

SHELL & TUBES

MAIN FEATURES

Although not as efficient and compact as the Plate Water Oil coolers, Shell and Tubes coolers are still extremely popular in various types of industries. OLAER Fawcett Christie therefore strives to find the best possible design that would combine a limited water flow rate with a maximum efficiency.

GENERAL DESCRIPTION

Standard OLAER heat exchangers are designed for medium to heavy duty applications. The wide variety of materials available gives a lot of versatility to this range. It provides the ability to process special applications involving a large diversity of fluids in various types of environments. Special designs to offshore and gas codes are also available.

OLAER standard Shell and Tubes coolers are designed around a fixed bundle of tubes in which circulates the cooling water. These tubes, externally finned to increase the heat transfer area by a factor of 5, are usually made of treated copper of an extremely high thermal conductivity. Other materials such as stainless steel or copper/nickel alloys are also available. The tubes are permanently rolled flared at their end into a tube sheet. This type of construction is a guarantee against any risk of water contamination in the oil.

OLAER has adopted a larger internal diameter of tubes than other conventional Shell and Tubes coolers. The increased cross section makes it easier to clean and offers a much better resistance against fouling with maintenance intervals often extended up to three times.

Double pass or four pass configurations are available on the water side. Modifying this configuration is easily done with installing a different set of end caps.

The oil travels around the tubes following a circuitous pass dictated by some baffles placed at precise intervals around and between the copper tubes. This optimises the turbulence and the heat transfer. The oil port connections are located on the external shell, while the water connections are on the end caps covering the tube sheets.

All models may be fitted with a set of feet that can be rotated around for ease of installation.



QUALITY CONTROL

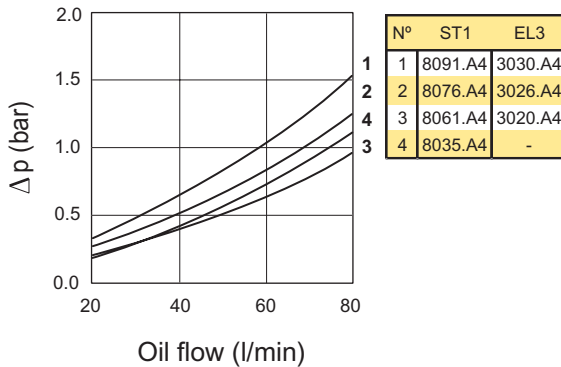
All tube bundles are bubble point tested after being rolled on the tube sheets. This testing procedure is an insurance against any possible internal leak resulting in mixing the two media. The complete cooler is also pressure tested after final assembly.

Applications

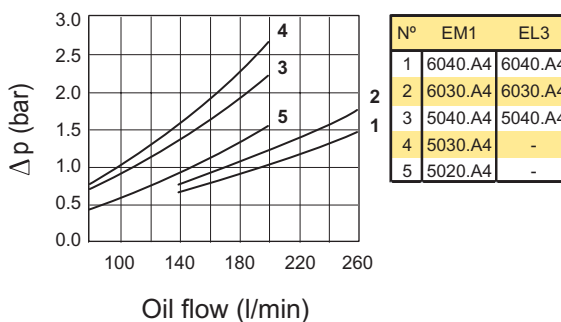
- Compressors
- Die casting machines
- Fixed industrial power units
- Fluid couplings
- Gear boxes
- Injection moulding machines
- Paper Industry
- Steel works

40

Oil pressure drop - ST1,EL3



Oil pressure drop - EM1,EL3



The OLAER Fawcett Christie standard range of Shell and Tubes coolers is grouped into three families:

➤ ST1 - Medium Duty

Medium duty cooler for hydraulics applications. The ST1 has an exceptional resistance to thermal shocks and water hammering. It uses a light alloy corrosion treated shell and porting sleeves with stainless steel tube sheets.

The end covers are made of a re-enforced plastic composite material with copper inserts for the connections.

The oil porting is integrated on the sleeves that carry the tube sheets. Connections are available with SAE flanges or BSPP threads.

➤ EM1 - Heavy Duty

Heavy duty heat exchanger for various industrial applications. Both shell end covers and tube sheets are made of carbon steel. As a standard, the EM1 model is fitted with threaded oil port connections welded onto the shell. A wide variety of flanges is also available upon request.

➤ EL3 - Marine Duty

This is the marine version of the EM1 model. The tube sheets are made of stainless steel, while the end covers are epoxy coated for a better corrosion resistance against salt water. Sacrificial anodes are mounted inside the end covers.

Shell & Tubes Model Code

ST1 . 80 76 . A 4

Shell & Tubes Cooler Series

ST1 - Alloy Oil / Water Cooler
EM1 - Heavy Duty Oil/Water Cooler
EL3 - Oil / Salt-Water Cooler

Cooler Diameter Code

ST1 Series	EM1 Series	EL3 Series
80 - Ø80mm	5 - Tube Ø140mm 6 - Tube Ø168mm	3 - Tube Ø83mm 5 - Tube Ø140mm

Tube length (Water Side)

ST1 Series	EM1 Series	EL3 Series
35 - 355mm	030 - 3'	020 - 2'
61 - 615mm	040 - 4'	026 - 2'6"
76 - 765mm		030 - 3'
91 - 915mm		040 - 4'

Flow Code (Oil Side)

A - High Efficiency (OLAER Fawcett Christie Standard)
B - High Flow

N° of Passes (Water Side)

2 - 2 pass
4 - 4 pass (OLAER Fawcett Christie Standard)

	OIL	WATER
Design pressure:	16 bar	10 bar
Test pressure :	24 Bar	15 Bar
Design Temperature:	99°C	99°C

Example: EM1.5020.A4

41

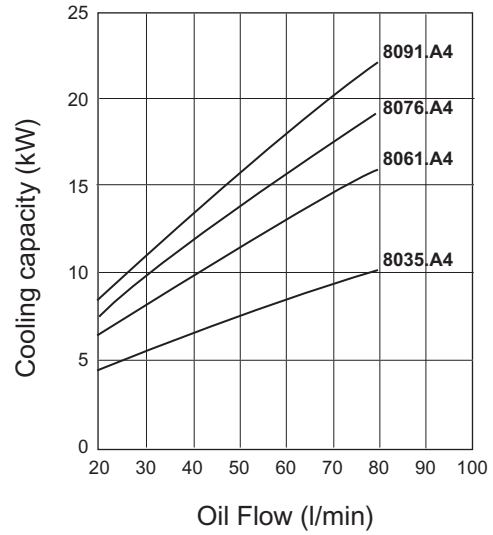
SHELL & TUBES

TECHNICAL DATA

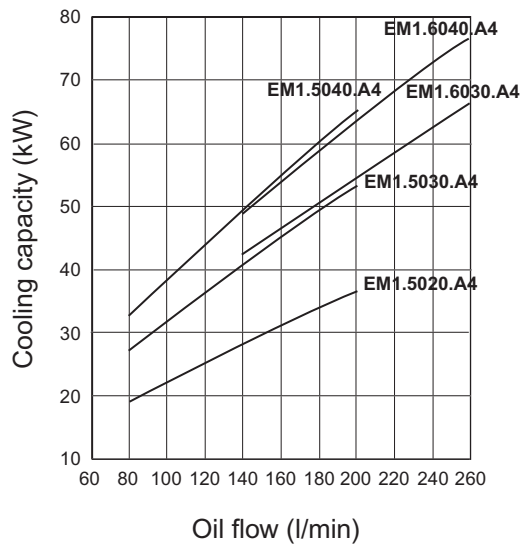
The curves are based on :

Oil	ISO VG68
Oil inlet temperature	60°C
Water inlet temperature	20°C
Oil/Water Ratio	2:1
Configuration	4 pass

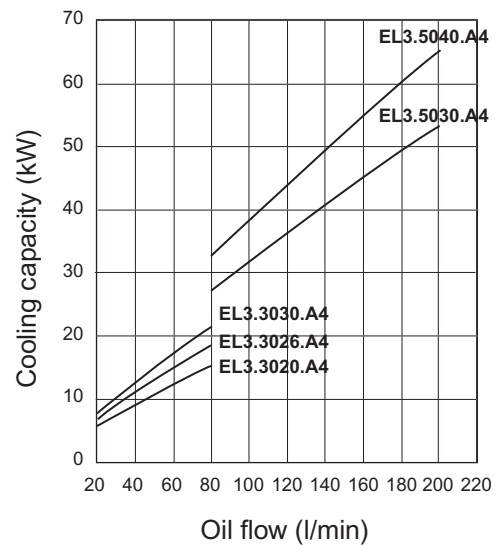
Heat dissipation - ST1



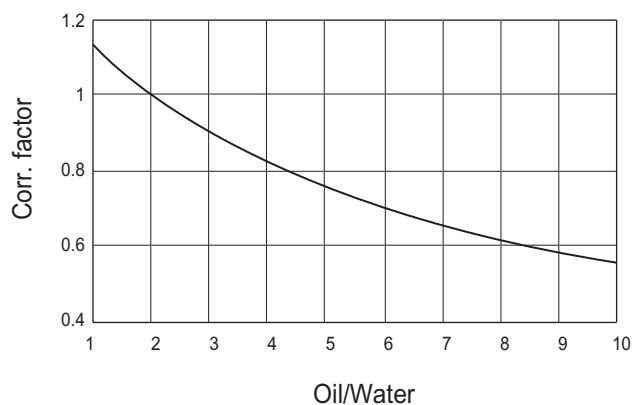
Heat dissipation - EM1



Heat dissipation - EL3



Correction factor for different Oil/Water Ratio

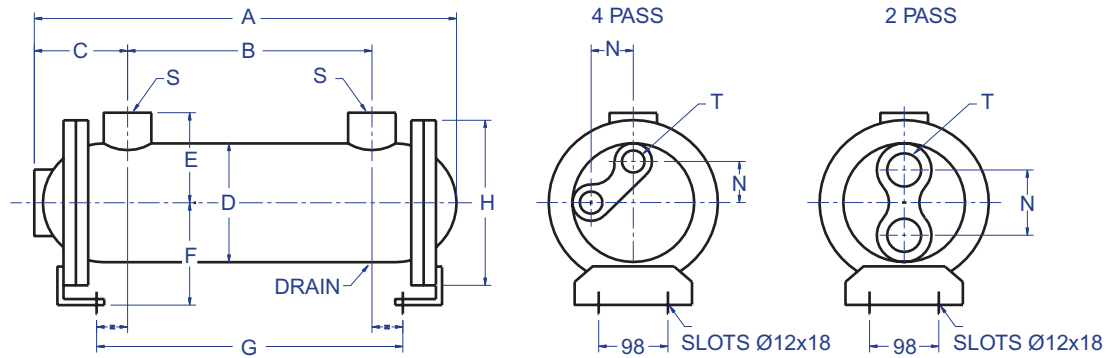


42

S & T

TECHNICAL DATA

Model : EM1-EL3

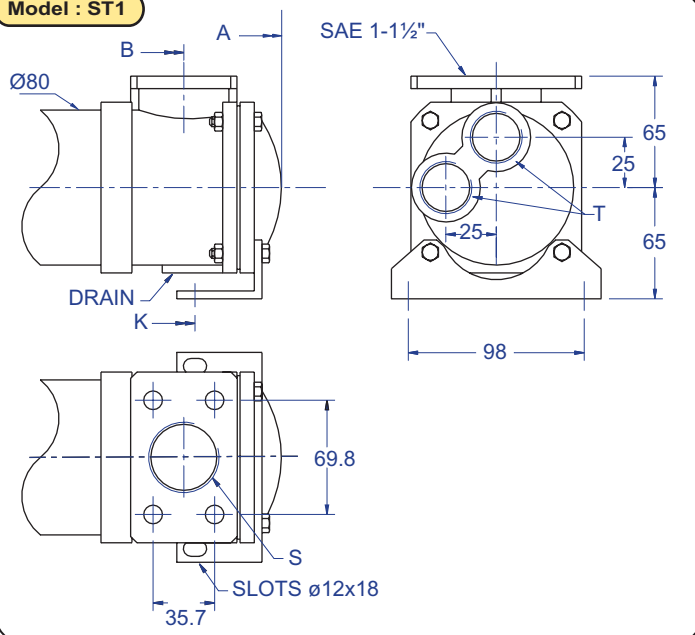


EM1 & EL3 Models

EM1 - EL3	A	B	C	D	E	F	G	H	Flow Code		4 PASS*		2 PASS	
									- A*	- B	4 PASS*		2 PASS	
									S	S	T	N	T	N
3012	430	250	90	83	60	65	309	108	G1	G1½	G3/4	25	G1	50
3020	685	500	90	83	60	65	564	108	G1	G1½	G3/4	25	G1	50
3026	890	705	90	83	60	65	767	108	G1	G1½	G3/4	25	G1	50
3030	990	805	90	83	60	65	869	108	G1	G1½	G3/4	25	G1	50
5020	710	490	115	140	95	105	568	180	G1½	G2	G1	45	G1½	76
5030	1015	795	115	140	95	105	873	180	G1½	G2	G1	45	G1½	76
5040	1320	1100	115	140	95	105	1178	180	G1½	G2	G1	45	G1½	76
6030	1055	775	145	168	110	125	878	210	G2	G2	G1½	50	G2	86
6040	1360	1080	145	168	110	125	1183	210	G2	G2	G1½	50	G2	86

* OLAER Fawcett Christie standard

Model : ST1



ST1 Model

ST1	A	B	K
8035.A4	425	285	305
8061.A4	680	540	560
8076.A4	830	692	712
8091.A4	985	845	865

43