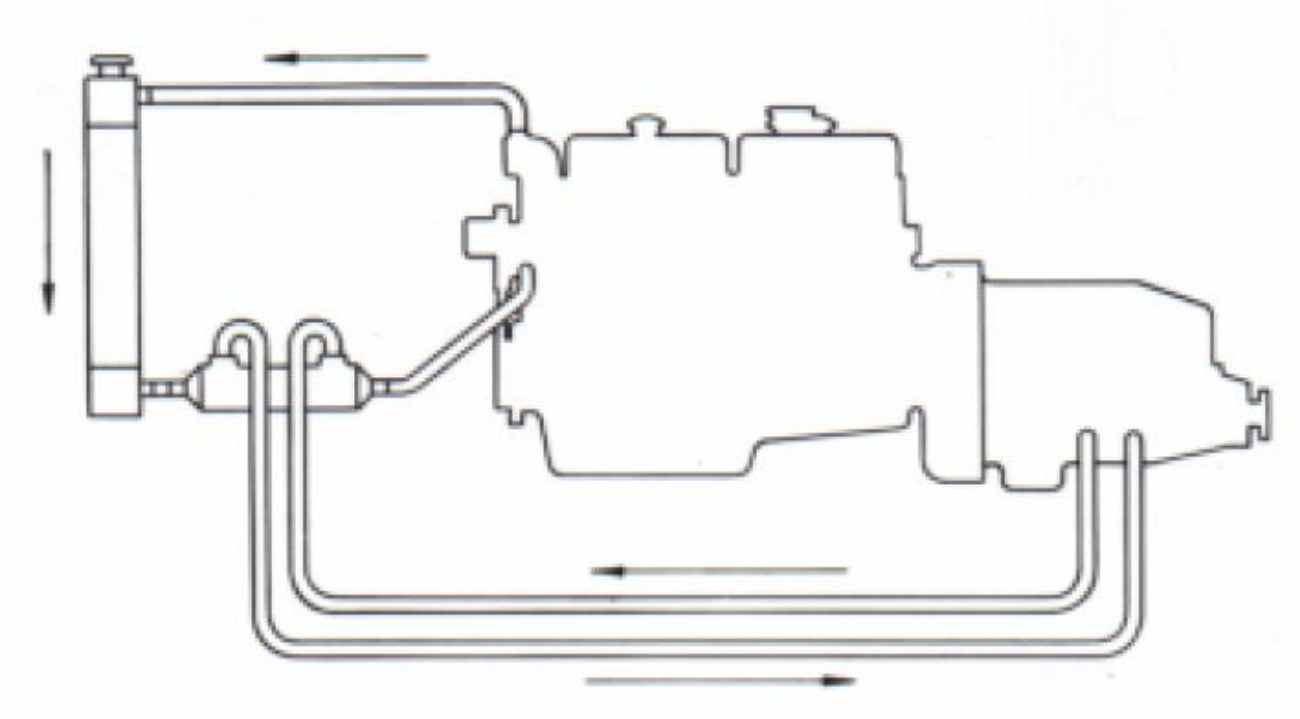
Engine & Transmission Oil Cooler

These Oil Coolers are equally suitable for cooling torque converter, automatic transmission and engine oils. Being water cooled they have the advantage of freedom from accidental damage and also encourage quicker warming up of the oil, a feature which is particularly valuable in cold climates. The tube stack is fully floating so that thermal stresses are minimised and it can easily be removed should cleaning be necessary.

The cooler should be fitted into the engine water circuit between the bottom tank of the radiator and the water inlet connection on the engine as illustrated as below, the radii of water pipe bends should be as large as possible to reduce the pressure drop. Also indicated as below are the approximate capabilities of the various coolers for torque converter applications. This information is only intended as a general guide as the factors affecting the choice of oil cooler are complex. In the case of engine oil applications we are not able to give any general recommendations, but proposals can be submitted on receipt of details of the particular engine.



Installation of an oil cooler in an engine water circuit.

Design Parameter

Maximum working pressure on oil side：25 bar
Maximum working pressure on water side：15 bar
Design temperature：150°C
We produce customized applications on different working pressure and temperature.

Performance data of engine & transmission oil coolers

Typical examples of oil coolers fitted to torque converter transmissions with an oil inlet temperature of 110C and a water inlet temperature of 80C.

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Cooler Type	Maximum oil flow	Maximum water fow	Suitable for torque converter transmitting	Internal oil volume	Internal water volume
	Liter/min	Liter/min	kW	Liter	Liter
EC 80-E	30	200	45	0.26	0.31
EC100-E	60	200	60	0.49	0.44
EC120-E	60	200	75	0.74	0.57
EC140-E	60	200	90	0.97	0.71
EC160-E	60	200	105	1.30	0.91
FC100-E	100	300	90	1.10	0.84
FC120-E	100	300	105	1.50	1.06
FC140-E	100	300	120	2.00	1.35
FC160-E	100	300	135	2.60	1.68
FG100-E	150	400	120	2.40	1.56
FG120-E	150	400	140	3.00	1.96
FG140-E	150	400	170	3.90	2.42
FG160-E	150	400	200	5.00	2.97
GL180-E	220	700	180	4.80	3.80
GL240-E	220	700	240	6.30	4.60
GL320-E	220	700	300	8.00	5.50
GL400-E	220	700	360	10.00	6.60
GK250-E	350	1000	360	9.00	7.50
GK320-E	350	1000	450	11.60	9.00
GK400-E	350	1000	540	14.60	10.60
GK480-E	350	1000	630	17.40	12.30
JK250-E	550	1600	520	12.50	10.40
JK320-E	550	1600	640	16.10	12.50
JK400-E	550	1600	780	20.30	14.70
JK480-E	550	1600	900	24.20	17.10

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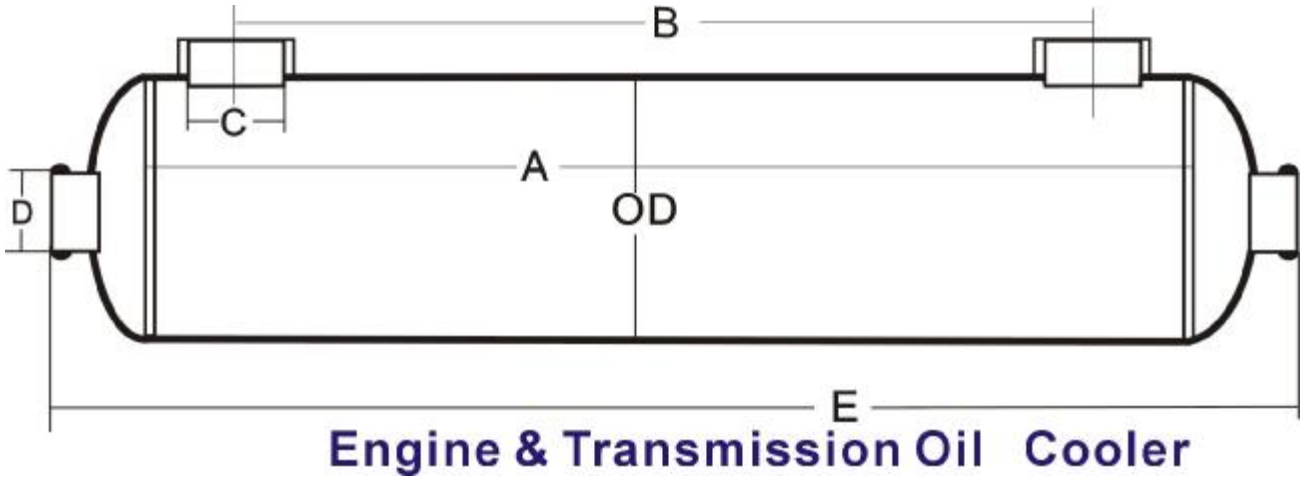
Water port connector selection table

Type	In line (axially)	Right angled
EC	32mm 50mm	32mm 40mm 50mm
FC	40mm 50mm 2"	40mm 50mm 65mm
FG	40mm 2 1/2"	50mm 65mm
GL	3"	70

Specification and dimension of oil coolers



Engine & Transmission Oil Cooler

Cooler Type	A(mm)	B(mm)	C(BSP)	D(mm)	E(mm)	Note
EC 80-E	100	70	1/2"	40	200	OD89mm,bolt
EC100-E	196	156	3/4"	40	296	M8 X 100 X76mm
EC120-E	286	246	3/4"	40	386	
EC140-E	396	356	3/4"	40	496	
EC160-E	536	496	3/4"	40	636	
FC100-E	286	242	1"	50	386	OD108mm,bolt
FC120-E	396	352	1"	50	496	M8 X 100X 76mm
FC140-E	536	492	1"	50	636	
FC160-E	696	652	1"	50	796	
FG100-E	396	342	1 1/4"	50	536	OD133mm,bolt
FG120-E	536	482	1 1/4"	50	676	M8 X 100 X 76mm
FG140-E	696	642	1 1/4"	50	836	
FG160-E	896	842	1 1/4"	50	1036	
GL180-E	536	472	1 1/2"	65	676	OD159mm,bolt
GL240-E	696	632	1 1/2"	65	836	M12X100X150mm
GL320-E	896	832	1 1/2"	65	1036	
GL400-E	1116	1052	1 1/2"	65	1256	

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Cooler Type	A(mm)	B(mm)	C(BSP)	D(mm)	E(mm)	Note
GK250-E	646	570	2"	100	796	OD200mm,bolt
GK320-E	836	760	2"	100	986	M12X100X150mm
GK400-E	1056	980	2"	100	1206	
GK480-E	1276	1200	2"	100	1426	
JK250-E	646	548	2 1/2"	**120**	786	OD230mm,bolt
JK320-E	836	738	2 1/2"	**120**	976	M12X100X150mm
JK400-E	1056	958	2 1/2"	**120**	1196	Flange 120
JK480-E	1276	1178	2 1/2"	**120**	1416	

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Hydraulic Oil Coolers

INTRODUCTION
These oil coolers are also suitable for heat transfer fluids, lubricating and quenching oils. They are high-quality products incorporating the best materials and the latest technical features. The tube stack is fully floating, so that thermal stresses are minimised and it can be easily removed, should cleaning be necessary.

SELECTION
We have listed on page 7 some typical examples of oil cooler performance. This information is only intended to provide a general basis for selection. Graphs are available which show how heat dissipation and pressure losses vary with oil and water flow. Alternatively, we can select by computer, the size of oil cooler required from the following information:

Oil type or its viscosity at a specified temperature cSt at °C
Oil flow l/min
Required oil outlet temperature °C
Heat to be dissipated kW
Temperature of cooling water °C

INSTALLATION
The oil coolers should be mounted as shown below to ensure that they operate full of water and should be connected for counterflow. If the water control valve is used, it should be of the modulating type and fitted on the inlet side, so that the cooler is not unnecessarily pressurised with water when the system is shut down. Care must be taken not to exceed the recommended water flow rates and the pH of the water should be between 7.2 and 7.8. For hydraulic applications, the oil cooler should be in the return pipe to tank as shown in the diagram, but on installations where this is subject to violent fluctuations in flow and pressure, it may be advisable to connect the cooler into a separate circuit with its own pump. It is good practice for the oil pressure in the cooler to be higher than the water pressure, so that should a leak occur, the oil will not be contaminated with water.

MARINE
The stainless steel shell and head are satisfactory with fresh water. For use with contaminated fresh water or sea water, we can, at extra cost, supply stainless steel 316L construction for tubes and heads and high anti-corrosive titanium material for tubes and heads.

150°C OIL
We can supply coolers suitable for oil temperatures of up to 150°C. For this application, we use thicker material for shell and tubesheet.

200°C OIL
In addition, we have a limited range of oil coolers suitable for use with oil or heat transfer fluids up to 200°C. These oil coolers have a cast iron shell, viton seals and a special tube stack.

MINING
We have various range of oil coolers suitable for underground mining applications and water pressures up to 35 bar.

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GENERAL

Please contact us for applications not covered by our published information. We can also advise on the best method of installing coolers, particularly for unusual or critical applications. If a single unit is too small, multiple units can be connected either in series or in parallel according to the oil flow rate. We can also supply the PK range of coolers with 4” ports and special high flow tube stacks suitable for oil flow rates up to 1400 l/min.

Performance data of hydraulic oil coolers

Cooler Type	Maximum oil flow	Maximum sea water fow	Maximum fresh water flow	Internal oil volume	Internal water volume
	Liter/min	Liter/min	Liter/min	Liter	Liter
EC 80-H	100	54	80	0.26	0.31
EC100-H	110	54	80	0.49	0.44
EC120-H	90	54	80	0.74	0.57
EC140-H	80	54	80	0.97	0.71
EC160-H	70	54	80	1.30	0.91
FC 80-H	140	95	140	0.75	0.65
FC100-H	130	95	140	1.10	0.84
FC120-H	110	95	140	1.50	1.06
FC140-H	100	95	140	2.00	1.35
FC160-H	90	95	140	2.60	1.68
FG 80-H	230	125	190	1.64	1.26
FG100-H	210	125	190	2.40	1.56
FG120-H	190	125	190	3.00	1.96
FG140-H	170	125	190	3.90	2.42
FG160-H	150	125	190	5.00	2.97
FG200-H	130	125	190	7.58	4.53
GL140-H	330	225	330	3.60	3.10
GL180-H	290	225	330	4.80	3.80
GL240-H	280	225	330	6.30	4.60
GL320-H	260	225	330	8.00	5.50
GL400-H	260	225	330	10.00	6.60
GL480-H	240	225	330	12.20	7.70
JK190-H	780	460	700	9.70	8.80
JK250-H	740	460	700	12.50	10.40
JK320-H	690	460	700	16.10	12.50
JK400-H	660	460	700	20.30	14.70
JK480-H	620	460	700	24.20	17.10
JK600-H	560	460	700	30.70	20.40
PK190-H	1200	700	1050	13.60	16.00
PK250-H	1100	700	1050	17.70	18.60
PK320-H	1050	700	1050	22.60	21.80
PK400-H	1000	700	1050	28.50	25.30
PK480-H	960	700	1050	34.00	29.00
PK600-H	900	700	1050	42.50	34.40

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Note:
Maximum permitted oil flow based on Shell Tellus 37 at 60C

Cooler Type	Heat dissipated	Oil flow	Oil pressure drop	Water flow	Head loss
	kW	Liter/min	kPa	Liter	kPa
EC 80-H	4	80	100	80	50
EC100-H	9	92		80	
EC120-H	13	77		77	
EC140-H	17	68		72	
EC160-H	22	64		66	
FC 80-H	13	140	100	140	50
FC100-H	19	145		135	
FC120-H	26	116		125	
FC140-H	35	105		120	
FC160-H	45	96		108	
FG 80-H	28	192	100	185	50
FG100-H	37	190		175	
FG120-H	50	160		160	
FG140-H	62	160		150	
FG160-H	79	145		135	
FG200-H	123	130		120	
GK190-H	112	460	100	420	50
GK250-H	144	445		385	
GK320-H	181	430		355	
GK400-H	221	420		325	
GK480-H	259	400		300	
GK600-H	329	365		275	
JK190-H	145	830	100	600	50
JK250-H	186	740		550	
JK320-H	232	690		500	
JK400-H	283	650		460	
JK480-H	335	620		430	
JK600-H	401	600		400	
PK190-H	212	1600	100	900	50
PK250-H	270	1240		840	
PK320-H	336	1060		750	
PK400-H	414	950		700	
PK480-H	497	890		650	
PK600-H	660	750		600	

Note:
Typical examples of oil cooler performance with an oil outlet temperature of 50C and a water inlet temperature of 25C

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Design Parameter:

Maximum working pressure on oil side：20bar, 25bar or 35 bar
Maximum working pressure on water side：15 bar
Design temperature：200°C
We produce customized applications on different working pressure and temperature.

Specification and dimension of oil coolers

Model	A(mm)	B(mm)	C(BSP)	D(BSP)	E(mm)	Note
EC 80-H	100	70	1/2"	3/4"	200	OD89mm,bolt
EC100-H	196	156	3/4"	3/4"	296	M8 X 100 X76mm
EC120-H	286	246	3/4"	3/4"	386	
EC140-H	396	356	3/4"	3/4"	496	
EC160-H	536	496	3/4"	3/4"	636	
FC 80-H	196	152	1"	1"	296	OD108mm,bolt
FC100-H	286	242	1"	1"	386	M8 X 100X 76mm
FC120-H	396	352	1"	1"	496	
FC140-H	536	492	1"	1"	636	
FC160-H	896	842	1"	1"	1036	
FG 80-H	286	232	1 1/4"	1 1/4"	426	OD133mm,bolt
FG100-H	396	342	1 1/4"	1 1/4"	536	M8 X 100 X 76mm
FG120-H	536	482	1 1/4"	1 1/4"	676	
FG140-H	696	642	1 1/4"	1 1/4"	836	
FG160-H	896	842	1 1/4"	1 1/4"	1026	
FG200-H	1340	1286	1 1/4"	1 1/4"	1480	
GL140-H	396	332	1 1/2"	1 1/2"	536	OD159mm,bolt
GL180-H	536	472	1 1/2"	1 1/2"	676	M12X100X150mm
GL240-H	696	632	1 1/2"	1 1/2"	836	
GL320-H	896	832	1 1/2"	1 1/2"	1036	
GL400-H	1116	1052	1 1/2"	1 1/2"	1256	
GL480-H	1340	1276	1 1/2"	1 1/2"	1480	
GK190-H	486	410	2"	2"	626	OD200mm,bolt
GK250-H	646	570	2"	2"	786	M12X100X150mm
GK320-H	836	760	2"	2"	976	
GK400-H	1056	980	2"	2"	1196	
GK480-H	1276	1200	2"	2"	1416	
GK600-H	1606	1530	2"	2"	1746	
JK190-H	486	388	2 1/2"	2 1/2"	626	OD230mm,bolt
JK250-H	646	548	2 1/2"	2 1/2"	786	M12X100X150mm
JK320-H	836	738	2 1/2"	2 1/2"	976	
JK400-H	1056	958	2 1/2"	2 1/2"	1196	
JK480-H	1276	1178	2 1/2"	2 1/2"	1416	
JK600-H	1606	1508	2 1/2"	2 1/2"	1746	

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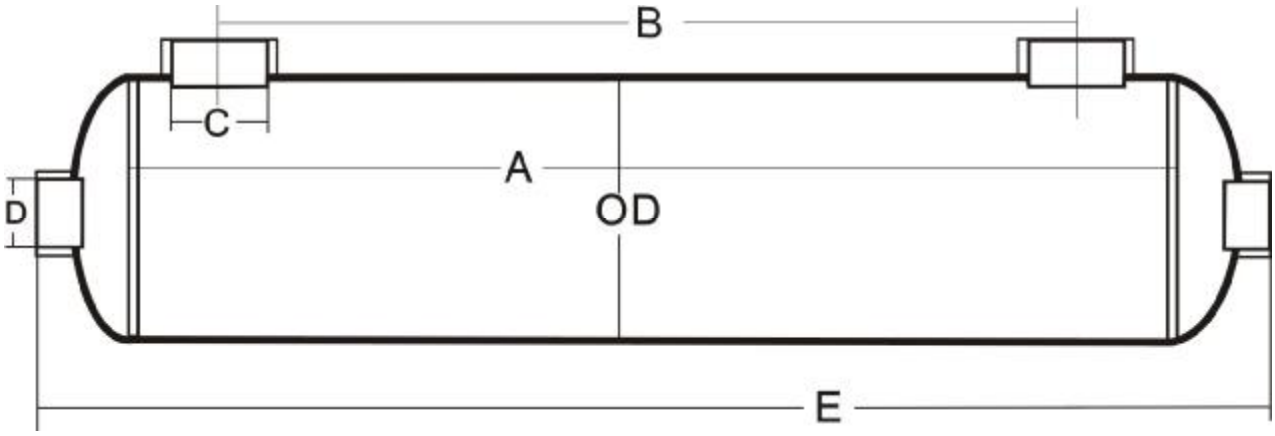
Model	A(mm)	B(mm)	C(BSP)	D(BSP)	E(mm)	Note
PK190-H	486	370	3"	3"	636	OD273mm, Bolts
PK250-H	646	530	3"	3"	796	M12 X 100X150
PK320-H	836	720	3"	3"	986	
PK400-H	1056	940	3"	3"	1206	
PK480-H	1276	1160	3"	3"	1426	
PK600-H	1606	1490	3"	3"	1756	



Operation and Maintenance of Coolers

No oil cooler manufacturer can guarantee that his products will have an indefinite life and for this reason, we suggest that the cooling system is
designed to minimise any damage caused by a leaking oil cooler.
This can be achieved as follows:
1. The oil pressure should be higher than the sea water pressure, so that in the event of a leak occurring, the oil will not be contaminated.
2. When the hydraulic system is not being used, the coolers should be isolated from sea water pressure.
3. The sea water outlet pipe from the cooler should have a free run to waste.
4. Stainless steel sea water pipes and fittings should not be used adjacent to the oil cooler.
5. Ensure maximum stated flow rates are not exceeded.

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Engine Exhausted Air to Water Intercoolers

Alfa engine exhausted air to water intercoolers are ideal for cooling marine engines as well as various land based engines such as gensets, co-generation equipment and fire pumps. They are also suitable for facilitating engine test and development programs. Additional air to water intercoolers designed for specific engines are also available; please see the website or contact the sales department for further information.

- Standard range for engines up to 650kW.
- Improve fuel efficiency and enhance engine performance by cooling turbo charged air.
- Readily available from stock through our global network of stockists.
- Available in materials suitable for cooling with fresh or salt water.

Design Parameter:

Maximum working pressure on charged air side：20bar, 25bar, 35 bar
Maximum working pressure on water side：
15 bar
Design temperature：200°C
We produce customized applications on different working pressure and temperature.

Performance details

Type	Engine Power		Charge Air Flow	Pressure Drop	Water Flow	Pressure drop	Heat Rejection
	kW	HP	Kg/min	kPa	Lit/min	kPa	kW
EC140-C	65	86	2.5	12.5	60	25.3	8
FC100-C	110	146	6.7	7.5	100	24.3	15
FG100-C	190	253	11	9.3	130	25.6	25
GL140-C	240	320	14	9.4	160	13.9	32
GK190-C	370	493	21	12.6	180	9.7	48
JK190-C	650	866	35	15.0	220	8.2	85

Note:

1. The above figures are based on Air temperature from 180°C to 50°C at 1.75 Bar G, using water temperature at 20°C.
2. Maximum Air Inlet temperature 200°C.

Specification and dimension of air to water intercoolers

	OD(mm)	A(mm)	B(mm)	C(mm)	D(BSP)	E(mm)	Mounting Bolt
EC140-C	89	396	320	50	3/4"	496	
FC100-C	108	286	210	50	1"	386	M8 X 100X
FG100-C	133	396	298	65	1 1/4"	536	76mm
GL140-C	159	396	298	65	1 1/2"	536	M12X100X15
GK190-C	200	486	366	BSP3"	2"	626	0mm
JK190-C	230	486	346	Flange 100	2 1/2"	626	

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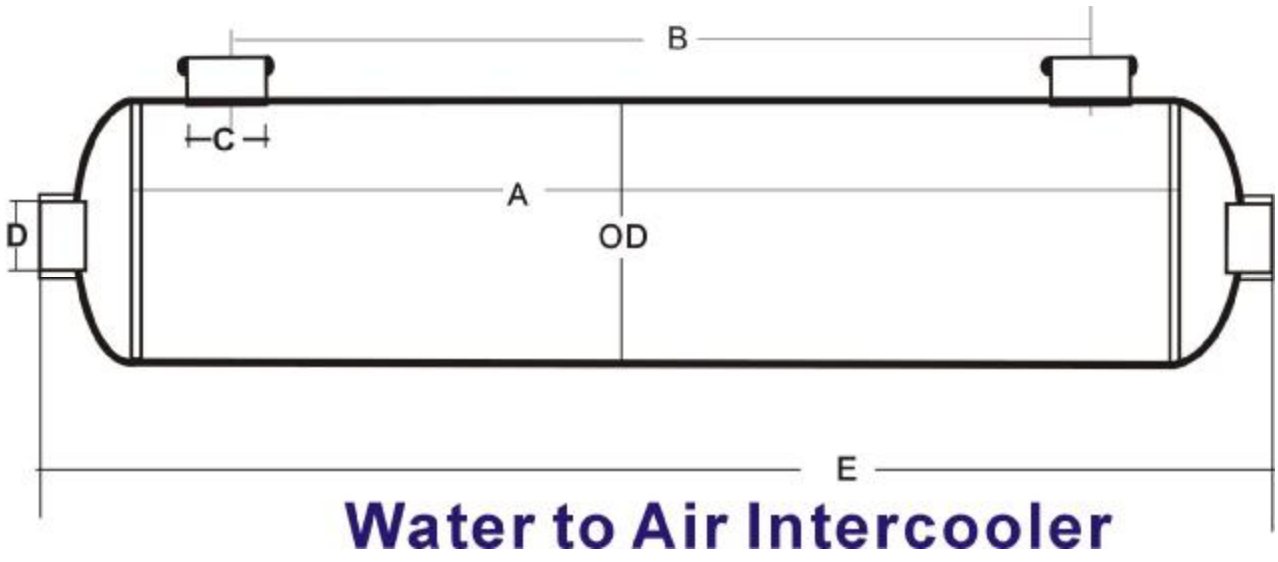

Water to Air Intercooler

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Marine Heat Exchangers

There are three methods employed for water-cooled marine petrol and diesel engines: direct, heat exchanger and keel cooling. Direct cooling of the cylinders and heads by seawater is unsatisfactory, because the engine – which was probably originally designed for radiator cooling – will run too cold and the sea-water will eventually ruin the cylinder block and heads. Keel cooling is suitable for small boats operating in shallow weedy water, but the need for pipework external to the hull is a severe limitation. Heat exchanger cooling is the most common method, the seawater being isolated in components which can be designed to withstand its corrosive affect. The closed fresh-water circuit can be thermostatically controlled so that the engine operates at its design temperature. Bowman heat exchangers are high-quality products incorporating both the best materials and the latest technical features. The tube stack is fully floating, thus minimizing thermal stresses, and it can easily be removed should cleaning be necessary. Bowman heat exchanger header tanks prevent aeration of the engine water circuit which must be designed so that the system is self-venting on initial filling. It is usual for all the components in the seawater circuit to be in series, the gearbox-oil and engine-oil coolers being on the suction side of the sea-water pump and the heat exchanger and any sea-water-cooled exhaust manifolds being on the discharge side. In the case of turbocharged engines the charge air cooler should receive the sea-water first so that the lowest possible air temperature is obtained. The sea-water outlet from the heat exchanger should be from the end cover equipped with the upper connection, this ensures that the tube stack is always full of water. The gearbox cooler size will depend on the type of transmission used, but it will usually be a size smaller than the engine-oil cooler. If preferred, the oil coolers can be fresh-water-cooled; these will need to be larger owing to the higher water temperature but need not be suitable for sea-water and can be taken from our leaflet ENGINE AND TRANSMISSION OIL COOLERS.

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A water-jacketed exhaust manifold is necessary on marine engines to reduce the temperature of the engine-room air space and the exhaust pipe. If the exhaust manifold is in the sea-water circuit it should be installed with the sea-water inlet at the back and the outlet at the front on the top to ensure that it operates completely full of sea-water. If the manifold is in the fresh-water circuit a small by-pass hole must be provided in the thermostat to ensure that some water is circulating through the manifold at ail times. A Bowman development is to combine a water jacketed exhaust manifold with the heat exchanger and header tank. This arrangement is particularly suitable for small seriesproduced engines; the manifold is cooled by fresh water and as a result a keel-cooled engine can be made by omitting the heat exchanger tube stack and the sea-water pump. On installation the fresh-water outlet from the manifold would be connected to the keel pipes and the return taken back to the engine fresh-water pump. Alternative type numbers are listed for these assemblies on pages 24/25. Heat exchanger/manifold assemblies are heavier than ordinary marine manifolds and must therefore be supported on the underside using the fixing lugs provided. When automotive engines are being converted for marine use the existing centrifugal-type pump should be retained for the fresh-water circuit and an additional pump fitted for the sea-water circuit. The sea water pipe bore should be chosen so that the velocity does not exceed 2 m/sec on the suction side and 3 m/sec on the discharge side of the pump. If the engine is being used to drive auxiliary equipment in a ship and the sea water supply is taken from the ship’s main, ensure that the recommended flow rate cannot be exceeded.

typical arrangement showing the position of the heat exchanger, sea water cooled exhaust manifold and oil coolers on a marine engine.

Design Parameter

Maximum working pressure on engine water side：15 bar
Maximum working pressure on sea water side：15 bar
Maximum working temperature：200°C
We produce customized applications on different working pressure and temperature.

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Suitable for engine brands:

We produces various oil coolers for different brands. The brands includes:

CUMMINS, Land Rover, FORD, BRITISH LEYLAND, GARDNER, GENERAL MOTORS, MITSUBISHI, NEW HOLLAND, GENESIS, PERKINS, VW, PEUGEOT, VOLVO and so on.

Also, we provided customized products for customers.

Performance data of marine oil coolers

Type	Sea water pipe (mm)	Engine Water Pipe	Engine power	
			kW	HP
DC 50	20/25	Rc 3/8" or 1/2"	30	40
DC 60	20/25	Rc 3/8" or 1/2"	40	54
DC 90	20/25	Rc 3/8" or 1/2"	60	80
DC120	20/25	Rc 3/8" or 1/2"	80	107
EC 80-E	32/40	Rc 1/2"	60	80
EC100-E	32/40	Rc 1/2" or 3/4"	90	120
EC120-E	32/40	Rc 1/2" or 3/4"	120	160
EC140-E	32/40	Rc 3/4"	150	200
FC100-E	65	Rc 1"	135	180
FC120-E	65	Rc 1"	180	240
FC140-E	65	Rc 1"	225	300
FC160-E	65	Rc 1"	270	360
FG100-E	Rc 2 1/2"	Rc 1 1/4"	225	300
FG120-E	Rc 2 1/2"	Rc 1 1/4"	270	360
FG140-E	Rc 2 1/2"	Rc 1 1/4"	360	480
GL140-E	Rc 2"	Rc 1 1/2"	360	480
GL180-E	Rc 2"	Rc 1 1/2"	450	600
GK190-E	100	Rc 2"	700	940
GK250-E	100	Rc 2"	950	1270
GK320-E	100	Rc 2"	1200	1608

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Type	Sea water pipe (mm)	Engine Water Pipe	Engine power	
			kW	HP
GL140-H	Rc 1 1/2"	Rc 2"	180	240
GL180-H	Rc 1 1/2"	Rc 2"	250	335
GL240-H	Rc 1 1/2"	Rc 2"	320	428
GK190-E	Rc 2"	Rc 2 1/2"	360	428
GK250-E	Rc 2"	Rc 2 1/2"	450	600
GK320-E	Rc 2"	Rc 2 1/2"	550	737
JK190-E	Rc 2 1/2"	80	550	737
JK250-E	Rc 2 1/2"	80	700	938
JK320-E	Rc 2 1/2"	80	850	1140
PK190-E	Rc3"	100	700	938
PK320-E	Rc3"	100	950	1273
PK350-E	Rc3"	100	1200	1608
PK400-E	Rc3"	100	1400	1876

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DC Heat Exchanger

This page describes our DC range of heat exchangers for engine cooling which are designed for use on small marine transmissions. They have the same cupro-nickel tubes as our larger EC to PK range of heat exchangers and therefore have the same long life expectancy.
The seawater connections are neoprene mouldings making them simple and easy to install and should cleaning be necessary, they can be removed using only a screwdriver. We can select by computer the appropriate oil cooler for a particular duty from the following information.

oil type or its viscosity at a specified temperature	cSt at °C
heat to be dissipated	kW
engine water flow	liter/min
engine water inlet temperature	°C
seawater temperature	°C
seawater flow	liter/min

If this information is not available, a selection can be made using the table below. In many cases we will have on file information which will enable us to select a suitable engine cooler for a particular engine and gearbox combination. Two shell connection sizes are available and three seawater pipe sizes which can be either in line or at right angles to the axis of the cooler. If preferred, the engine water coolers can be supplied without end covers for incorporating directly into the seawater pipework.

Performance data of DC Heat Exchangers

Typical examples of engine water coolers fitted to marine transmissions with an engine water inlet temperature of 80°C and a sea water temperature of 32°C.

Cooler Type	Maximum sea water flow for end cover code internal oil volume				Suitable for gearbox transmitting	
	Rc1"	Rc1 1/4"	Rc1 1/2"	Direct connector		
	Liter/min	Liter/min	Liter/min	Liter/min	kW	HP
DC 50	60	90	120	180	75	100
DC 60	60	90	120	180	120	160
DC 90	60	90	120	180	150	200
DC120	60	90	120	180	180	240

Design Parameter

Maximum working pressure on engine water side：15 bar
Maximum working pressure on sea water side：15 bar
Maximum working temperature：200°C
We produce customized applications on different working pressure and temperature.

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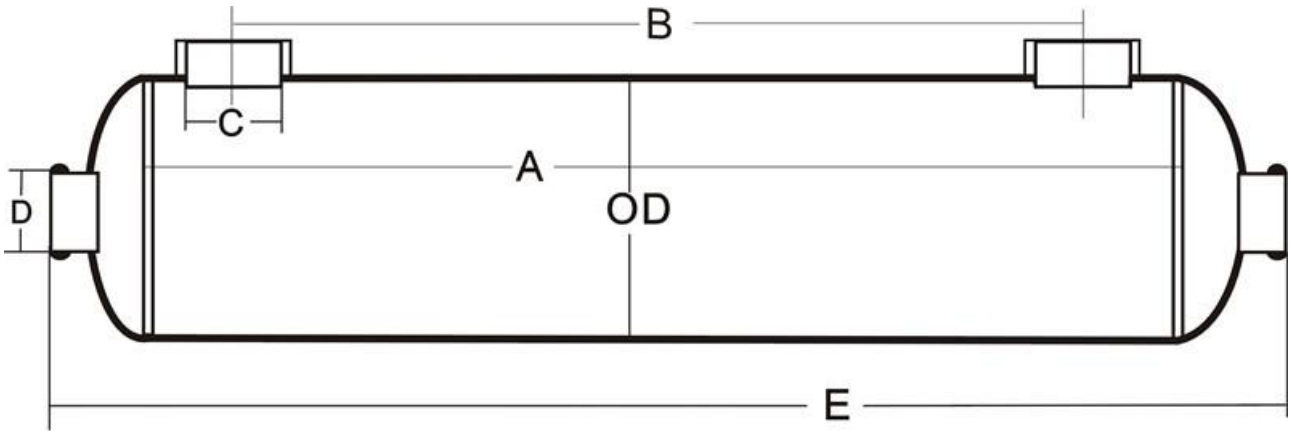
Specification and dimension of DC Heat Exchangers

	A(mm)	B(mm)	C(BSP)	D(BSP)	E(mm)	Internal oil volume(ml)	Internal water volume(ml)
DC 50	136	102	1/2" or 3/8"	1", 1 1/4" , 1 1/2"	236	80	160
DC 60	176	142	1/2" or 3/8"	1", 1 1/4" , 1 1/2"	276	105	200
DC 90	256	222	1/2" or 3/8"	1", 1 1/4" , 1 1/2"	356	160	240
DC120	356	322	1/2" or 3/8"	1", 1 1/4" , 1 1/2"	456	200	325



DC Heat Exchanger

Operation and Maintenance of DC Heat Exchangers

No oil cooler manufacturer can guarantee that his products will have an indefinite life and for this reason, we suggest that the cooling system is designed to minimise any damage caused by a leaking oil cooler.
This can be achieved as follows:

1. The oil pressure should be higher than the sea water pressure, so that in the event of a leak occurring, the oil will not be contaminated.
2. When the hydraulic system is not being used, the coolers should be isolated from sea water pressure.
3. The sea water outlet pipe from the cooler should have a free run to waste.
4. Stainless steel sea water pipes and fittings should not be used adjacent to the oil cooler.
5. Ensure maximum stated flow rates are not exceeded.

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Fuel Coolers

We have been manufacturing marine heat exchangers for many years and have built up an enviable reputation for quality and reliability. We have recently introduced our fuel cooler range to meet the requirement on modern marine diesel engines for fuel cooling.

With increasing exhaust omission regulations, manufacturers have been turning to digitally controlled high pressure common rail fuel injection systems on their engines. This generates much higher diesel fuel temperatures and flows in the return lines to the fuel tanks.

This can cause problems, particularly in marine applications where fuel tanks are in enclosed spaces with little or no air flow over them to prevent heat build up. Excessive heat build up in the fuel tanks can be dangerous and also engines using warm fuel suffer a significant power loss. To overcome these problems, our sea water cooled fuel cooler should be fitted in the low pressure return line to the fuel tank to eliminate the build up of heat. This actual amount of heat to be dissipated from the return fuel is very small. The size of fuel cooler is always the smallest one that will take the full sea water flow of the engine.

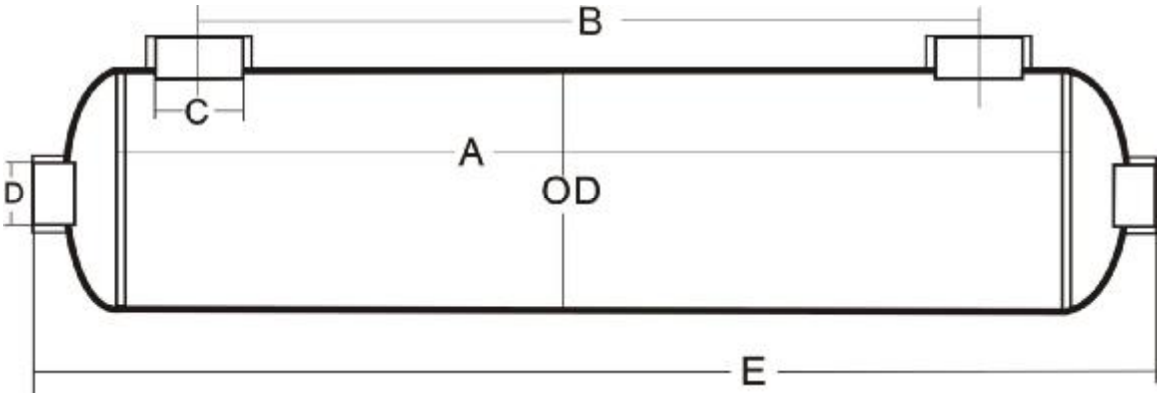
All our marine products are manufactured use stainless steel 316L or titanium tubes on the sea water side. This is a very corrosive resistant material and is suitable for use in harsh sea water environments.
Our fuel coolers are shown with their dimensions and maximum allowable sea water flow on the reverse side of the brochure.

Typical examples of oil coolers fitted to marine transmissions with an oil inlet temperature of 80°C and a sea water temperature of 32°C.

Design Parameter

Maximum working pressure on oil side：25 bar
Maximum working pressure on water side：3 bar
Design temperature：-100-125°C

Specification and dimension of oil coolers



Type	A (mm)	B (mm)	C (BSP)	D (BSP)	E (mm)	Max sea water flow L/M	Suitable for engine power	Outer diameter
DC 50	136	102	3/8"	1"	236	100	215HP/160kW	OD60mm
EC80-H	100	70	1/2"	1 1/2"	200	180	400HP/300kW	OD89mm
FC80-H	196	152	1"	2"	296	270	600HP/450kW	OD108mm
FG80-H	286	232	1 1/4"	2 1/2"	426	370	830HP/620kW	OD133mm

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After Coolers

Our after coolers will reduce the temperature of air from a compressor down to within 8C of the cooling water temperature. They should be mounted in a vertical position as shown in the picture below with a moisture separator inserted in the air-line immediately after the air outlet from the cooler. To avoid undure strain on the aftercooler long lengths of unsupported pipes should be avoided.

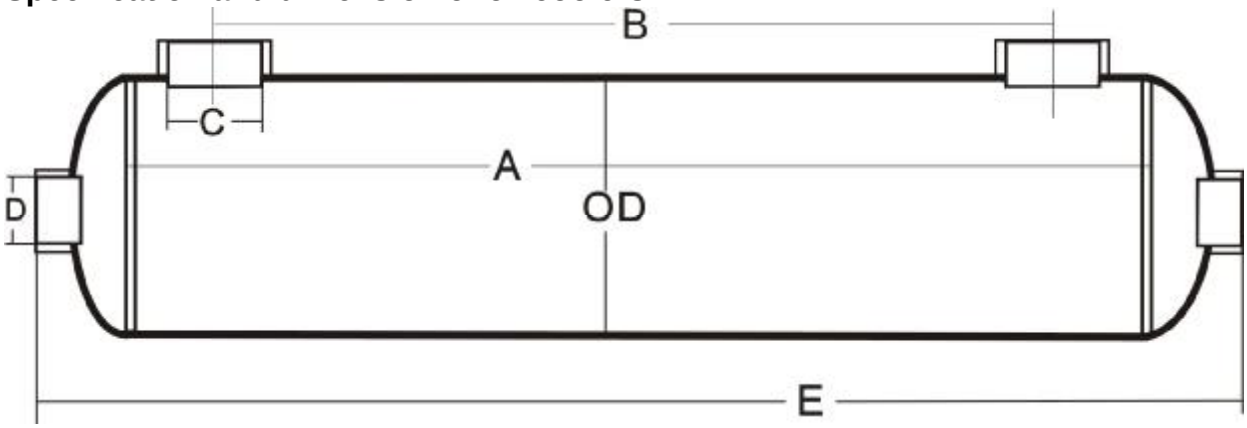
Rating details of the aftercoolers with an air inlet of 7 bar and 100C. The air outlet temperature will be 8C above the cooling water temperature.

	Air flow (m3/h)	Air pressure drop (kPa)	Cooling water flow(l/min)	Internal air volume(l)	Internal water volume(liter)
EC100-A	1.5	10	5	0.26	0.31
FC100-A	2.5	10	8	1.10	0.84
FG100-A	4.5	10	14	2.40	1.56
GL180-A	8.0	10	25	4.80	3.80
GK190-A	14.0	10	50	7.00	6.30

Design Parameter

Maximum working pressure on air side：10 bar
Maximum working pressure on water side：10 bar
Design temperature：125°C

Specification and dimension of oil coolers



Specification and dimension of after cooler

	A (mm)	B (mm)	C (mm)	D (BSP)	E (BSP)	F(mm)
EC 80-A	210	140	104	G 3/4"	G 3/4"	320
FC100-A	290	202	190	G 1"	G 1"	410
FG80-A	380	294	190	G 11/4"	G 1 1/4"	520
GL180-A	510	400	236	G 2"	G1 1/2"	650
GK190-A	510	370	236	G 2"	G 2"	670

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