWSTCA...05184FU00	20.55	12.20	7.48	8.11	5.00	21.46	4.02	6.50	2.52	4.92	3/4"	0.43x0.98	1 1/2"	2"	1/4"	41.9
ILWSTCA...05244FU00	26.54	18.19	7.48	8.11	5.00	27.44	4.02	6.50	2.52	4.92	3/4"	0.43x0.98	1 1/2"	2"	1/4"	50.7
ILWSTCA...05364FU00	38.54	30.20	7.48	8.11	5.00	39.45	4.02	6.50	2.52	4.92	3/4"	0.43x0.98	1 1/2"	2"	1/4"	66.1
ILWSTCA_05484FU00	50.55	42.17	7.48	8.11	5.00	51.42	4.02	6.50	2.52	4.92	3/4"	0.43x0.98	1 1/2"	2"	1/4"	77.2
ILWSTDA...05244FU00	30.00	20.12	7.48	8.11	5.24	27.44	4.02	5.24	2.44	5.28	1"	0.51x0.75	1 1/2"	2"	3/8"	44.1
ILWSTDA...05364FU00	42.01	32.13	7.48	8.11	5.24	40.24	4.02	5.24	2.44	5.28	1"	0.51x0.75	1 1/2"	2"	3/8"	66.1
ILWSTDA...06244FU00	30.12	19.02	8.58	9.21	6.26	28.11	5.00	6.26	2.87	5.91	1 1/2"	0.51x0.75	2"	2"	3/8"	99.2
ILWSTDA...06364FU00	42.13	30.98	8.58	9.21	6.26	40.24	5.00	6.26	2.87	5.91	1 1/2"	0.51x0.75	2"	2"	3/8"	125.7
ILWSTDA...06484FU00	54.13	42.99	8.58	9.21	6.26	52.13	5.00	6.26	2.87	5.91	1 1/2"	0.51x0.75	2"	2"	3/8"	149.9
ILWSTDA...08364FU00	45.24	30.75	11.30	12.20	8.62	41.89	7.01	8.27	4.25	7.48	2"	0.63x0.87	3"	3"	3/8"	200.6
ILWSTDA...08484FU00	57.24	42.76	11.30	12.20	8.62	53.90	7.01	8.27	4.25	7.48	2"	0.63x0.87	3"	3"	3/8"	251.3
ILWSTDA...08604FU00	69.25	54.76	11.30	12.20	8.62	65.91	7.01	8.27	4.25	7.48	2"	0.63x0.87	3"	3"	3/8"	302.0



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Oil/Water Coolers

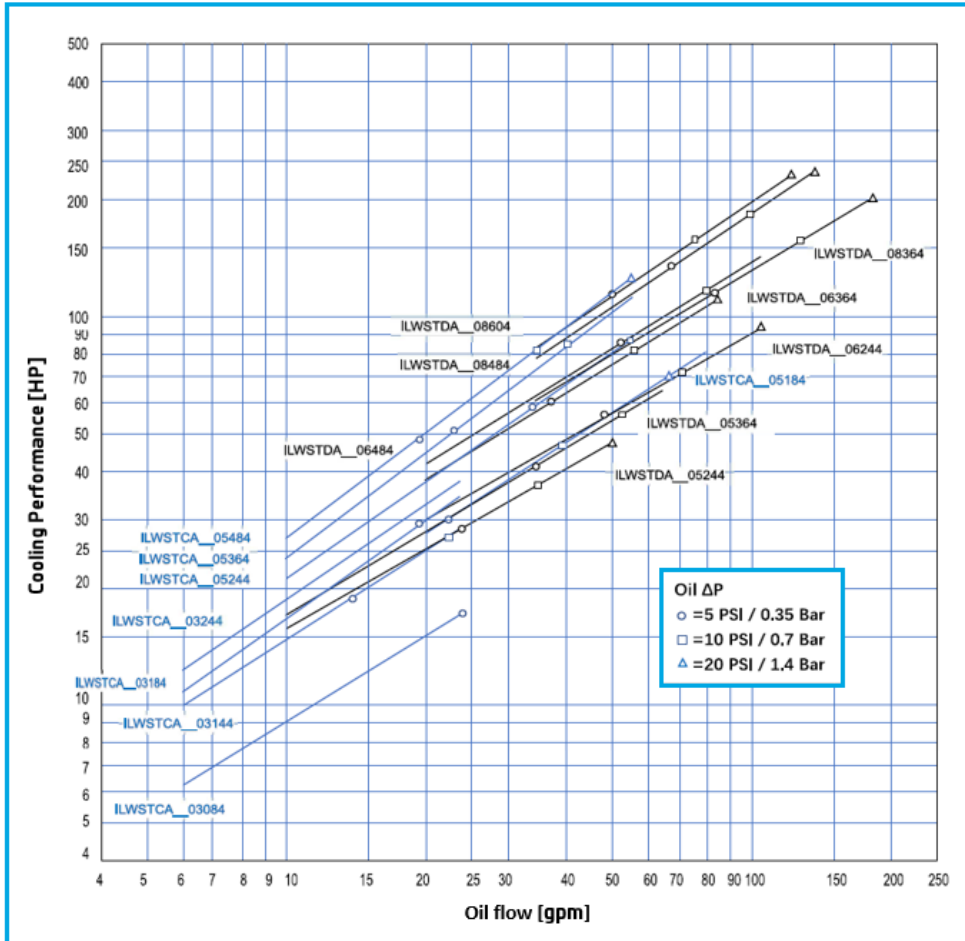
ST-Series



FOUR PASS

Performance at 150SSU

4:1 Oil to Water Ratio-Medium Water Usage



Maximum Water Flow Rates 4 Pass	
size	[gpm]
2"	n/a
3"	6.1
5" (0,20 in)	14.0
5" (0,37 in)	16.1
6"	30.1
8"	65.0

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Oil/Water Coolers

ST-Series



Selection Procedure

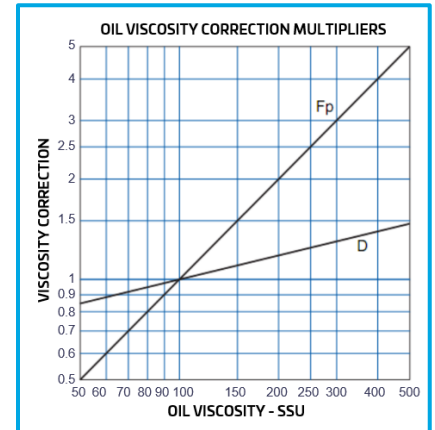
Step 1 Thermal Duty Determination.

This will vary with different systems, but typically coolers are sized to remove 20% to 35% of the input nameplate hp.

Step 2 Determine Approach Temperature.

Desired oil leaving cooler = 122°F
 Water inlet temperature = 86°F

$$\begin{array}{rcl} \text{Desired oil leaving cooler } ^\circ\text{F} & - & \text{Water inlet temp. } ^\circ\text{F} = \text{Actual Approach} \\ 122^\circ\text{F} & - & 86^\circ\text{F} = 36^\circ\text{F} \end{array}$$



Step 3 Determine hp Curve Heat Load

$$\text{hp heat load} \times \frac{40}{\text{Actual approach}} \times \text{Viscosity Correction D} = \text{Curve hp Power}$$

Step 4 Enter Curves

Enter the value of the hp Curve Heat Load on the vertical line oil flow on the cooling performance diagram (Pages 5, 7, 9), any curve above the intersecting point will work.

Step 5 Determine oil pressure drop

The values indicated in the diagram are valid for hydraulic oil with a viscosity of 150SSU (appr. ISO VG 32). Multiply the pressure drop by the Correction factor Fp according to the used hydraulic oil viscosity.

- = 5 PSI
- = 10 PSI
- △ = 20 PSI

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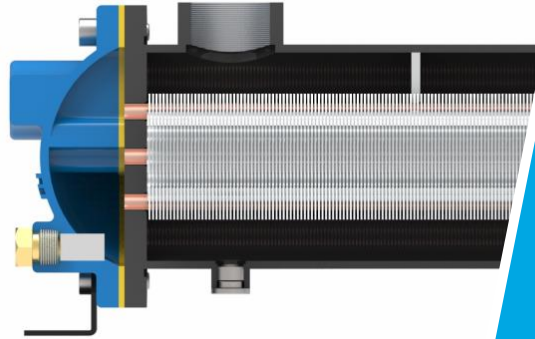
ST-Series

Customized to your applications

Apart from the actual application parameters, ambient conditions and scope of delivery, we offer customized heat exchanger solutions for many types of fluids. Please contact us with your specific requirements and make the most of our benefits such as expert consultation and accurate verification of the product against your system requirements.

your advantages:

- ✓ project management
- ✓ calculation and simulation
- ✓ verification on test bench
- ✓ procurement option system
- ✓ approved quality





Thermal Systems
Connection Technology
Fluid Controls

be different.
make a difference.



USA

asa hydraulik of America
160 Meister Avenue 20 A
Branchburg, New Jersey 08876
Tel.: +1 800 473 94 00
Tel.: +1 908 541 15 00
sales_us@asahydraulik.com

AUSTRIA

asa technology Produktions-
und Vertriebs GmbH
Prager Strasse 280
A-1210, Vienna
Tel.: +43 1 292 40 20
support@asahydraulik.com

AUSTRALIA

asa Products Pty Ltd
Quinlan Road 23
3076 Epping, Victoria
Tel.: +61 3 9397 6129
melbourne@asahydraulik.com

BRASIL

asa hydraulik do Brasil Ltda.
Rua Maria Fett 96 Bloco B
Vila Mercedes, 03263000, Sao Paulo, SP
Tel.: +55 11 9 8862-0022
sales_brazil@asahydraulik.com

CHINA

asa Hydraulik Technology (Suzhou) Co.Ltd
江苏省苏州市工业园区方洲路 128 号 6 区 B 幢
Area 6, Building B,
Fangzhou Road No 128,
Suzhou industrial park,
Suzhou City, Jiangsu Province
Tel.: +86 512 62381988
suzhou@asahydraulik.com

INDIA

asa heatexchanger Pvt Ltd
Plot no.1226, Phase-3, GIDC, Vatva
Ahmedabad - 382445
Tel.: +91 70 43907273
salesindia@asahydraulik.com