aerospace
climate control
electromechanical
filtration
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hydraulics
pneumatics
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SWO Water/oil cooler

Lightweight, compact and efficient for industrial and marine applications

Parker

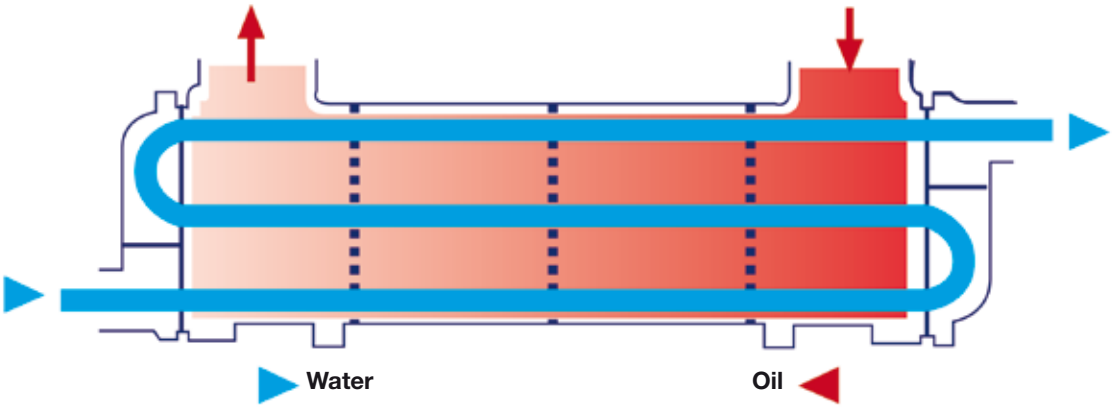
ENGINEERING YOUR SUCCESS.

The Olaer Group is part of Parker Hannifin since July 1st, 2012. With manufacturing and sales in 14 countries in North America, Asia and Europe, the Olaer Group expands Parker's presence in geographic growth areas and offers expertise in hydraulic accumulator and cooling systems for target growth markets such as oil and gas, power generation and renewable energy.

Shell & tube water/oil coolers

Theory and application of shell & tube water/oil coolers
Two fluids, of different starting temperatures, flow through the water oil cooler. 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.

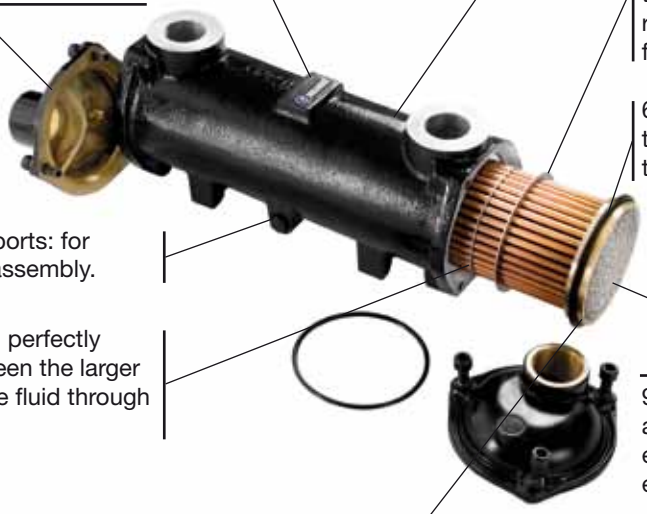
GWO water/oil coolers in short:
- **Light and compact**
- **Suitable for many applications**
- **Easy installation**
- **Cost-efficient and environmentally friendly**



Flow range:	0 – 900 l/min
Design Pressure:	Oil side 15 bar / water side 10 bar
Max working temperature:	+95 °C with NBR seals
Connections:	¾" BSP - 3" BSP

Specifications may be changed without prior notice.
Please contact Parker for specific details.

Design attributes



1) Name plate: indentifying the model, serial No., tube material, seals and MAWT/MAWP.

2) Shell: made from cast aluminium/bronze, finely machined to accept the tube bundle with no friction and accurate tolerances. All shell ports are machined by CNC equipment to provide the highest degree of accuracy.

3) End covers: bolted type to allow access to the tube bundle for maintenance. Made from gun metal and hot pressed brass as standard to prevent corrosion.

4) Larger baffles: hot pressed, cut and drilled accurately to allow the tubes to pass through. Finely rounded edges to ensure the oil flow circulation inside the shell.

6) O-rings: Nitrile seals to ensure tightness and avoid any fluid contamination. Easily replaceable.

5) Anchoring supports: for direct and quick assembly.

7) Smaller baffles: perfectly arranged in-between the larger baffles to drive the fluid through the tubes.

9) Soldered to ensure full tightness and fluid separation. Can also be expanded or silver soldered for extremely corrosive services.

8) End plate: Made of hot pressed brass, accurately drilled by CNC equipment. All size range to accomodate the tubes.

Design features
Parker SWO water/oil coolers are manufactured to cater for the most common power requirements in the hydraulics industry. The serialised manufactured units range from the smallest size (TP-A1) with 3 kW of heat dissipation power to the largest size (TP-F6) with 500 kW per average. Parker SWO Oil Coolers are of floating tube bundle design.

Materials of construction (primary standards in italic):

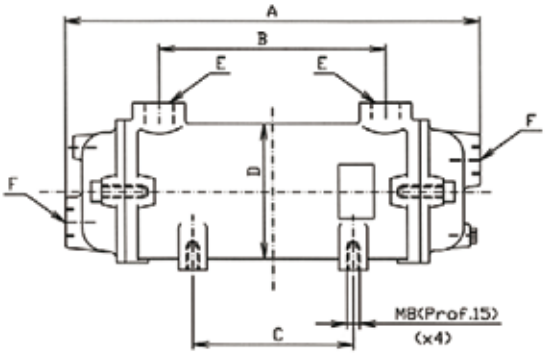
Industrial version:
- **Shell: *Aluminium*, Bronze**
- **END COVERS: *Hot pressed brass*, Bronze**
- **TUBES: *Copper*, CuNi 90/10**
- **BAFFLES: *Aluminium***
- **END PLATES: *Brass***
- **O-Rings/Seals: *NITRILE***

Marine version:
- **Shell: *Aluminium*, Bronze**
- **END COVERS: *Hot pressed brass*, Bronze**
- **TUBES: *Copper,* CuNi 90/10**
- **BAFFLES: *Aluminium***
- **END PLATES: *Brass***
- **O-Rings/Seals: *NITRILE***

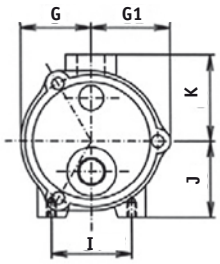
Application limits
Maximum working temperature: 95 °C with NBR seals (this is the peak temperature and should not be understood as continuous service temps). Design Pressure: Oil side 15 bar, water side 10 bar (pressure/temperature charts should be observed).

Installation and maintenance
The Parker SWO Water Oil Coolers may be installed vertically or horizontally but both fluids must circulate counter to current flow. The cooler could be installed in the return line to the tank or in a closed circuit, and bypass isolation be set in place to allow for maintenance. Consult your nearest Parker distributor for complete operating and maintenance booklets if not received along with the product, alternatively download them from www.parker.com.

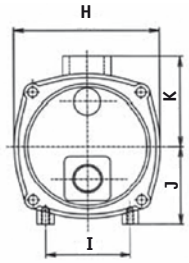
Main dimensions and typical performance



Type A, B and C



Type D, E and F



Model	Dimensions mm												Dis-sipated Power	Oil Flow Rate	Water Flow Rate	Oil Pres-sure Drop	Water Pres-sure Drop	Sur-face	Weight
	A	B	C	D	E	F	G	G1	H	I	J	K	kW	l/min	l/min	bar	bar	m²	kg
Tp-A 1	195	72	38	86	¾”		50	55	-	54	55	60	3	30	15	0.10	0.02	0.13	3
Tp-A 2	263	142	106	86	¾”		50	55	-	54	55	60	6	46	23	0.19	0.05	0.22	3.5
Tp-A 3	349	228	192	86	¾”		50	55	-	54	55	60	9	56	28	0.36	0.09	0.32	4
Tp-A 4	448	326	290	86	¾”		50	55	-	54	55	60	13	64	32	0.60	0.13	0.46	4.7
Tp-A 5	576	454	418	86	¾”		50	55	-	54	55	60	16	56	28	0.56	0.12	0.68	5.5
Tp-B 1	273	123	109	108	1”		60	65	-	77	65	70	8	66	33	0.16	0.02	0.33	5
Tp-B 2	355	205	190	108	1”		60	65	-	77	65	70	12	80	40	0.32	0.03	0.48	6
Tp-B 3	452	302	289	108	1”		60	65	-	77	65	70	18	104	52	0.96	0.07	0.66	7
Tp-B 4	587	437	422	108	1”		60	65	-	77	65	70	25	106	53	1	0.11	0.90	8.2
Tp-B 5	730	580	566	108	1”		60	65	-	77	65	70	29	98	49	1.04	0.14	1.16	10
Tp-C 1	372	187	93	130	1¼”		70	80	-	77	75	80	16	100	50	0.28	0.04	0.64	9
Tp-C 2	472	287	193	130	1¼”		70	80	-	77	75	80	26	120	60	0.55	0.07	0.90	10
Tp-C 3	600	416	322	130	1¼”		70	80	-	77	75	80	36	140	70	0.74	0.13	1.23	12.5
Tp-C 4	744	559	465	130	1¼”		70	80	-	77	75	80	48	160	80	1.06	0.17	1.60	14.5
Tp-C 5	922	737	643	130	1¼”		70	80	-	77	75	80	56	140	70	0.95	0.16	2.07	17.5
Tp-D 1	505	273	109	162	1½”		-	-	177	119	95	100	40	180	90	0.40	0.07	1.58	20
Tp-D 2	634	402	238	162	1½”		-	-	177	119	95	100	52	200	100	0.55	0.09	2.14	24
Tp-D 3	780	548	384	162	1½”		-	-	177	119	95	100	66	220	110	0.62	0.12	2.79	27
Tp-D 4	954	722	558	162	1½”		-	-	177	119	95	100	84	240	120	0.80	0.16	3.57	32
Tp-D 5	1160	928	764	162	1½”		-	-	177	119	95	100	108	260	130	1	0.19	4.48	38
Tp-D 6	1364	1132	968	162	1½”		-	-	177	119	95	100	120	240	120	0.96	0.21	5.38	45
Tp-E 1	675	372	239	198	2”		-	-	206	120	110	120	76	320	160	0.44	0.09	3.27	33
Tp-E 2	816	513	380	198	2”		-	-	206	120	110	120	106	360	180	0.64	0.13	4.24	39
Tp-E 3	998	696	560	198	2”		-	-	206	120	110	120	134	400	200	0.90	0.20	5.45	45
Tp-E 4	1204	901	766	198	2”		-	-	206	120	110	120	175	420	210	1.10	0.25	6.82	54
Tp-E 5	1408	1102	968	198	2”		-	-	206	120	110	120	205	400	200	1.15	0.28	8.22	64
Tp-E 6	1712	1406	1272	198	2”		-	-	206	120	110	120	240	360	180	1.10	0.28	10.27	75
Tp-F 1	754	330	236	278	3”		-	-	288	180	155	170	133	720	360	0.36	0.09	7.20	47
Tp-F 2	900	476	382	278	3”		-	-	288	180	155	170	180	780	390	0.50	0.13	9.14	57
Tp-F 3	1077	654	560	278	3”		-	-	288	180	155	170	250	840	420	0.62	0.17	11.81	68
Tp-F 4	1280	856	762	278	3”		-	-	288	180	155	170	325	900	450	0.76	0.25	14.60	79
Tp-F 5	1484	1060	966	278	3”		-	-	288	180	155	170	410	960	480	1	0.32	17.30	91
Tp-F 6	1790	1364	1270	278	3”		-	-	288	180	155	170	500	900	450	1.16	0.52	21.54	105

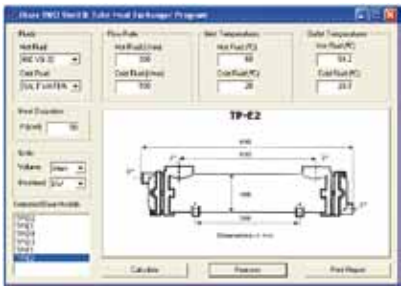
DRAIN/VENT PLUGS

WATER SIDE (END COVERS)	
For series A,B,C & D	¼” BSP
For series E & F	½” BSP

OIL SIDE (SHELL)	
For series B,C & D	¼” BSP
For series E & F	½” BSP

There is no drain plug in the shell for A-serie.

The table to the left shows the typical performance of the standard range of Parker models. This table should be taken as a quick reference and always supported by more detailed performance graphs or the use of our software. The table is built using the following typical performance data: Oil Outlet temperature of 50 °C, Water Inlet temperature of 25 °C and Oil Viscosity of 38 cSt. Any other parameter would alter the typical selection. Ask you nearest Parker distributor for the software, a powerful tool which will enhance your quotations, optimise your selection process and store a process fluid data base. Pressure drop diagrams are available from Parker.

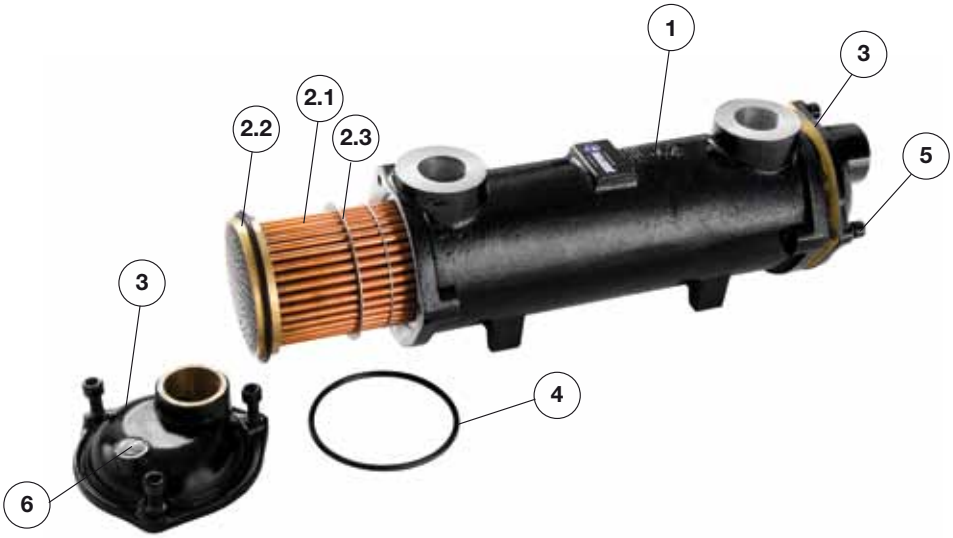


Industrial Shell & tube water/oil cooler

Series A - F / AM - FM

Parker SWO water/oil coolers are designed in a three pass tube stack arrangement. with cooling fluid inlet and outlet on opposite sides and counter-current flows. The tube stack is of the fully floating type, thus thermal stresses are minimised while maintenance operations are kept to a minimum.

The Parker range of industrial SWO water/oil coolers is suitable for any sort of heat transfer fluids, heating or cooling process fluids.



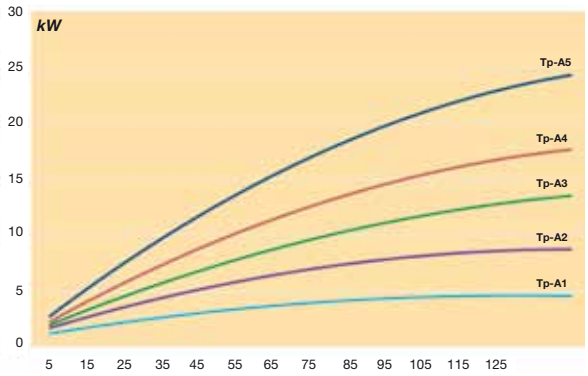
Part	Name	Material
1	Shell	Aluminium/Bronze
2	Tube Stack	
2.1	Tubes	Copper/Copper-Nickel
2.2	Tube plates	Brass
2.3	Baffles	Aluminium
	Welding	Soldered 60/40
3	End Caps	Brass/Bronze
4	Seals	NBR
5	Cover screws	Steel
6	Drain plugs	Brass

Industrial version:
copper tubes are standard.

Marine version:
copper-nickel tubes 90/10 are standard.

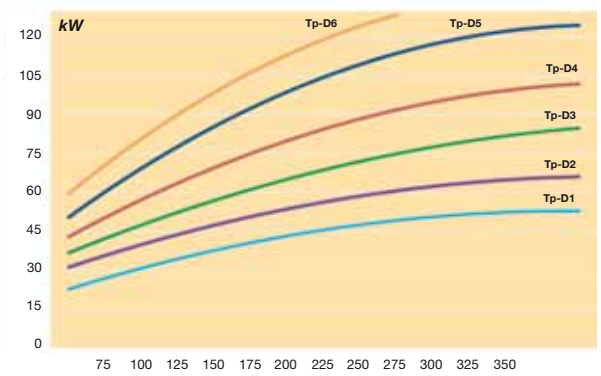
Performance graphs

Series A/AM



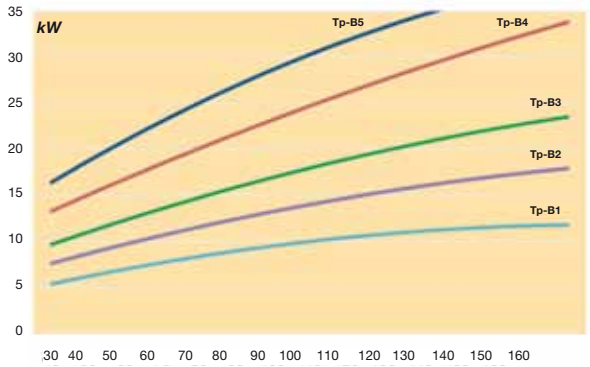
Oil Flow (l/min)

Series D/DM



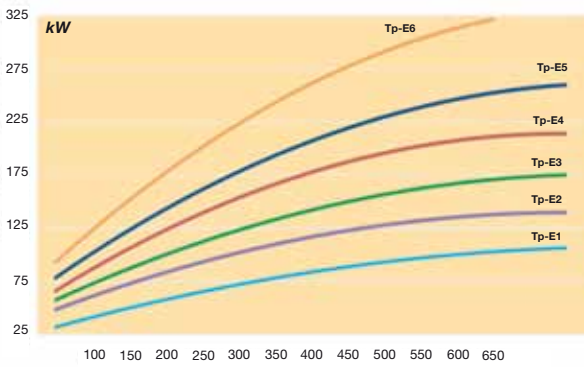
Oil Flow (l/min)

Series B/BM



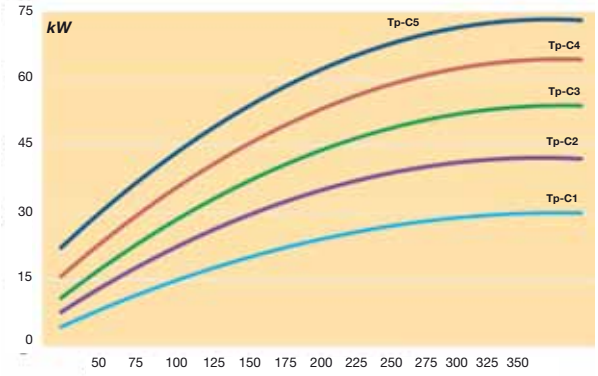
Oil Flow (l/min)

Series E/EM



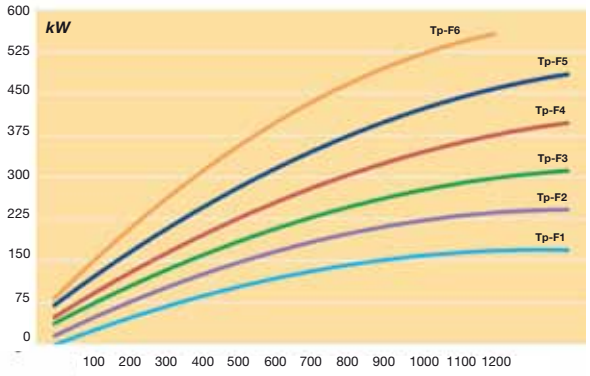
Oil Flow (l/min)

Series C/CM



Oil Flow (l/min)

Series F/FM



Oil Flow (l/min)

Graphs were plotted using the following parameters: ΔT = 25 °C, Viscosity of oil: 38 cSt (SAE 30) and water.

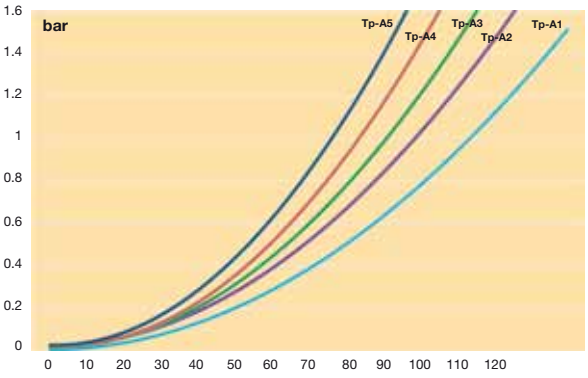
Temperature Correction Factors
When temperature gap between oil outlet and water inlet exceeds the given 25 °C the following correction factors should be used: 10 °C: 0.4 / 15 °C: 0.6 / 20 °C: 0.8 / 30 °C: 1.2 / 35 °C: 1.4 / 40 °C: 1.6 (multiply kW by the suitable correction factor).

Flow Rate Correction Factors
For water flow rates other than 50% of the oil flow rate, the following correction factors should be used: 25%: 0.8 / 100%: 1.2 (multiply the flow rate by the suitable correction factor).

The Olaer software is available also for units that fall outside the above curves. Data subject to technical modification without prior notice.

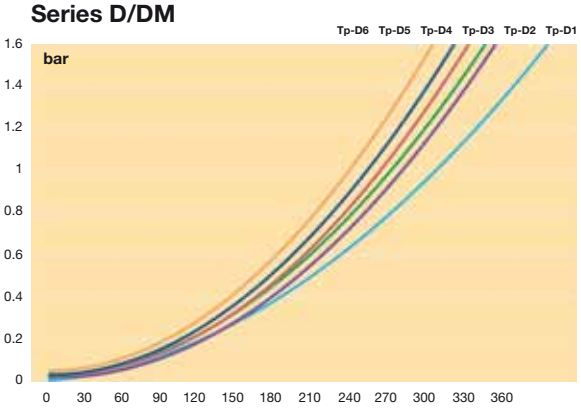
Oil pressure drop

Series A/AM



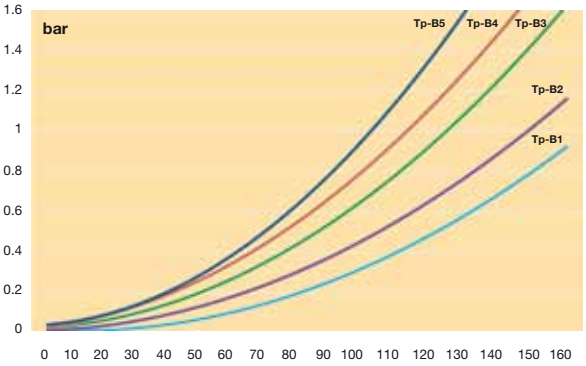
Oil Flow (l/min)

Series D/DM



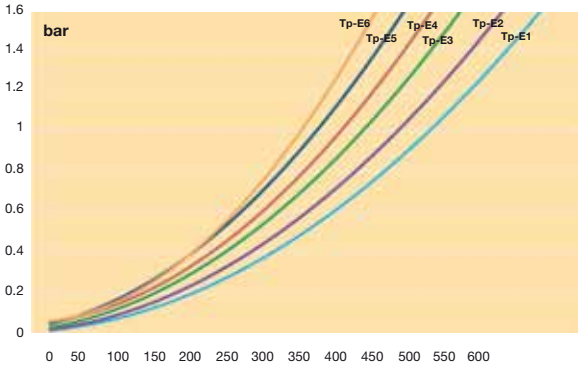
Oil Flow (l/min)

Series B/BM



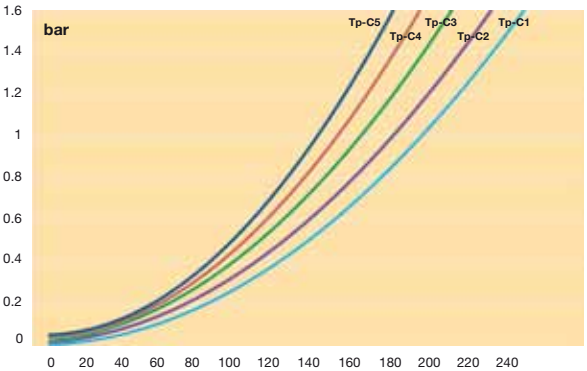
Oil Flow (l/min)

Series E/EM



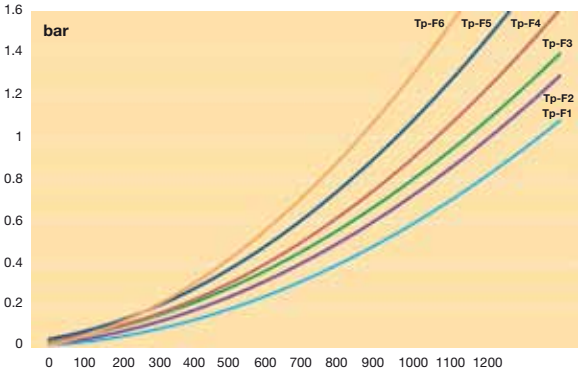
Oil Flow (l/min)

Series C/CM



Oil Flow (l/min)

Series F/FM



Oil Flow (l/min)

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