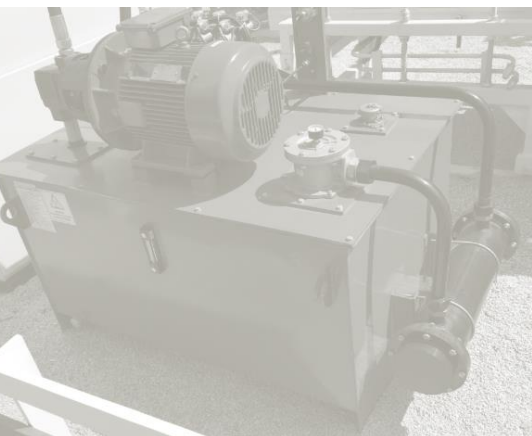




Thermal Systems  
Tube & Fin Heat Exchanger  
Oil/Water Coolers  
Shell & Tube Heat Exchanger



be different.  
make a difference.

# Oil/Water Coolers

## ST-Series

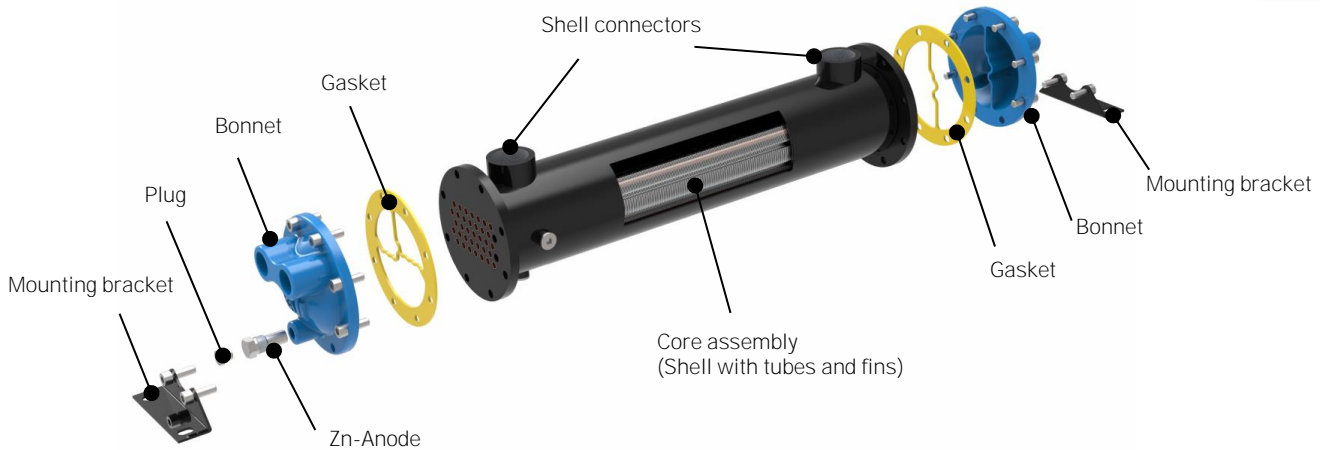


### Function

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.

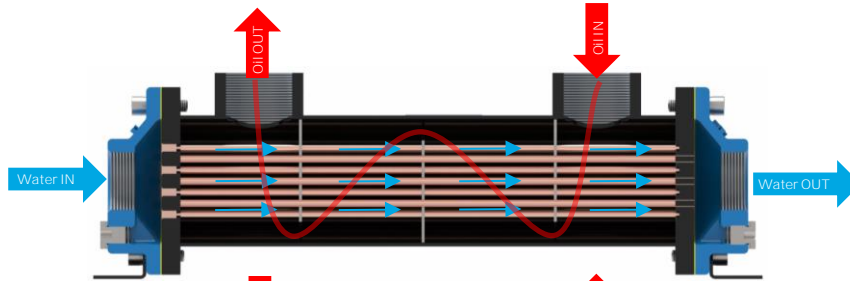
### Design

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.

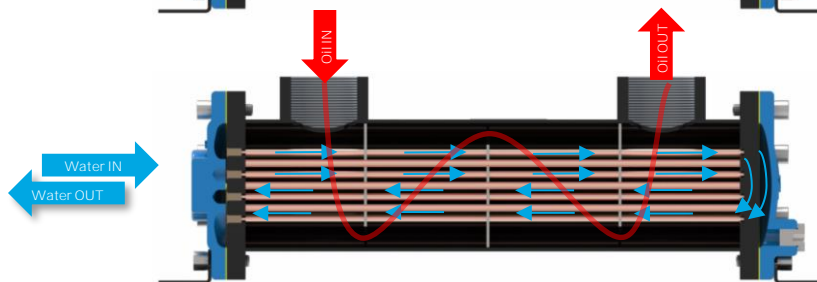


Along with different sizes we offer one-pass, two pass and four pass configuration:

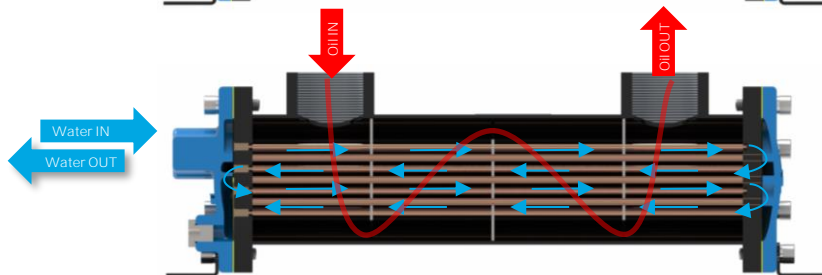
one-pass



two-pass



four-pass



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# Oil/Water Coolers

## ST-Series



### Material and Limits

Depending on the intended 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

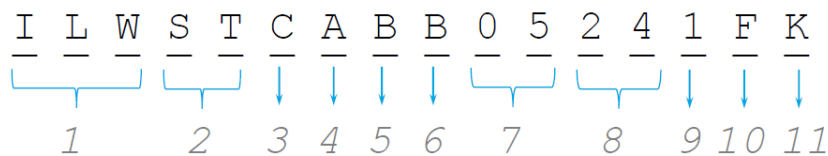
shell side (oil side)	max. 20 bar *
tube side	max. 10 bar

### Max. working temperature

oil	120°C
water	100°C

\*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

<i>hybrid with fin</i>	
C	5,0 mm tube Ø – with fin / only shell 02, 03 & 05
D	9,5 mm 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	60 mm / only with 8 & 10
03	80 mm / only with 14 & 24
05	125 mm / only with 24 & 36
06	150 mm / only with 24, 36 & 48
08	200 mm / only with 36, 48, & 60

#### 8 Tube length

08	203 mm
10	254 mm
12	304 mm
14	355 mm
18	457 mm
24	609 mm
36	914 mm
48	1219 mm
60	1524 mm

#### 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

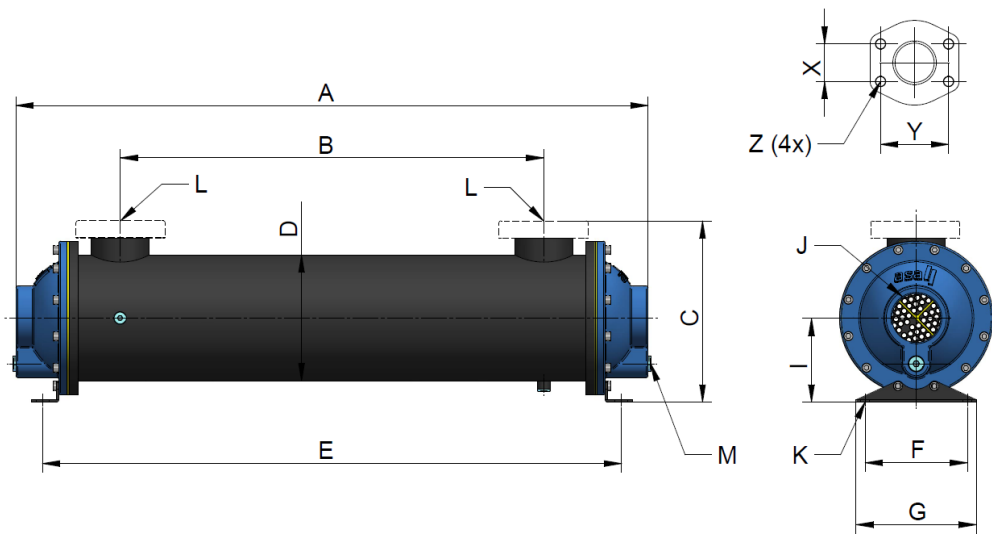
K	Standard EU sales kit
BXX	To be advised by asa

# Oil/Water Coolers

## ST-Series



ONE PASS



SAE Flange	X	Y	Z
1 1/2"	36	70	M12
2"	43	78	M12
3"	62	106	M16

### Dimension

order number	A	B	C		D	E	F	G	I	J	K	L		M	weight
	[mm]	[mm]	BSPP [mm]	SAE [mm]	Ø [mm]	[mm]	[mm]	[mm]	[mm]	BSPP/NPT	slot [mm]	BSPP/NPT	SAE	BSPP	[kg]
ILWSTCA....02081F	264	98	99	n/a	65	265	64	89	41	3/4"	9x16	3/4"	n/a	n/a	3
ILWSTCA....02101F	315	149	99	n/a	65	316	64	89	41	3/4"	9x16	3/4"	n/a	n/a	4
ILWSTCA....03081F	283	76	139	145	89	272	76	127	66	1 1/4"	11x19	1 1/2"	1 1/2"	1/4"	7
ILWSTCA....03141F	435	228	139	145	89	424	76	127	66	1 1/4"	11x19	1 1/2"	1 1/2"	1/4"	9
ILWSTCA....03181F	537	330	139	145	89	526	76	127	66	1 1/4"	11x19	1 1/2"	1 1/2"	1/4"	10
ILWSTCA....03241F	689	482	139	145	89	678	76	127	66	1 1/4"	11x19	1 1/2"	1 1/2"	1/4"	12
ILWSTCA....05181F	542	310	190	206	127	545	102	165	102	1 1/2"	11x25	1 1/2"	2"	1/4"	19
ILWSTCA....05241F	694	462	190	206	127	697	102	165	102	1 1/2"	11x25	1 1/2"	2"	1/4"	23
ILWSTCA....05361F	999	767	190	206	127	1002	102	165	102	1 1/2"	11x25	1 1/2"	2"	1/4"	30
ILWSTCA....05481F	1304	1071	190	206	127	1306	102	165	102	1 1/2"	11x25	1 1/2"	2"	1/4"	35
ILWSTDA....05241F	762	511	190	206	133	697	102	133	102	1 1/2"	11x25	1 1/2"	2"	3/8"	20
ILWSTDA....05361F	1067	816	190	206	133	1022	102	133	102	1 1/2"	11x25	1 1/2"	2"	3/8"	30
ILWSTDA....06241F	765	483	218	234	159	714	127	159	114	3"	13x19	2"	2"	3/8"	45
ILWSTDA....06361F	1070	787	218	234	159	1022	127	159	114	3"	13x19	2"	2"	3/8"	57
ILWSTDA....06481F	1375	1092	218	234	159	1324	127	159	114	3"	13x19	2"	2"	3/8"	68
ILWSTDA....08361F	1149	781	287	310	219	1064	178	210	146	4"	16x22	3"	3"	3/8"	91
ILWSTDA....08481F	1454	1086	287	310	219	1369	178	210	146	4"	16x22	3"	3"	3/8"	114
ILWSTDA....08601F	1759	1391	287	310	219	1674	178	210	146	4"	16x22	3"	3"	3/8"	137



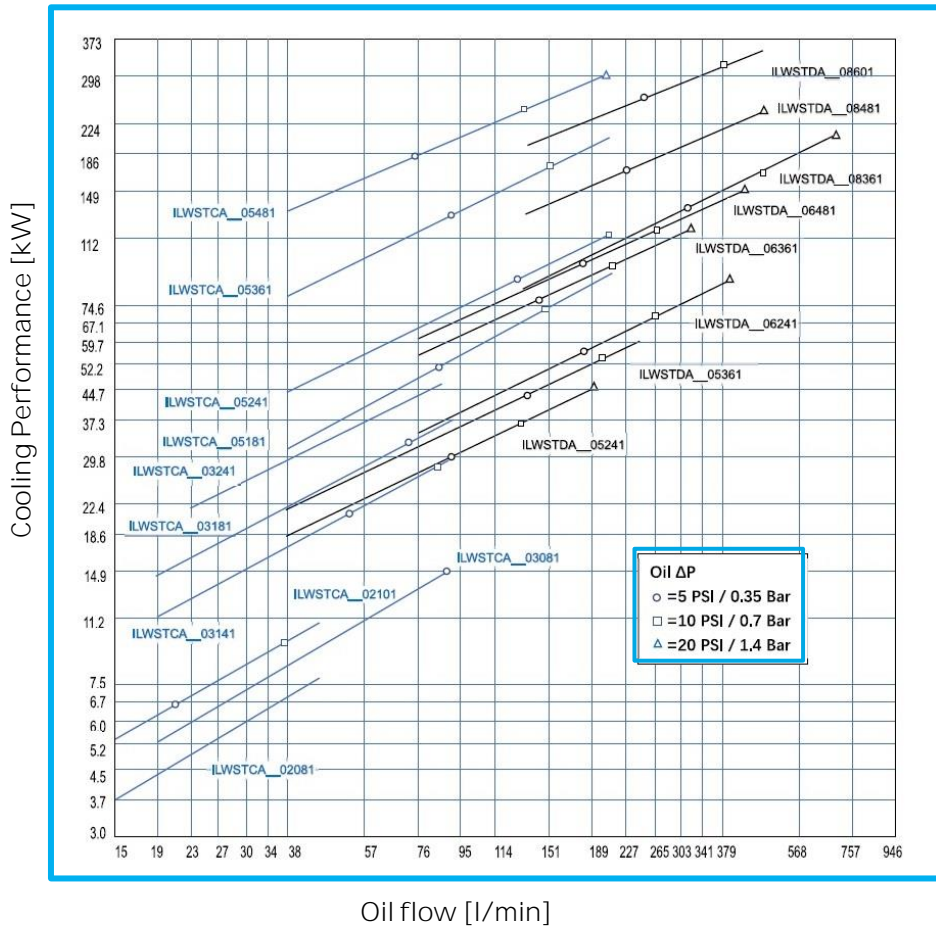
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ONE PASS

Performance at 30Cst

1:1 Oil to Water Ratio-High Water Usage



Maximum Water Flow Rates 1 Pass	
size	l/min
2"	49
3"	91
5" (5 mm)	212
5" (9,5 mm)	246
6"	454
8"	833

### Oil Pressure Drop

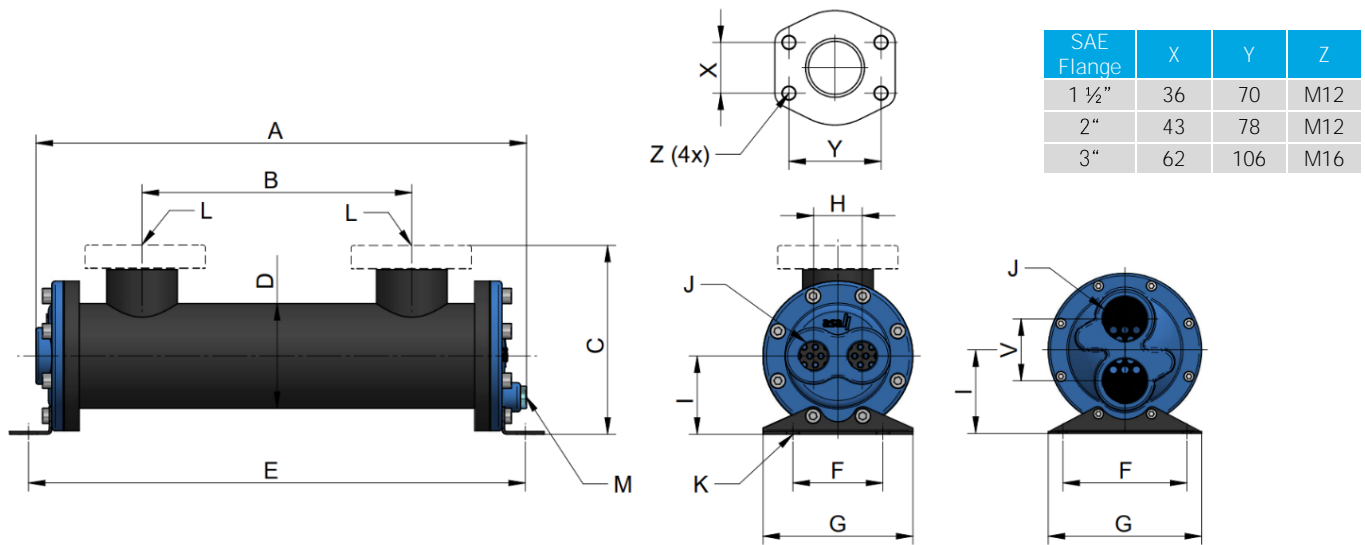
- Most systems can tolerate a pressure drop through the heat exchanger of 1 to 2 Bar.
- Excessive pressure drop should be avoided.

# Oil/Water Coolers

## ST-Series



TWO PASS



### Dimension

order number	A	B	C	D	E	F	G	H	I	J	K	L	M	V	weight		
	[mm]	[mm]	BSPP [mm]	SAE [mm]	Ø [mm]	[mm]	[mm]	[mm]	[mm]	BSPP/NPT	slot [mm]	BSPP/NPT	SAE	BSPP	[mm]	[kg]	
ILWSTCA...02082F	264	98	99	n/a	65	265	64	89	29	41	3/8"	9x16	3/4"	n/a	n/a	-	3
ILWSTCA...02102F	315	149	99	n/a	65	316	64	89	29	41	3/8"	9x16	3/4"	n/a	n/a	-	4
ILWSTCA...03082F	264	76	139	145	89	272	76	12	41	66	3/4"	11x19	1 1/2"	1 1/2"	1/4"	-	7
ILWSTCA...03142F	411	228	139	145	89	424	76	127	41	66	3/4"	11x19	1 1/2"	1 1/2"	1/4"	-	9
ILWSTCA...03182F	518	330	139	145	89	526	76	127	41	66	3/4"	11x19	1 1/2"	1 1/2"	1/4"	-	10
ILWSTCA...03242F	665	482	139	145	89	678	76	127	41	66	3/4"	11x19	1 1/2"	1 1/2"	1/4"	-	12
ILWSTCA...05182F	522	310	190	206	127	545	102	165	61	102	1"	11x25	1 1/2"	2"	1/4"	-	19
ILWSTCA...05242F	679	462	190	206	127	697	102	165	61	102	1"	11x25	1 1/2"	2"	1/4"	-	23
ILWSTCA...05362F	984	767	190	206	127	1002	102	165	61	102	1"	11x25	1 1/2"	2"	1/4"	-	30
ILWSTCA...05482F	1289	1071	190	206	127	1306	102	165	61	102	1"	11x25	1 1/2"	2"	1/4"	-	35
ILWSTDA...05242F	762	511	190	206	133	697	102	133	-	102	1 1/2"	13x19	1 1/2"	2"	3/8"	76	20
ILWSTDA...05362F	1067	816	190	206	133	1022	102	133	-	102	1 1/2"	13x19	1 1/2"	2"	3/8"	76	30
ILWSTDA...06242F	765	483	218	234	159	714	127	159	-	114	2"	13x19	2"	2"	3/8"	80	45
ILWSTDA...06362F	1070	787	218	234	159	1022	127	159	-	114	2"	13x19	2"	2"	3/8"	80	57
ILWSTDA...06482F	1375	1092	218	234	159	1324	127	159	-	114	2"	13x19	2"	2"	3/8"	80	68
ILWSTDA...08362F	1149	781	287	310	219	1064	178	210	-	146	2 1/2"	16x22	3"	3"	3/8"	114	91
ILWSTDA...08482F	1454	1086	287	310	219	1369	178	210	-	146	2 1/2"	16x22	3"	3"	3/8"	114	114
ILWSTDA...08602F	1759	1391	287	310	219	1674	178	210	-	146	2 1/2"	16x22	3"	3"	3/8"	114	137



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# Oil/Water Coolers

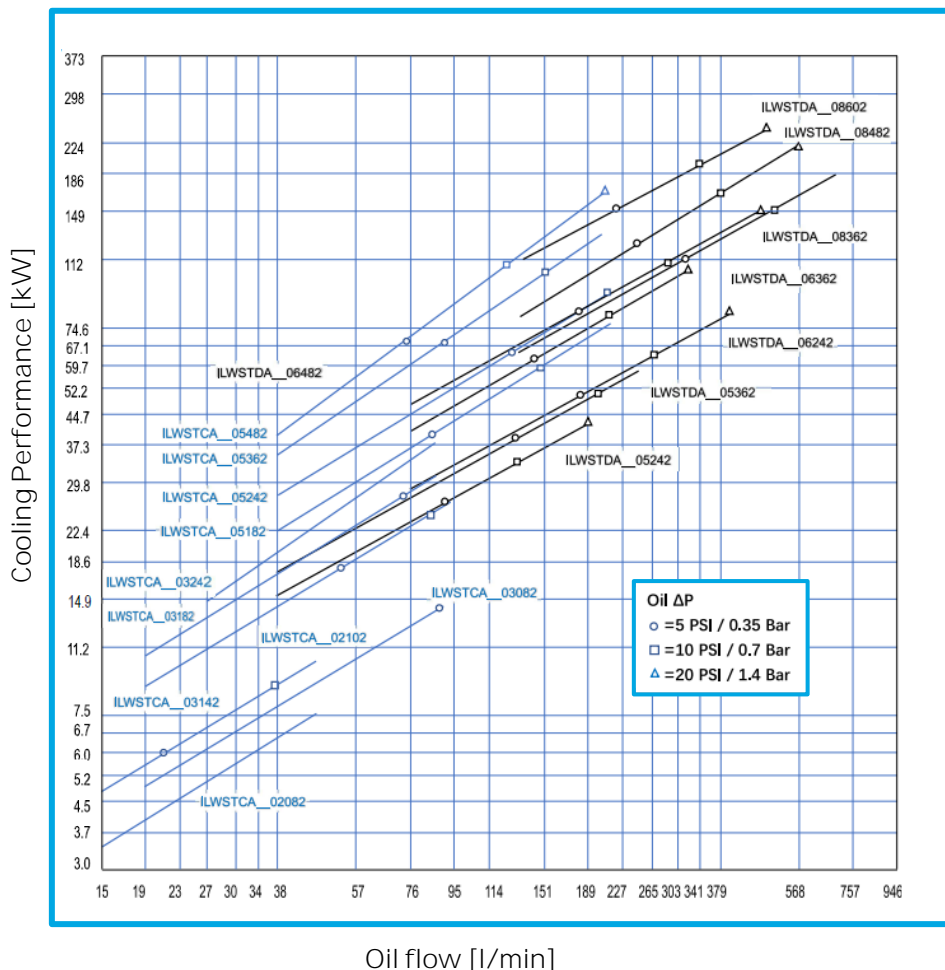
## ST-Series



TWO PASS

Performance at 30cSt

2:1 Oil to Water Ratio-Medium Water Usage



Maximum Water Flow Rates 2 Pass	
size	[l/min]
2"	23
3"	45
5" (5mm)	106
5" (9,5 mm)	121
6"	227
8"	416

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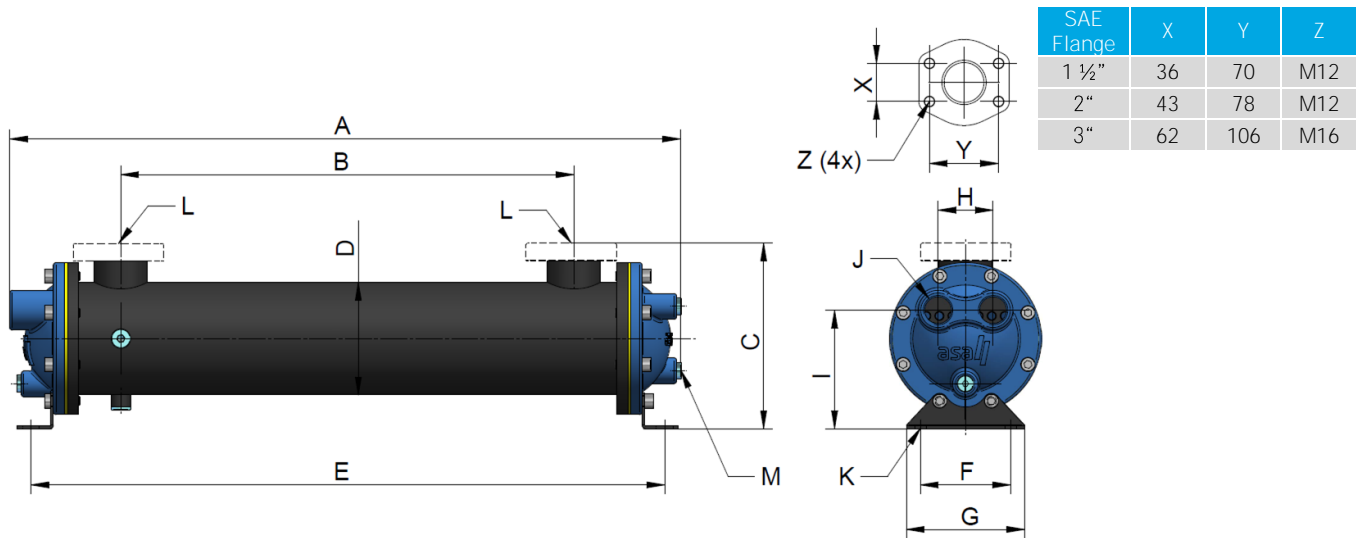
# Oil/Water Coolers

## ST-Series



FOUR PASS

Dimension



### Technical Data

order number	A	B	C		D	E	F	G	H	I	J	K	L		M	weight
	[mm]	[mm]	BSPP [mm]	SAE [mm]	Ø [mm]	[mm]	[mm]	[mm]	[mm]	[mm]	BSPP/NPT	slot [mm]	BSPP/NPT	SAE	BSPP	[kg]
ILWSTCA_03084F	271	76	139	145	89	272	76	127	45	84	1/2"	11X19	1 1/2"	1 1/2"	1/4"	7
ILWSTCA_03144F	423	228	139	145	89	424	76	127	45	84	1/2"	11X19	1 1/2"	1 1/2"	1/4"	9
ILWSTCA_03184F	525	330	139	145	89	526	76	127	45	84	1/2"	11X19	1 1/2"	1 1/2"	1/4"	10
ILWSTCA_03244F	677	482	139	145	89	678	76	127	45	84	1/2"	11X19	1 1/2"	1 1/2"	1/4"	12
ILWSTCA_05184F	522	310	190	206	127	545	102	165	64	125	3/4"	11X25	1 1/2"	2"	1/4"	19
ILWSTCA_05244F	674	462	190	206	127	697	102	165	64	125	3/4"	11X25	1 1/2"	2"	1/4"	23
ILWSTCA_05364F	979	767	190	206	127	1002	102	165	64	125	3/4"	11X25	1 1/2"	2"	1/4"	30
ILWSTCA...05484F	1284	1071	190	206	127	1306	102	165	64	125	3/4"	11X25	1 1/2"	2"	1/4"	35
ILWSTDA_05244F	762	511	190	206	133	697	102	133	62	134	1"	13x19	1 1/2"	2"	3/8"	20
ILWSTDA_05364F	1067	816	190	206	133	1022	102	133	62	134	1"	13x19	1 1/2"	2"	3/8"	30
ILWSTDA_06244F	765	483	218	234	159	714	127	159	73	150	1 1/2"	13x19	2"	2"	3/8"	45
ILWSTDA_06364F	1070	787	218	234	159	1022	127	159	73	150	1 1/2"	13x19	2"	2"	3/8"	57
ILWSTDA_06484F	1375	1092	218	234	159	1324	127	159	73	150	1 1/2"	13x19	2"	2"	3/8"	68
ILWSTDA...08364F	1149	781	287	310	219	1064	178	210	108	190	2"	16x22	3"	3"	3/8"	91
ILWSTDA...08484F	1454	1086	287	310	219	1369	178	210	108	190	2"	16x22	3"	3"	3/8"	114
ILWSTDA...08604F	1759	1391	287	310	219	1674	178	210	108	190	2"	16x22	3"	3"	3/8"	137



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# Oil/Water Coolers

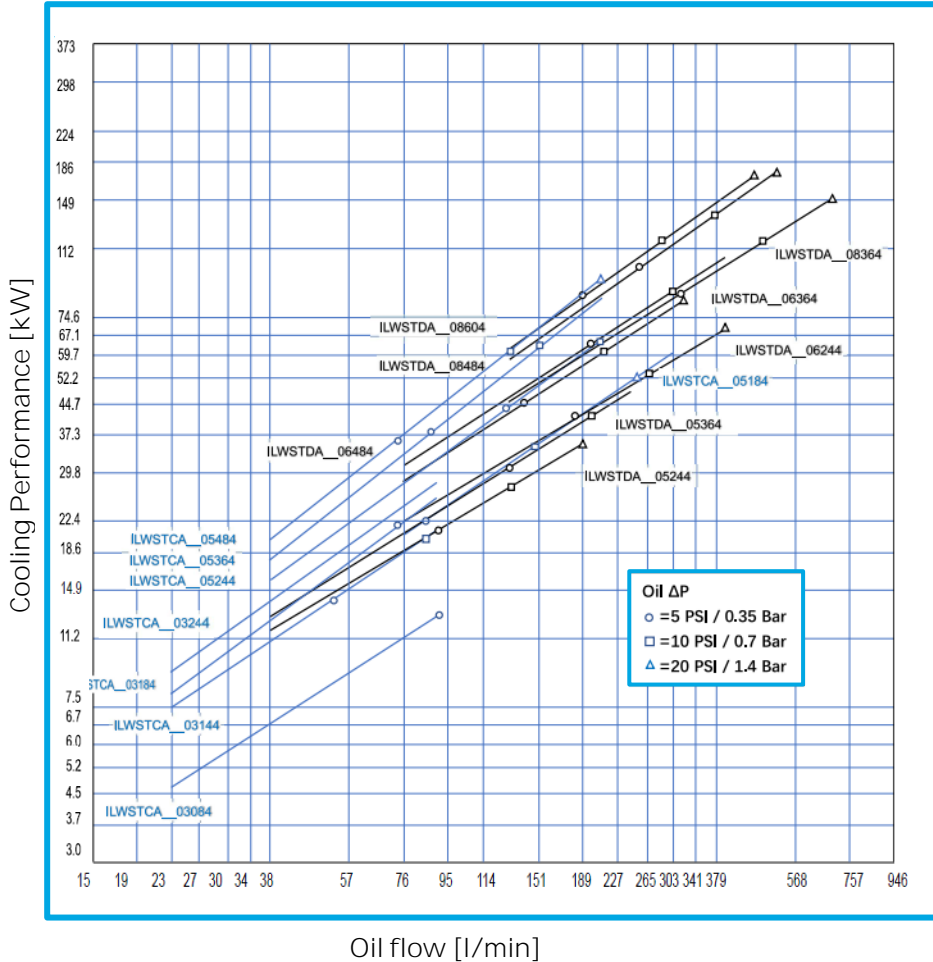
## ST-Series



FOUR PASS

Performance at 30Cst

4:1 Oil to Water Ratio-Low Water Usage



Maximum Water Flow Rates 4 Pass	
size	[l/min]
2"	n/a
3"	23
5" (5mm)	53
5" (9,5 mm)	61
6"	114
8"	246

This data sheet and the corresponding scale drawings are to be used as a general guideline and technical overview of our products. Please contact us if more exact information is needed. As we are constantly improving our products, their characteristics, dimensions and weights may also change, although we do our best to incorporate these changes continually. asa assumes no liability for any information therein, any errors, omissions, misprints, nor any direct or indirect damages, losses or costs resulting therefrom. Any cooling performances and general technical values indicated in this catalogue are measured at a test bench according to asa testing procedures or calculated, based on such tests. They represent a basis for your product selection. Due to different conditions in testing and application environments the performance may also vary by +/- 15%. All sound values are determined in accordance with ISO 9614-2, DIN EN ISO 11203 accuracy class 3 or Machinery Directive 2006/42/EG and are A-rated. At some of the performance data, possible differences to competition data are possible. The reason to that are no existing standardized testing procedures on individual subjects, e.g. for cooling performance measurements. Therefore, we recommend all products to be checked under the system operating conditions. This is also true of vibrations and mechanical stress as well as for pressure peaks and thermal stress and any other relevant factors. General tolerances according to DIN ISO 2768-vL. General tolerances for casted parts according to EN ISO 8062-3 (DCTG 10). Tolerances for rubber parts are according to ISO 3302-1 (class M4-F-C). The tolerances of welding seams are defined by quality group D according to EN ISO 10042, if it is not specified on the actual scale drawing or data sheet. Any form of liability is excluded for the information included in this datasheet. All details and calculation values are checked to the best of our ability, but these do not ensure any intrinsic product properties; due to the wide-ranging possible applications, it is advised that all technical data herewith included be confirmed through testing carried out by the end-user. asa technology Produktions- und Vertriebs GmbH reserves the right to modify the product without any separate notification. This refers to both technical data and the product itself. Furthermore, it is herewith specified that the datasheet does not substitute the corresponding scale drawings, assembly and installation guidelines, nor the operating instructions.

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### Selection Procedure

#### Step 1 Thermal Duty Determination.

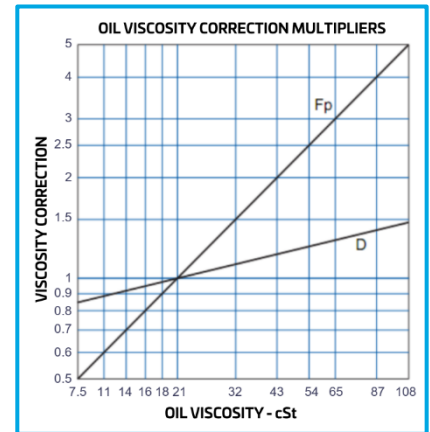
This will vary with different systems, but typically coolers are sized to remove 20% to 35% of the input nameplate kW.

#### Step 2 Determine Approach Temperature.

Desired oil leaving temp. = 50°C  
 Water inlet temperature = 30°C

$$\text{Desired oil leaving cooler } ^\circ\text{C} - \text{Water inlet temp. } ^\circ\text{C} = \text{Actual Approach}$$

$$50^\circ\text{C} - 30^\circ\text{C} = 20^\circ\text{C}$$



#### Step 3 Determine kW Curve Heat Load

$$\text{kW heat load} \times \frac{22}{\text{Actual approach}} \times \text{Viscosity Correction D} = \text{Curve kW Power}$$

#### Step 4 Enter Curves

Enter the value of the kW 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 30cSt (appr. ISO VG 32). Multiply the pressure drop by the Correction factor Fp according to the used hydraulic oil viscosity.

- = 0,35 bar
- = 0,7 bar
- △ = 1,4 bar

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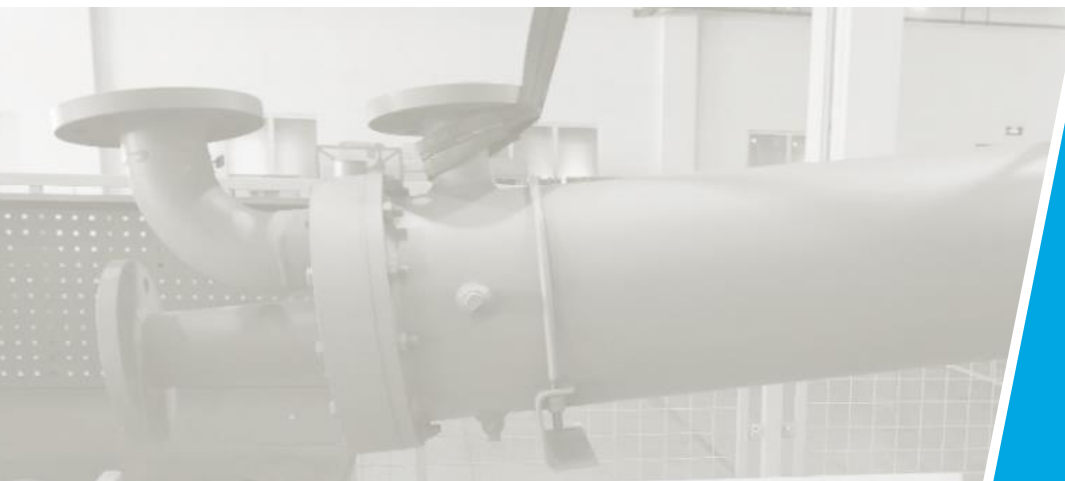
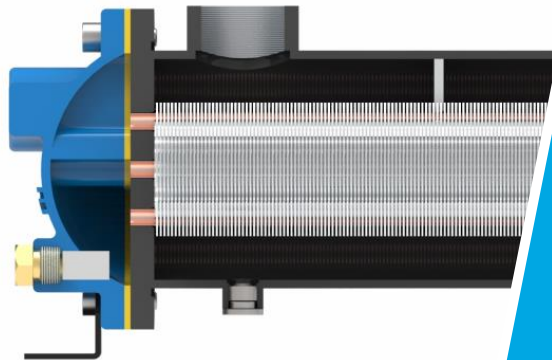
## ST-Series

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.



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